MASTER OF COMPUTER APPLICATIONS - MCA
Course Structure and Scheme of Examination w.e.f 2016-17

FIRST YEAR – FIRST SEMESTER

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	No of Credits	Hours/ Week
MCA101	Fundamentals of Computers	30	70	100	4	4
MCA102	Programming with C	30	70	100	5	4
MCA103	Computer Organization	30	70	100	5	4
MCA104	Discrete Mathematical Structures	30	70	100	5	4
MCA105	Accountancy and Financial Management	30	70	100	4	4
MCA106	PC Software Lab	30	70	100	3	6
MCA107	C Programming Lab	30	70	100	3	6
MCA108	Seminar	50	--	50	1	3
	TOTAL	**260**	**490**	**750**	**30**	**35**

FIRST YEAR – SECOND SEMESTER

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	No of Credits	Hours/ Week
MCA201	Language Processors	30	70	100	4	4
MCA202	Data Base Management Systems	30	70	100	5	4
MCA203	Data Structures using C++	30	70	100	5	4
MCA204	Operating System Principles	30	70	100	5	4
MCA205	Probability & Statistics	30	70	100	4	4
MCA206	Data Structures using C++ LAB	30	70	100	3	6
MCA207	DBMS LAB	30	70	100	3	6
MCA208	Communication Skills	50	--	50	1	3
	TOTAL	**260**	**490**	**750**	**30**	**35**

SECOND YEAR – THIRD SEMESTER

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	No of Credits	Hours/ Week
MCA301	Object Oriented Programming through JAVA	30	70	100	5	4
MCA302	Computer Networks	30	70	100	5	4
MCA303	Operations Research	30	70	100	4	4
MCA304	Computer Graphics	30	70	100	5	4
MCA305	Artificial Intelligence	30	70	100	4	4
MCA306	Java Programming Lab	30	70	100	3	6
MCA307	Unix Shell Programming LAB	30	70	100	3	6
MCA308	Seminar	50	--	50	1	3
	TOTAL	**260**	**490**	**750**	**30**	**35**

SECOND YEAR – FOURTH SEMESTER

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	No of Credits	Hours/ Week
MCA401	Principles of Programming Languages	30	70	100	4	4
MCA402	Object Oriented Modeling and Design Using UML	30	70	100	5	4
MCA403	Web Technologies	30	70	100	5	4
MCA404	Software Engineering	30	70	100	5	4
MCA405.1 405.2 405.3	Grid and Cluster Computing Cryptography and Networks Security Simulation Modeling and Analysis	30	70	100	4	4
MCA406	Web Technologies Lab	30	70	100	3	6
MCA407	Visual Programming Lab	30	70	100	3	6
MCA408	Soft skills	50	--	50	1	3
	TOTAL	**260**	**490**	**750**	**30**	**35**
Non - Core		30	70	100	4	4

THIRD YEAR – FIFTH SEMESTER

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	No of Credits	Hours/ Week
MCA501	Data Mining and Big Data	30	70	100	5	4
MCA502	.Net Programming	30	70	100	5	4
MCA503	Design and Analysis of Algorithms	30	70	100	5	4
MCA504.1 504.2 504.3	Embedded Systems Mobile Computing Cloud Computing	30	70	100	4	4
MCA505.1 505.2 505.3	Image Processing Microprocessors and Interfacing Web Engineering	30	70	100	4	4
MCA 506	.Net Programming Lab	30	70	100	3	6
MCA 507	Data Mining And Hadoop Lab	30	70	100	3	6
MCA 508	Seminar	50	--	50	1	3
TOTAL		**260**	**490**	**750**	**30**	**35**
Non - Core		30	70	100	4	4

THIRD YEAR - SIXTH SEMESTER

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	No of Credits	Hours/ Week
MCA601	Project Work	--	150	150	10	Five Months Duration

TOTAL MARKS FOR THE MCA COURSE : 3900

TOTAL CREDITS FOR THE MCA COURSE : 160

I SEMESTER

MCA 101: INFORMATION TECHNOLOGY

Unit – I

Business and information technology
Business in the information age: Pressures and responses, why you need to know about Information Technology, what is an Information System?

Information technologies in the modern organization
Basic concepts of information systems organizations: Structure and IT support, IT support at different organizational levels, managing Information Technology in organizations, IT people and careers.

Unit –II

Computer hardware: The significance of hardware, the central processing unit, computer memory, computer hierarchy, input technologies, output technologies

Computer software: Software history and significance, system software, application software, software issues, programming languages, enterprise software

Managing organizational data and information: Basics of data arrangement and access, the traditional file environment, Databases – The modern approach, database management system, logical data models, data warehouses

Unit – III

Telecommunications and networks: The Telecommunications system, networks, network communication software, network processing strategies, Telecommunication applications

The Internet, Intranets and Extranets: What exactly is the Internet?, the evolution of the Internet, the operation of the Internet, services provided by the Internet, the World Wide Web, Internet Challenges, Intranets, Extranets, Enterprise information protocols, The Mobile Internet

Unit – IV

Functional, Enterprise, and Inter Organizational Systems: Information Systems to support business functions, transaction processing. Information systems, accounting and finance systems, marketing and sales systems, production and operations management systems, human resources management systems, integrated information systems and enterprise resource planning, inter organizational /global information systems

Electronic Commerce: Overview of E – commerce, business – to – consumer applications, market research, advertising, and consumer service, business – to – business collaborative commerce applications, innovative applications of E – commerce, infrastructure and E – commerce support service

Computer based supply chain management and information systems integration: Supply chain and their management, supply chain problems and solutions, IT supply chain support and systems integration

Data, Knowledge, and Decision support: Management and decision making, data transformation and management, decision support systems

Prescribed Book:

EFRAIM Turban, R. Kelly Rainer, Richard E. Potter, "**Introduction to Information Technology**" , john wiley (2008), chapters 1 to 9, 10.1, 10.2, 10.3 and 11.1, 11.2, 11.3.

Reference Books:

1. ITL Education Solutions Ltd., "Introduction to Information Technology", Pearson India (2008).
2. Deborah Morley, Charless S. Parker, "Understanding Computers Today and Tomorrow, 11th edition, Thomson (2007).
3. Aksoy, DeNardis, "Introduction to Information Technology", Cengage Learning (2008).
4. Ajoy Kumar Ray, Tinku Acharya, "Information Technology", PHI.

Model Paper

MCA 101: Information Technology

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1.

(a)Briefly explain the difference between data, information and knowledge.

(b)What is an operating system? How does it differ with other system software?

(c)What are the characteristics of Multimedia technology?

(d)What is network?

(e)Differentiate between the Intranet and the Extranet.

(f)What do you mean by 'Global Information System'?

(g)Define E – commerce and distinguish it from E – business.

Unit - I

2.(a)Explain how the business pressures can be alleviated using Information Technology.

(b)Explain the structure of organization.

(or)

3.(a)Enumerate the different organizational responses with respect to Information Technology.

(b)Explain the following.

(i) Transaction processing system.

(ii) Management information system.

Unit –II

4.(a)How is information stored and accessed in computer's memory? Explain the types of memory available and compare the efficiency of storing information on each of these devices.

(b)Briefly explain the issues associated with computer software.

(or)

5.(a)Discuss various levels of computer languages namely Machine language, Assembly language and High level language.

(b)What are the disadvantages with the traditional file system approaches? Explain.

Unit –III

6.(a)Discuss about various types of transmission medium used for telecommunications.

(b)What are different Internet applications and services.

(or)

7.(a)What is a network topology? And what are the different types of network topologies?

(b) Explain the following terms.
(i) Internet
(ii) URL
(iii)WWW
(iv) HTTP

Unit – IV

8.(a)Discuss various activities of the HRM department.
(b)Define supply chain and describe the components of a supply.

(or)

9.(a)Explain the various types of E – commerce.
(b)Explain the two phases of management decision making.

MCA 102: PROGRAMMING WITH C

Unit-I

Introductory Concepts: Types of Programming Languages, Introduction to C, Desirable Program Characteristics

Introduction to C Programming: The C Character Set, Writing First Program of C, Identifiers and Keywords, Data types, Constants, Variables and Arrays, Declarations, Expressions Statements, Symbolic Constants

Operators and Expressions: Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, The Conditional Operator, Library Functions.

Data Input and Output: Preliminaries, Single Character Input-The Getchar Function, Single Character Output – The Putchar Function, Enter Input Data – The Scanf Function, More About the Scanf Function, Writing Output Data – The Printf Function, More About the Printf Function, The Gets and Puts Functions

Preparing and Running A Complete C Program: Planning a C Program, Writing a C Program, Error Diagnostics, Debugging Techniques

Unit-II

Control Statements: Preliminaries, Branching: The IF-ELSE Statement, Looping: The while Statement, More Looping: The do-while Statement, Still More Looping: The for Statement, Nested Control Structures, The Switch Statement, The break Statement, The continue Statement, The comma Statement, The goto Statement.

Functions: A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Passing Arguments to a Function, Recursion

Program Structure: Storage Classes, Automatic Variables, External (Global) Variables, Static Variables.

Unit-III

Arrays: Defining an Array, Processing an Array, Passing Arrays to Functions, Multidimensional Arrays, Arrays and Strings

Pointers: Fundamentals, Pointer Declarations, Passing Pointers to a Function, Pointers and One-dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers, Passing Functions to Other Functions

Structures and Unions: Defining a Structure, Processing a Structure, User-defined Data Types (Typedef), Structure and Pointers, Passing Structures to Functions, Self-referential Structures, Unions

Data Files: Why Files, Opening and Closing a Data File, Reading and Writing a Data File, Processing a Data File, Unformatted Data Files, Concept of Binary Files

Unit-IV

Low-Level Programming: Register Variables, Bitwise Operations, Bit Fields

Some Additional Features of C: Enumerations, Command Line Parameters, More About Library Functions, Macros, The C Processor

Appendix H Library Functions

Prescribed Book:

Byron S Gottfriend, "Programming with C", Second Edition, Schaum Out Lines, TATA Mc Graw Hill (2007)

Chapters: 1.8 to 1.10, 2,3,4,5,6,7,8.1 to 8.4,9,
10.1 to 10.9,11,12,13,14 and Appendix H

Reference Book:

1. Behrouy A. Foreuyan & Richard F. Gilberg, "Computer Science A structured programming Approach using C", Third Edition, Cengage Learning (2008).

2. Herbert Schildt, "The Complete Reference C", Fourth Edition, TMH (2008)

3. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education (2008)

4. Mullish Cooper, "The Spirit of C – An Introduction to Moderen Programming", Jaico Books (2006)

Model Paper

MCA 102: Programming in 'C'

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1.

(a)Importance of storage class.
(b)What is the purpose of typedef.
(c)Define type casting.
(d)Difference between macro and procedure.
(e)What is the difference between array of characters and a string.
(f)Why 'C' is called middle level language.
(g)How pointers are used to access structure elements.

Unit – I

2.(a)Explain with suitable examples different data types in 'C'.
(b)Briefly explain different operators in 'C'.

(or)

3.(a)With suitable examples explain structure of 'C' program.
(b)Explain gets() and puts() with examples.

Unit –II

4.(a)Explain loop structures in 'C'.
(b)Write a program for sum of digits of a number and no.of digits in a number.

(or)

5.(a)Write about different storage classes in 'C'.
(b)Write a program to pass n arguments to a function and return average of n values.

Unit –III

6.(a)Explain declaration, accessing and processing of two dimensional arrays in 'C'.
(b)Write a program to sort strings using pointers.

(or)

7. What is a pointer ? How pointers are useful in self referential structures ? What are the advantages of pointers?

Unit – IV

8.(a)Explain File processing in 'C'.
(b)Write a program to update a record in a file.

(or)

9.(a)With examples explain different pre-processor directives.
(b)Write a program to calculate no.of vowels, words in a given text.

MCA 103: COMPUTER ORGANIZATION

Unit-I

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.

Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.

Data Representation: Data Types, Complements, Fixed Point Representation, Floating Point Representation, Other Binary Codes, error Detection Codes.
(Chapters:)

Unit-II

Register Transfer and Microoperations: Register Transfer Languages, Register Transfer, Bus and Memory Transfer, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupt.
(Chapters:

Unit-III

Microprogrammed Control: Control Memory, Address Sequencing, Micro Program Example, Design of Control Unit.

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Format, Addressing Modes, Data Transfer and Manipulation, Program Control.
(Chapters:

Unit-IV

Computer Arithmetic: Addition, Subtraction, Multiplication, Division Algorithms, Floating Point Arithmetic Operations.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory.
(Chapters:

Prescribed Book:

M.Morris Mano, “Computer System Architecture”, 3rd Edition, Pearson Education (2008).

Chapters : 1,2,3, 4, 5.1 to 5.7, 7, 8.1 to 8.7, 10.2 to 10.5, 11.1 to 11.5, 12.1 to 12.5

Reference Books:

1. V. Rajaraman, T. Radha Krishnan, “Computer Organization and Architecture”, PHI

2. Behrooz Parhami, “Computer Architecture”, Oxford (2007)

3. ISRD group, “Computer Organization”, ace series, TMH (2007)

4. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Pearson Education (2005)

5. P.Chakraborty, “Computer Architecture and Organization”, Jaico Books (2008)

Model Paper

MCA 103: Computer Organization

Time: 3hours **Maximum: 70 Marks.**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a) Universal Logic gate.
   b) Tristate Buffer.
   c) Interrupt Cycle.
   d) RISC Characteristics.
   b) Associative Memory.
   c) Perform (67) – (42) in binary using $2^{'s}$ complement method.
   d) Instruction Format.
   e) Floating point representation.

UNIT-I

2. a) Simplify the following Boolean functions using K-maps and draw the relevant logic diagram.

   $f(abcd) = \Sigma m(0,3,7,8,9,11,12,13) + \Sigma d(1,4,14,15)$

   b) Explain the operation of Full– Adder circuit.

(or)

3. a) Design a 4-bit Synchronous counter using T-Flip Flops.
   b) Explain the Operation of Bidirectional Shift Register.

UNIT-II

4. a) Explain about Instruction cycle in detail.
   b) Explain various Memory reference instructions.

(or)

5. a) Explain any one stage of arithmetic logic shift unit.
   b) What are various logic micro operations and their implementation?

UNIT-III

6.a) Explain different addressing modes with an example.
  b) What is an interrupt ? Explain various types of interrupts.

(or)

7.a) What is Control memory ? Explain address sequencing with suitable diagram.

b) Prepare 3-address, 2-address, 1-address, 0-address instructions to solve the following statement.

$$X = \frac{(A+B)(C+D)}{(A+C)}$$

UNIT-IV

8.a) Explain Booth multiplication Algorithm with an example.
  b) Explain memory mapped I/O and Isolated I/O.

(or)

9.a) What is Locality of reference? Explain various organizations of Cache memory.
  b) What is an I/O Interface? Explain DMA data transfer in detail.

MCA 104: DISCRETE MATHEMATICAL STRUCTURES

UNIT-I:

The Foundations: Logic and Proofs: Propositional Logic – Propositional Equivalences – Predicates and Quantifiers – Nested Quantifiers – Rules of Inference – Introduction to Proofs – Proof Methods and Strategy

Basic Structures: Sets, Functions, Sequences and Sums: Sets – Set Operations – Functions – Sequences and Summations

The Fundamentals : Algorithms , The Integers and Matrices: Algorithms – The Growth of Functions – Complexity of Algorithms – The Integers And Divisions – Primes and Greatest Common Divisors – Integers and Algorithms – Applications of Number Theory – Matrices

Introduction and Recursion : Mathematical Induction – Strong Induction and Well-Ordering – Recursive Definitions and Structural Induction – Recursive Algorithms – Program Correctness

UNIT-II:

Counting: The Basics of Counting – The Pigeon Hole Principle – Permutations and Combinations – Binomial Coefficients – Generalized Permutations and Combinations – Generating Permutations and Combinations

Advanced Counting Techniques: Recurrence Relations – Solving Linear Recurrence Relations – Divide and Conquer Algorithms and Recurrence Relations – Generating Functions – Inclusion – Exclusion – Applications of Inclusion & Exclusion

UNIT-III:

Relations : Relations and Their Properties – n-ary Relations and Their Applications – Representing Relations – Closures of Relations – Equivalence Relations – Partial Orderings

Graphs: Graphs and Graph Models – Graph Terminology and Special Types of Graphs – Representing Graphs and Graph Isomorphism's – Connectivity – Euler and Hamilton Paths – Shortest Path Problems – Planar Graphs - Graph Coloring

UNIT-IV:

Trees: Introduction to Trees – Applications of Trees – Tree Traversal – Spanning Trees – Minimum Spanning Trees

Boolean Algebra: Boolean Functions – Representing Boolean Functions – Logic Gates – Minimization of Circuits

Prescribed Book:

Kenneth H Rosen, “Discrete Mathematics & its Applications”, 6th Edition, McGraw-Hill (2007)

Chapters : 1 to 10

Reference Books:

1. Ralph P. Grimaldi, B.V. Ramana, “Discrete and Combinational Mathematics”, 5th Edition, Pearson Education (2008).

2. Swapan Kumar Sarkar, “A Text Book of Discrete Mathematics”, S.Chand (2008).

3. D.S.Malik and M.K.Sen, “Discrete Mathematical Structures”, Thomson (2006).

Model Paper

MCA 104: Discrete Mathematical Structures

Time: 3hours	**Maximum: 70 M.**
Answer Question No.1 Compulsory:	**7 x 2 = 14 M**
Answer ONE Question from each unit:	**4 x 14 = 56 M**

1. (a) Find the truth table of the proposition $(p \rightarrow q) \vee (\sim p \rightarrow r)$ is p and r are true and q is false.

   (b) Find the inverse of $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 3 & 0 \\ 0 & 1 & 2 \end{bmatrix}$

   (c) Express the integer 325 as a product of powers of primes.

   (d) How many ways are there to seat 8 boys and 8 girls around a circular table.

   (e) Define equivalence relation with example.

   (f) Define an Euler circuit in a graph.

   (g) Write Warshalls Algorithm.

   (h) State the generalized Pigeon hole principle.

UNIT-I

2. (a) Verify whether the following is a tautology by using truth table. $\{(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R)\} \rightarrow R$.

   (b) Let $f:A \rightarrow B$ be a function then f^{-1} is a function from B to A iff f is 1 – 1.

(or)

3. (a) Find LCM and GCD of 540 and 504.

   (b) Show that if we select 151 distinct computer science courses numbered between 1 and 300 inclusive at least two are consecutively numbered.

UNIT-II

4. (a) Show that if any five numbers from 1 to 8 are choosen then two of them will add to 9.

   (b) If n is a +ve integer Prove that $C(n,0)+C(n,2)+\ldots\ldots=C(n,1)+C(n,3)\ldots\ldots\ldots\ldots = 2^{n-1}$.

(or)

5. (a) Solve the following recurrence relation $a_n=4a_{n-1}+5a_{n-2}$ $a_1=2$, $a_2=6$.

   (b) Find a generating function for a_r=the no.of ways of distributing r similar balls in to n numbered boxes where each box is non empty.

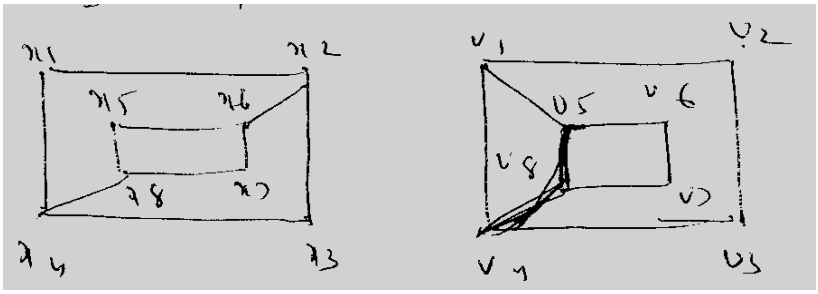
UNIT-III

6. (a) i) Define irreflexive relation give an example.
ii) Determine whether the following relation R on a set A is reflexive, irreflexive, symmetric asymmetric, Antisymmetric or transitive $A=Z^+$ $aRb \Leftrightarrow a=b^k$ for some $K \in Z^+$.

(b) Let A = {1,2,3,4}
R={(1,2) (2,3) (3,4) (2,1)} Find the transitive closure of K.

(or)

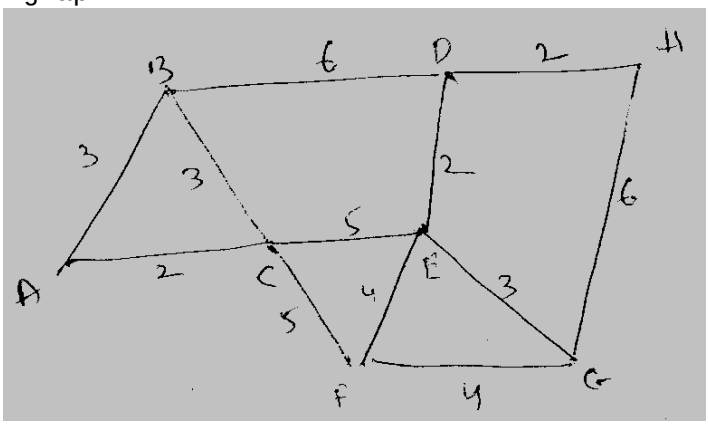
7. (a) Check whether the following graphs are Isomorphic or not.



(b) Show that the sum of all vertex degree is equal to twice the number of edges.

UNIT-IV

8. (a) Show a tree with n vertices has exactly n-1 edges.
(b) Use primes algorithm to find minimal spanning tree for a connected graph.



9.(a) Use K-map for the expression to find a minimal sum of products $f(a,b,c) = \Sigma\ (0,1,4,6)$.

(b) Use Quine – mcclusky to find minimal expression for $f(a,b,c) = \Sigma\ (0,2,3,7)$

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MCA 105: ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I:

Cost Accounting

1.1 Accounting concepts

1.2 Double entry system

1.3 Journal-ledger, trial balance, preparation of final accounts (problems)

1.4 Nature of financial statement-preparation of trading-profit and loss accounts-balance sheet of joint stock companies

UNIT II:

Cost Accounting

1.1 cost sheet

1.2 marginal costing (problems)

1.3 budget and budgetary control

1.4 standard costing (Problems)

UNIT III:

Financial Management

3.1 nature and scope of finance function-goals of financial management-modern concept of finance function.

3.2 Nature of financial decisions: concept-major financial decision areas-investment decision-financing decision and dividend decision.

3.3 Financial analysis: concept of financial analysis-types of analysis-tables of analysis-ratio analysis-tables of analysis-funds flow and cash flow analysis (Problems)

UNIT IV:

Working capital management

4.1 concepts of working capital-importance of working capital-components of working capital-determination of working capital-source of working capital.

4.2 Inventory management-accounts of receivable management-cash management

4.3 Forecasting of working capital management

Prescribed Book:

K.Rajeswara Rao & G.Prasad, Accounting and finanace, Jaibharath publishers, 2002 (Chapters 1 to 19)

Reference Books:

1. Vanherne & James C, John M.Wachewiez J.R., Fundamentals of Financial management, PHI, 2002

2. Horngren, Sundem Blliott, Introduction to financial accounting, pearson education, 2002

3. Ambrish Gupta, “Financial Accounting for Management”, Third Edition, Pearson Education (2009)

4. Paresh Shah, “Basic Financial Accounting for Management”, Oxford Higher Education (2008)

Model Paper

MCA 105: Accounting and Financial Management

Time: 3hours **Maximum: 70 M**

Answer question No.1 Compulsorily (7 x 2 = 14M)
Answer ONE question from each unit. (4 x 14 = 56M)

1.
a) State the different parties interested in accounting information and briefly mention the uses to them.
b) What is Process Costing ?
c) Net present value.
d) What is B.E.P ?
e) Uses of cash flow analysis.
f) Significance of 'Ratio Analysis'.
g) Funds flow analysis.

UNIT – I

2. From the following Trial Balance prepare Trading and Profit and Loss Account for the year ended 31st March 2008.

Particulars	Debit	Credit
	Rs.	Rs.
Opening Stock	51,000	---
Capital	---	72,000
Purchases	2,50,000	---
Sales	---	4,00,000
Carriage inwards	12,000	
Wages	50,000	
Salaries	26,000	
Commission	3,000	
Bad debts	2,000	
Insurance	4,000	
Rent, Rates and Taxes	12,000	
Postage and Telegram	2,800	
Carriage outwards	7,700	
Machinery	40,000	
Furniture	5,000	
Debtors	60,000	
Creditors	---	53,500
	5,25,500	5,25,500

Additional information :
(i) Stock on 31-3-2007 was Rs.60,000.
(ii) Depreciation on furniture is charged at 10%.
(iii) Out standing salaries Rs.4,000.
(iv) Bad debts Rs.1,000.
(v) Reserve for doubtful debts @ 5% on debtors.

(or)

3. How do you classify the accounts. Explain the rules of accounts.

UNIT – II

4. From the following particulars you are required to Calculate
i) P/V Ratio ii) BEP for sales iii) Sales required to earn a profit Rs.40,000. (iv) Margin of safty in second year.

Year	Sales Rs.	Profit Rs.
2006	2,40,000	18,000
2007	2,80,000	26,000

(or)

5.Define the terms 'Budget and budgetary control'. Write Main objectives of budgetary control system.

UNIT-III

6. Define Finance function. What are the functions of a financial Manager? Explain.

(or)

7. From the following information prepare a statement of Balance Sheet.
Current Ratio 2.5, Liquidity ratio 1.5
Proprietary ratio 0.75 (Fixed assets / Proprietary fund)
Working Capital Rs.60,000.
Reserves and surplus : Rs.40,000
There is no long term loan.

UNIT-IV

8. Define working capital concepts. What are the determinants of working capital of a manufacturing company ?

(or)

9. Explain the concept of working capital. What are the various sources of working capital? Give examples for long term sources and short term sources of working capital.

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MCA 106: PC SOFTWARE LAB

MS-WORD

1. Design an Invitation to invite Staff, students to a seminar on "Emerging Trends in Computers".

2. Assignment using Mail merge.

3. Creation of Bio-Data: consisting Name, email-id, Contact Address, Carrier Objective, Educational qualifications, social activities, achievements.

4. Assignment to implement macro operations.

MS-POWERPOINT

1. Make a Power point presentation on your carrier planning.
2. Make a Power point presentation on any Current affair.
3. Make a Power point presentation to represent a Software Company Profile.
4. Make a Power point presentation about things you learned during student life.

MS-ACCESS

1. Create a database using MS-ACCESS with at least 5 records
TABLE1 STRUCTURE:
EMPLOYEE NUMBER NAME DOB GENDER DEPARTMENT

TABLE2 STRUCTURE:
EMPLOYEE NUMBER BASIC HRA DA DEDUCTIONS GROSS SALARY

Maintain the relationship between two tables with REGISTER NUMBER as a Primary Key and answer the following quarries:

Show the list of Employees with the following fields as one query

EMPLOYEE NUMBER NAME GENDER GROSS SALARY

2. Maintain the relationship between above two tables with EMPLOYEE NUMBER as a Primary Key and generate following reports:
Report 1 : EMPLOYEE NUMBER, NAME, BASIC HRA DA DEDUCTIONS

Report 2 : EMPLOYEE NUMBER, DEPARTMENT, NET SALARY.

Use forms to enter data in to tables

3. Create a table and form with following fields
Book Number, Book Name, Author, Publisher, Price
Generate the report with following fields
All Books with price between Rs.500 and Rs.1000

MS-EXCEL

1. Create an electronic spreadsheet to convert
   a. Decimal Numbers to Hexa decimal, Octal, Binary
   b. Binary to Decimal, Octal, Hexadecimal
   c. Hexadecimal to Decimal, Octal, Binary

2. The Cement Company shows the sales of different products for 5 years. Create column chart, Pie Chart and Bar chart for the following data

YEAR	PRODUCT-1	PRODUCT-2	PRODUCT-3	PRODUCT-4
2004	1000	800	900	1000
2005	800	80	500	900
2006	1200	190	400	800
2007	400	200	300	1000
2008	1800	400	400	1200

3. Demonstrate Hyper Linking in Excel.

MCA 107 : C PROGRAMMING LAB

1. Program to calculate compound interest.
2. Program to calculate roots of a quadratic equation.
3. Program to average of ‘n’ numbers.
4. Program to find wheather the given number is
   (i) Prime number or not (ii) Perfect number or not
   (iii) Armstrong number or not (iv) Palindrome or not
5. Program to demonstrate function calling multiple times.
6. Program to read two integers and print the quotient and remainder of the first number divided by the second number.
7. Program to get the following output.
   Row 1 : 1 2 3 4 5
   Row 2 : 1 2 3 4 5
   Row 3 : 1 2 3 4 5
8. Program for sum of digits of an integer number.
9. Program for following using Recursion
   (i) Factorial of a number
   (ii) Fibonacci series
10. Program to write records in to a file.
11. Program to read records from a file sequentially.
12. Program to search a record in a file.
13. Program to update a record in a file.
14. Program to delete a record in a file.
15. Program to calculate average of n no’s in an array.
16. Program for addition of matrix.
17. Program for multiplication of matrix.
18. Program for sorting an array.
19. Program for row and column total of a two dimensional array.
20. Program to sort strings using pointers.
21. Program to calculate
    (i) No.of lines (ii) No.of words
    (iii) No.of special characters.
22. Program to demonstrate string palindrome.
23. Program to demonstrate union in structure.
24. Program for (i) String Comparison (ii) String Copy
25. Program to demonstrate call by value and call by reference.
26. Program to calculate area of a Hall using macros.
27. Program to calculate no.of vowels, words in a text.

MCA 108: SEMINAR

II SEMESTER

MCA 201: LANGUAGE PROCESSORS

Unit-I

Language Processors: Introduction – Language processing activities – Fundamentals of language processing – Fundamentals of language specification – Language processor development tools.0

Data Structures for language processing: Search data structures, Allocation data structures.

Unit–II

Scanning and parsing: Scanning – Parsing

Assemblers: Elements of assembly language programming – A simple assembly scheme – Pass structure of assemblers – Design of a two pass assembler – A single pass assembler for IBM PC.

Unit–III

Macros and Macro processors: Macro definition and call – Macro expansion – Nested macro calls – Advanced Macro facilities – Design of a macro preprocessor.

Compliers and Interpreters: Aspects of compilation – Memory allocation – compilation of expressions – compilation of control structures – code optimization – Interpreters.

Unit-IV

Linkers: Relocation and linking concepts – Design of a linker, self relocating programs – A linker for MS DOS – Linker for overlays – loaders.

Software tools: Software tools for program development – Editors – Debug monitors – Programming environments – User Interfaces.

Prescribed Book: D.M. Dhamdhere, “Systems programming and Operating systems”, 2nd revised edition, TMH (2008).

Chapters : 1 through 8

Model Paper

MCA 201: Language Processor

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

I.

a) Construct a parse tree for the expression a : = b+i.
b) Define binding.
c) Write generic search procedure to search for an element 'S'.
d) What is reduction ?
e) Write an assembly language problem to find the biggest of 2Nos.
f) Define semantic gap.
g) Pure vs impure interpreters.

UNIT - I

2. a) Discuss different passes and phases of a language processor.
   b) Explain in brief different allocation data structures.

(or)

3. a) Discuss various collision handling methods.
   b) Define language processor development tools. Explain LEX.

UNIT – II

4. a) Define DFA. Construct DFA for recogniting identifiers, unsigned integers & real nos with fractions.
   b) Explain Pass I of an assembler.

(or)

5. a) Explain the features of assembly language.
   b) Write about top down parsing with out back tracking.

UNIT – III

6. a) Explain different data structures needed to design a macro preprocessor.
   b) Discuss different parameter passing mechanism.

(or)

7. a) Write the procedure to access non-local variables.
   b) Discuss expansion time variables.

UNIT - IV

8. a) Explain the generation of intermediate codes for expressions.
   b) Write an algorithm for performing relocation.

(or)

9. a) Explain : Dead code elimination, frequency reduction and strength reduction.
   b) Briefly explain different object record formats.

MCA 202: DATABASE MANAGEMENT SYSTEMS

Unit–I

Databases and Database Users: Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the scene, Advantages of the using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas and Instances, Three Schema architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architecture for DBMS, Classification of Database Management Systems.

Disk Storage, Basic File Structures and Hashing: Introduction, Secondary Storage Devices, Buffering of Blocks, Placing file Records on Disk, Operations on Files, Files of Unordered Records, Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access using RAID Technology.

Indexing Structures for Files: Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B^+ Trees, Indexes on Multiple Keys, Other Types of Indexes.

Data Modeling Using the ER Model: Conceptual Data models, Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship sets, roles and structural Constraints, Weak Entity types, Relationship Types of Degree Higher than Two, Refining the ER Design for the COMPANY Database.

The Enhanced Entity-Relationship Model: Sub classes, Super classes and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization Hierarchies, Modeling of Union Types using Categories, An Example University ERR Schema, Design Choices and Formal Definitions.

Unit-II

The Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations.

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples, The Tuple Calculus and Domain Calculus.

SQL-99: Schema Definition, Constraints, Queries and Views: SQL Data Definitions and Data Types, Specifying Constraints in SQL, Schema Change Statements on SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE statements in SQL, Triggers and Views.

Unit-III

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas, Functional dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

Relational Database Design Algorithms and Further Dependencies: Properties of Relational Decompositions, Algorithms fro Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies, Other Dependencies and Normal Forms.

Unit-IV

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing schedules Based on Serializability.

Concurrency Control Techniques: Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency control techniques, Validation concurrency control Techniques, Granularity of Data Items and multiple Granularity Locking.

Distributed Databases and Client Server Architectures: Distributed Database Concepts, Data Fragmentation, Replication, and allocation Techniques for Distributed Database Design, Types of Distributed Database Systems, An Overview if 3 Tier Client Server Architecture.

Prescribed Text :

Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education (2007)

Chapters: 1.1 to 1.6, 2, 13.1 to 13.10, 14, 3.1 to 3.6, 3.9, 4.1 to 4.5, 5, 6, 8, 10, 11, 17, 18.1 to 18.5, 25.1 to 25.3, 25.6

Reference Books :

1. Peter Rob, Carlos Coronel, “Database Systems” – Design, Implementation and Management, Eigth Edition, Thomson (2008).

2. C.J. Date, A.Kannan, S. Swamynathan, “An Introduction to Database Systems”, VII Edition Pearson Education (2006).

3. Raman A Mata – Toledo, Panline K. Cushman, “Database Management Systems”, Schaum’s Outlines, TMH (2007).

4. Steven Feuerstein, “Oracle PL/SQL – Programming”, 10th Anniversary Edition, OREILLY (2008).

Model Paper

MCA 202: Database Management Systems

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Discuss about Security Management in DBMS.
b) What is failure? Mention different causes for failure of a transaction?
c) What is Entity? Give Examples for Entity types.
d) What is closure set of functional dependencies?
e) What is the use for Trigger? Give any two advantages of Triggers.
f) What are the pros and cons of distributed database over centralized databases?
g) What is Data Fragmentation?
h) What is partitioned Hashing?

Unit-I

2.a) Discuss about three level architecture with representation of data in each level.
b) Discuss about levels of RAID.

(or)

3.a) Compare and Construct the indexing of data by using B and B^+ Trees.
b) Discuss about Data Independency with an example.

Unit-II

4.a) Discuss about Arithmetic functions in SQL with example?
b) Express the following statements in terms of Relational Algebra

i. Fetch the Department Numbers consisting of more than three employees.
ii. Fetch the Employee aggregated salary for a department.

(or)

5.a) Discuss about Views and its Limitations?
b) What is Index? Create an index for the employees belongs to the Accounts and Sales departments.

Unit-III

6.a) What is Functional Dependency? Explain the role of FD's in construction of Relational Schema.
b) Can I say that BCNF is equivalent Normal Form for III NF, Justify?

(or)

7.a) What is Non-Loss Dependency? Explain with an example.
b) Discuss the following
i. II NF
ii. Multi-valued Dependency.

Unit-IV

8.a) What is Lock? Discuss about Shared and Exclusive Locking Process
  b) Discuss about
     i. Two-Phase Locking
     ii. Time-Stamping Algorithm

(or)

9.a) What is Dirty-Read Problem? Explain with an Example.
  b) What is serializability? Discuss with aid of an example to test the conflicts in serializability?

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MCA 203 : DATA STRUCTURES USING C++

Unit – I

Software Engineering Principles and C++ Classes : Classes: Variable - Accessing Class members – Operators – Functions and Classes – Reference parameters and Class Objects – Implementation of member function – Constructors – Destructors ; Data Abstraction, Classes and ADT – Information Hiding.

Pointers and Array based Lists : Pointer Data types and Pointer variables: Declaring Pointer Variables – Address of Operator – Dereferencing Operator - Classes, Structures and Pointer Variables – Initializing Pointer Variables – Dynamic Variables – Operators on Pointer Variables.

Unit – II

Linked Lists : Linked List – Properties – Item Insertion and Deletion – Building a Linked List – Linked List as an ADT – Ordered Linked Lists – Doubly Linked Lists – Linked Lists with header and trailer nodes – Circular Linked Lists.

Recursion : Recursive Definitions – Problem solving using recursion – Recursion or iteration - Recursion and Backtracking : n- Queens Puzzle.

Search Algorithms : Search Algorithms: Sequential – Binary search – Performance of binary search – insertion into ordered list; Hashing : Hash functions – Collision Resolution – Hashing : Implementation using Quadratic Probing – Collision Resolution : Chaining.

Unit – III

Stacks : Stack operations – Implementation of stacks as arrays – Linked implementation of stacks – Application of stacks.

Queues : Queues : Queue operations – Implementation of Queues as arrays ; Linked implementation of Queues ; Priority Queue ; Application of Queues.

Sorting Algorithms : Selection Sort – Insertion Sort – Quick Sort – Merge Sort – Heap Sort.

Unit – IV

Trees : Binary Trees – Binary Tree Traversal – Binary Search Tree – Nonrecursive Binary Tree Traversal Algorithms – AVL Trees.

Graphs : Graph Definitions and Notations – Graph Representation – Operations on graphs – Graph as ADT – Graph Traversals – shortest path Algorithm – Minimal Spanning Tree.

Prescribed Book:

D.S.Malik , “ Data Structures using C++ ” , Cengage Learning India Edition (2008).
(Chapters 1, 3, 5, 6, 7, 8, 9, 10, 11 and 12.)

Reference Books:

1. Mark Allen Weiss , “Data structures and Algorithem Analysis in C++” , Third Edition , Pearson Education (2008).
2. Adam Drozdek , ”Data Structures and Algorithms in C++“ , Cengage Learning , India Edition .

Model Paper

MCA 203: Data Structures

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Define Data Abstraction.
  b) Define Pointer.
  c) What are the differences between Single and Double Linked List?
  d) Write the complexity of binary search algorithm.
  e) What are the applications of Stack?
  f) Application of AVL Tree.
  g) Define Multigraph.
  h) What is the purpose of Garbage Collection.

UNIT - I

2.a) What is Class ? How can you define classes in C++.
  b) Explain how we can access class members by using Pointer Variable.

(or)

3.a) Write a C++ Program to implement the operations on Complex numbers using classes.
  b) Explain about constructors and destructors in C++.

UNIT – II

4.a) Write procedure to insert an element in an ordered list.
  b) Explain Back tracking with an example.

(or)

5.a) Write procedures to delete an element & count number of nodes in Double Linked List.
  b) Explain different collision resolution techniques.

UNIT - III

6.a) Define Stack. Implement operations on Stack using arrays.
  b) Write the procedure for selection sort.

(or)

7.a) What is priority Queue. Write the procedure for implementing the operations on Priority Queue.
  b) Write a C++ program for sorting ‘n’ elements using Merge Sort technique.

UNIT - IV

8.a) Write a procedure to find minimum & maximum element in a binary search tree.
  b) Write the non-recursive algorithm for post order.

(or)

9.a) Explain Different Graph traversal techniques.
  b) Using Kruskal’s algorithm. Develop minimum cost spanning tree for the following graph.

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MCA 204: OPERATING SYSTEM PRINCIPLES

UNIT–I:

Introduction : What Operating Systems Do – Computer System Orgranization – Computer system Architecture – Operating System Structure – Operating System Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Special purpose Systems – Computing Environments.

System Structure: Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs – Operating System Design and Implementation – Operating System Structure – Virtual Machine – Operating System Generation – System Boot.

Process Concept : Overview – Process Scheduling – Operations on Processes – Interprocess Communication – Examples of IPC Systems – Communication in Client Server Systems.

UNIT–II:

Multithreaded Programming : Overview – Multithreading Models – Thread Libraries – Threading Issues – Operating System Examples.

Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling – Thread Scheduling.

Synchronization: Background – The Critical Section Problem – Peterson's solution – Synchronization Hardware – Semaphores – Classic Problem of Synchronization – Monitors – Synchronization Examples – Atomic Transaction.

UNIT–III:

Deadlocks : System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

Memory Management Strategies: Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation – Example: The Intel Pentium.

Virtual Memory Management: Background – Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing.

UNIT–IV:

File System : File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.

Implementing File Systems : File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Efficiency and Performance – Recovery – Log structured File Systems.

Secondary Storage Structure : Overview of Mass – Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management – Swap Space Management – RAID structure.

I/O Systems: Overview – I/O Hardware – Application I/O Interface – Kernal I/O Interface – Transforming I/O requests to Hardware Operations – Streams – Performance.

Prescribed Book:

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne. "Operating System Principles", Seventh Edition, Wiley.

Chapters: 1.1 – 1.12, 2.1 – 2.10, 3.1 – 3.6, 4.1 – 4.5, 5.1 – 5.5, 6.1 – 6.9 , 7.1 – 7.7 , 8.1 – 8.7, 9.1 – 9.6, 10.1 – 10.6, 11.1 – 11.8, 12.1 – 12.7, 13.1 – 13.7

Reference Book:

1. William Stallings, "Operating Systems – Internals and Design Principles", Fifth Edition, Pearson Education (2007)

2. Achyut S Godbole, "Operating Systems", Second Edition, TMH (2007).

3. Flynn/McHoes, "Operating Systems", Cengage Learning (2008).

4. Deitel & Deitel, "Operating Systems",Third Edition, Pearson Education (2008).

Model Paper

MCA 204: Operating System Principles

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Advantages of Multiprocessor Systems.
b) What is s System Call ?
c) Importance of PCB
d) Difference between Thread and Process.
e) Advantages of Segmentation.
f) Virtual Memory is Logical or Physical, Why ?
g) Why Operating System requires Second Storage Support for its Operation ?
h) What are file attributes ?

UNIT – I

2.a) Explain Traditional computing, Client-Server computing and peer- to-peer computing
b) Describe Storage device Hierarchy

(or)

3.a) Discuss different types of Operating System Structures
b) Explain Process Scheduling

UNIT – II

4.a) Discuss different threading issues.
b) Explain semaphores with suitable examples.

(or)

5. Compare different types of Process Scheduling Algorithms.

UNIT – III

6.a) Explain Deadlock avoidance mechanisms.
b) Describe swapping with diagram.

(or)

7.a) Explain segmentation.
b) Write about LRU page replacement and Optimal page replacement.

UNIT - IV

8.a) Explain different file access metods.
b) Described linked file allocation methods.

(or)

9.a) Explain different RAID levels.
b) Discuss about interrupt driven I/O cycle.

MCA 205: PROBABILITY AND STATISTICS

Unit I:

Some probability laws: Axioms of Probability, Conditional Probability, Independence of the Multiplication Rule, Bayes' theorem

Discrete Distributions: Random Variables , Discrete Probability Densities, Expectation and distribution parameters, Binomial distribution, Poisson distribution, simulating a Discrete distribution,

Continuous distributions: continuous Densities, Expectation and distribution parameters, exponential distribution , Normal distribution, Weibull distribution and Reliability.

UNIT II:

Estimation: Point estimation, interval estimation and central limit theorem.

Inferences on the mean and the Variance of a distribution: Hypothesis Testing, significance testing, Hypothesis and significance test on the mean, Hypothesis tests on the Variance

Inferences on proportions: estimating proportions, testing hypothesis on a proportion,
Comparing two proportions: estimation, comparing two proportions: hypothesis testing.

UNIT III:

Comparing two means and two variances: point estimation: independent samples, Comparing variances: the F-distribution,
Comparing means: variances equal,

Analysis of Variance: One-way classification fixed effects model, comparing variances, pair wise comparisons, randomized complete block design

UNIT IV:

Simple linear regression and correlation : model and parameter estimation, inferences about slope, inferences about intercept, Co-efficient of determination

Multiple linear regression models: least square procedures for model fitting, a matrix approach to least squares, interval estimation.

Prescribed book:

J Susan Milton and Jesse C. Arnold: "Introduction to Probability and Statistics", Fourth edition, TMH,(2007).

Chapters: 2, 3.1 to 3.3, 3.5,3.8,3.9,4.1,4.2,4.4,4.7.1,7.4, 8.3 to 8.6,9,10.1 to 10.3, 11.1, 11.3, 11.6, 12.1, 12.2, 12.4, 13.1 to 13.3,13.5.

Reference book:

William Mendenhall, Robert J Beaver, Barbara M Beaver: Introduction to Probability and Statistics, Twelth edition, Thomson.

Model paper

MCA 205: Probability and Statistics

Time: 3hours **Maximum: 70 M.**

Answer Question No.1 Compulsory: 8 x 2 = 14 M
Answer ONE Question from each unit : 4 x 14 = 56 M

1. (a) If BCA then Prove that P(B) □ P(A).
   (b) If two unbiased die are thrown then find the expected values of the sum of numbers of points on them.
   (c) Conditional Expectations.
   (d) Estimator and Estimation.
   (e) Mathematical model of the Randomized complete block design.
   (f) Properties of F-distribution.
   (g) Covariance.
   (h) Type I error and Type II error.

UNIT-I

2. (a) State and Prove the addition theorem for n events.

   (b) In a certain town, Males and Females form 50 percent of the population. It is known that 20 percent of the males and 5 percent of the females are unemployed. A research student studying the employment situation selects unemployed persons at random. What is the probability that the person selected is (a) Male (b) Female.

(or)

3.(a) Out of 800 families with 5 children each how many would you expect you have (i) 3 boys (ii) 5 girls (iii) Either 2 or 3 girls Assume equal probabilities for boys and girls.

   (b) The distribution function of a random variate X is given by the following function.

$$f(x) = \begin{cases} 0 & ; \text{if } x < -2 \\ 1/2 & ; \text{if } -2 \leq x < 0 \\ 3/4 & ; \text{if } 0 \leq x < 2 \\ 1 & ; x \geq 2 \end{cases}$$

   (i) Sketch the group h of F(x)
   (ii) Obtain P.D.F of f(x)
   (iii) Compute the probabilities
   P(X □ 1); P(X □ 2); P(1 □ X □ 2)

UNIT-II

4. (a) Derive the 100 (1-□)% confidence interval limits of the mean in Normal distribution.

   (b) Define the following terms :
   (i) Critical region; Composite hypothesis; level of Significance; Power of the test;

   (ii) How can you derive the test statistic on significance test on the Mean

(or)

5. (a) How can you derive the test statistic on significance of Difference of Proportions.

   (b) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men 325 women were in favour of the proposal. Test the hypothesis, that proportions of men and women in favour of the proposal are same against that they are not, at 5% level.

UNIT-III

6. (a) Derive the test statistic on F test.

   (b) Two random samples drawn from two normal populations are

Sample I :	20	16	26	27	23	22	18	24	25	19
Sample II :	27	33	42	35	32	34	38	28	41	43
			30	37						

   Obtain estimates of the variances of the populations and test whether the populations have same variances.

(or)

7.(a) Explain the statistical analysis of one way classification.

   (b) The following data represent the number of units of production per day turned out by 5 different workmen using different types of machines.

Work Men	Machine Types			
	A	*B*	*C*	*D*
1	46	40	49	38
2	48	42	54	45
3	36	38	46	34
4	35	40	48	35
5	40	44	51	41

(i) Test whether the mean productivity is the same for the four brands of machine type.

(ii) Test whether 5 different workmen differ with respect to productivity.

UNIT-IV

8. (a) Derive the Normal equations of curve of Regression Y on X.

(b) The relationship between energy consumption and household income was studied, yielding the following data on household income X (in units of $ 1000/Year) and energy consumption Y (in Units of 108 Btu/Year).

Energy Consumption (Y)	Household income (X)
1.8	20.0
3.0	30.5
4.8	40.0
5.0 55.1	
6.5	60.3
7.0	74.9
9.0	88.4
9.1	95.2

(a) Plot a scatter diagram of these data.
(b) Estimate the linear regression equation

$$\square_{y/x} = \square 0 + \square_1 X$$

(c) If x=50 (household income of $ 50,000), estimate the average energy consumed households of this income. What would your estimate be for a single house hold.

(or)

9. (a) Derive the Normal equations for Multiple linear regression model.

(b) A Study is conducted to develop an equation by which the unit cost of producing a new drug (y) can be predicted based on the number of units produced (X). The proposed model is $\square_{y/x} = \square 0 + \square_1 X + \square_2 X^2$

Number of Units (X)	Cost in hundreds of dollars (Y)
5	14.0
5	12.5
10	7.0
10	5.0
11	2.1
12	1.8
13	6.2
14	4.9
15	13.2
16	14.6

(a) Draw the Scatter diagram.
(b) Estimate the constants of given model.

* * * * *

MCA 206: DATA STRUCTURES USING C++ LAB

1. Write a program for implementing the operations on complex numbers using classes.
2. Program for finding the area of circle, rectangle and room using function overloading.
3. Program for finding the volume of box using constructor overloading.
4. Program for Sorting ‘n’ elements Using bubble sort technique.
5. Sort given elements using Selection Sort.
6. Sort given elements using Insertion Sort.
7. Sort given elements using Merge Sort.
8. Sort given elements using Quick Sort.
9. Implement the following operations on single linked list.
   (i) Creation (ii) Insertion (iii) Deletion (iv) Display
10. Implement the following operations on double linked list.
    (i) Creation (ii) Insertion (iii) Deletion (iv) Display
11. Implement the following operations on circular linked list.
    (i) Creation (ii) Insertion (iii) Deletion (iv) Display
12. Program for splitting given linked list.
13. Program for traversing the given linked list in reverse order.
14. Merge two given linked lists.
15. Create a linked list to store the names of colors.
16. Implement Stack Operations Using Arrays.
17. Implement Stack Operations Using Linked List.
18. Implement Queue Operations Using Arrays.
19. Implement Queue Operations Using Linked List.
20. Implement Operations on Circular Queue.
21. Construct and implement operations on Priority Queue.
22. Implement Operations on double ended Queue.
23. Converting infix expression to postfix expression by using

stack.

24. Write program to evaluate post fix expression.
25. Implement Operations on two way stack.
26. Add two polynomials using Linked List.
27. Multiply Two polynomials using Linked List.
28. Construct BST and implement traversing techniques recursively.
29. Implement preorder traversal on BST non recursively.
30. Implement inorder traversal on BST non recursively.
31. Implement postorder traversal on BST non recursively.
32. Implement binary search techniques recursively.

MCA 207: DBMS LAB

Cycle-I: Aim: Marketing Company wishes to computerize their operations by using following tables.

Table Name: Client_Master
Description: This table stores the information about the clients.

Column Name	Data Type	Size	Attribute
Client_no	Varchar2	6	Primary Key and first letter should starts with 'C'
Name	Varchar2	10	Not null
Address1	Varchar2	10	
Address2	Varchar2	10	
City	Varchar2	10	
State	Varchar2	10	
Pincode	Number	6	Not null
Bal_due	Number	10,2	

Table Name:Product_master
Description: This table stores the information about products.

Column Name	Data Type	Size	Attribute
Product_no	Varchar2	6	Primary Key and first letter should starts with 'P'
Description	Varchar2	10	Not null
Profit_percent	Number	2,2	Not null
Unit_measure	Varchar2	10	
Qty_on_hand	Number	8	
Record_lvl	Number	8	
Sell_price	Number	8,2	Not null, can't be 0
Cost_price	Number	8,2	Not null, can't be 0

Table Name: salesman_master
Description: This table stores the salesmen working in the company

Column Name	Data Type	Size	Attribute
Salesman_id	Varchar2	6	Primary Key and first letter should starts with 'S'
Name	Varchar2	10	Not null
Address1	Varchar2	10	
Address2	Varchar2	10	
City	Varchar2	10	
State	Varchar2	10	
Pincode	Number	6	Not null
Sal_amt	Number	8,2	Should not null and zero
Target_amt	Number	6,2	Should not null and zero
Remarks	Varchar2	10	

Table Name: sales_order
Description: This table stores the information about orders

Column Name	Data Type	Size	Attribute
S_order_no	Varchar2	6	Primary Key and fisrt char is ‘O’
S_order_date	Date		
Client_no	Varchar2	6	Foreign key
Delve_address	Varchar2	20	
Salesman_no	Varchar2	6	Foreign key
Delve_type	Varchar2	1	Delivery: part(P)/Full(F) and default ‘F’
Billed_yn	Char	1	
Delve_date	Date		Can’t be less than the s_order_date
Order_status	Varchar2	10	Values in ‘IN PROCESS’, FULFILLED’, ‘BACK ORDER, ‘CANCELLED’

Table Name: sales_order_details
Description: This table stores the information about products ordered

Column Name	Data Type	Size	Attribute
S_order_no	Varchar2	6	Primary key, foreign key references sales_order table
Product_no	Varchar2	6	Primary key, foreign key references product_master table
Qty_ordered	Number	8	
Qty_disp	Number	8	
Product_rate	Number	10,2	

Table Name: challan_master
Description: This table stores the information about challans made for orders.

Column Name	Data Type	Size	Attribute
Challan_no	Varchar2	6	Primary key, first two letters must start with ‘CH’
S_order_no	Varchar2	6	Foreign key references sales_order
Challan_date	Date		
Billed_yn	Char	1	Values in ‘Y’, ‘N’ default ‘N’

Table Name: Challan_Details
Description: This table stores the information about challan details.

Column Name	Data Type	Size	Attribute

Challan_no	Varchar2	6	Primary key, foreign key references challan_master table
Product_no	Varchar2	6	Primary key, foreign key references product_master table
Qty_disp	Number	4,2	Not null

Solve the following queries by using above tables.

1. Retrieve the list of names and cities of all the clients.
2. List the various products available from product_master.
3. Find out the clients who stay in a city whose second letter is ‘a’.
4. Find the list of all clients who stay in the city ‘ CHENNAI’ or ‘DELHI’.
5. List all the clients located at ‘CHENNAI’.
6. Print the information from sales order as the order the places in the month of January.
7. Find the products with description as ‘Floppy Drive’ and ‘Pen drive’.
8. Find the products whose selling price is grater than 2000 and less than or equal to 5000.
9. Find the products whose selling price is more than 1500 and also find the new selling price as original selling price *15.
10. Find the products in the sorted order of their description.
11. Divide the cost of product ‘540 HDD’ by difference between its price and 100.
12. List the product number, description, sell price of products whose description begin with letter ‘M’.
13. List all the orders that were cancelled in the month of March.
14. Count the total number of orders.
15. Calculate the average price of all the products.
16. Determine the maximum and minimum product prices.
17. Count the number of products having price grater than or equal to 1500.
18. Find all the products whose quantity on hand is less than reorder level.
19. Find out the challan details whose quantity dispatch is high.
20. Find out the order status of the sales order, whose order delivery is maximum in the month of March.
21. Find out the total sales made by the each salesman.
22. Find the total revenue gained by the each product sales in the period of Q1 and Q2 of year 2006.
23. Print the description and total qty sold for each product.
24. Find the value of each product sold.
25. Calculate the average qty sold for each client that has a maximum order value of 1,50,000.
26. List the products which has highest sales.
27. Find out the products and their quantities that will have to deliver in the current month.
28. Find the product number and descriptions of moving products.
29. Find the names of clients who have purchased ‘CD DRIVE’.
30. List the product numbers and sales order numbers of customers having quantity ordered less than 5 from the order details for the product ‘1.44 Floppies’.

31. Find the product numbers and descriptions of non-moving products.
32. Find the customer names and address for the clients, who placed the order ‘019001’.
33. Find the client names who have placed orders before the month of May, 2006.
34. Find the names of clients who have placed orders worth of 10000 or more.
35. Find out if the product is ‘1.44 drive’ is ordered by any client and print the client number, name to whom it is sold.

Cycle-II

Aim: A Manufacturing Company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows

S(SNO,SNAME,CITY,STATUS)
P(PNO,PNAME,COLOR,WEIGTH,CITY,COST)
SP(SNO,PNO,QTY)
J(JNO,JNAME,CITY)
SPJ(SNO,PNO,JNO,QTY)

33. Get Suppliers Names for Suppliers who supply at least one red part.
34. Get Suppliers Names for Suppliers who do not supply part ‘P2’
35. Using Group by with Having Clause, Get the part numbers for all the parts supplied by more than one supplier.
36. Get supplier numbers for suppliers with status value less the current max status value.
37. Get the total quantity of the part ‘P2’ supplied.
38. Get the part color, supplied by the supplier ‘S1’
39. Get the names of the parts supplied by the supplier ‘Smith’ and “Black”
40. Get the Project numbers, whose parts are not in Red Color, from London.
41. Get the suppliers located from the same city.
42. Get the suppliers, who does not supply any part.
43. Find the pnames of parts supplied by London Supplier and by no one else.
45. Find the sno’s of suppliers who charge more for some part than the average cost of that part.
46. Find the sid’s of suppliers who supply only red parts.
47. Find the sid’s of suppliers who supply a red and a green part.
48. Find the sid’s of suppliers who supply a red or green part.

Cycle: III

An Airline System would like to keep track their information by using the following relations.

Flights (flno: integer, from: string, to: string, distance: integer,
Price: integer)

Aircraft (aid: integer, aname: string, cruising_range: integer)
Certified (eid: integer, aid: integer)
Employees (eid: integer, ename: string, salary: real)

Note that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for aircraft and only pilots are certified to fly. Resolve the following queries:

1. For each pilot who is certified for more than three aircraft, find the eid's and the maximum cruising range of the aircraft that he (or She) certified for.
2. Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.
3. Find the name of the pilots certified from some Boeing aircraft.
4. For all aircraft with cruising range over 1,000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
5. Find the aid's of all aircraft than can be used from Los Angels to Chicago.
6. Print the enames of pilots who can operate planes with cruising range greater than 3,000 miles, but are not certified by Boeing aircraft.
7. Find the total amount paid to employees as salaries.
8. Find the eid's of employees who are certified for exactly three aircrafts.
9. Find the eid's of employee who make second highest salary.
10. Find the aid's of all than can be used on non-stop flights from Bonn to Chennai.

Cycle: IV : Employee Database

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into to certain departments and each department consists of employees. The following two tables describes the automation schemas

DEPT (DEPTNO, DNAME, LOC)
EMP (EMPNO,ENAME,JOB,MGR,HIREDATE,SAL,COMM,DEPTNO)

1. Create a view, which contain employee names and their manager names working in sales department.
2. Determine the names of employee, who earn more than there managers.
3. Determine the names of employees, who take highest salary in their departments.
4. Determine the employees, who located at the same place.
5. Determine the employees, whose total salary is like the minimum salary of any department.
6. Update the employee salary by 25%, whose experience is greater than 10 years.
7. Delete the employees, who completed 32 years of service.
8. Determine the minimum salary of an employee and his details, who join on the same date.
9. Determine the count of employees, who are taking commission and not taking commission.

10. Determine the department does not contain any employees.
11. Find out the details of top 5 earners of company. (Note: Employee Salaries should not be duplicate like 5k,4k,4k,3k,2k)
12. Display those managers name whose salary is more than an average salary of his employees.
13. Display the names of the managers who is having maximum number of employees working under him?
14. In which year did most people join the company? Display the year and number of employees.
15. Display ename, dname even if there no employees working in a particular department(use outer join).

PL/SQL PROGRAMS

1. WRITE A PL/SQL PROGRAM TO CHECK THE GIVEN NUMBER IS STRONG OR NOT.

2. WRITE A PL/SQL PROGRAM TO CHECK THE GIVEN STRING IS PALINDROME OR NOT.

3. WRITE A PL/SQL PROGRAM TO SWAP TWO NUMBERS WITHOUT USING THIRD VARIABLE.

4. WRITE A PL/SQL PROGRAM TO GENERATE MULTIPLICATION TABLES FOR 2,4,6

5. WRITE A PL/SQL PROGRAM TO DISPLAY SUM OF EVEN NUMBERS AND SUM OF ODD NUMBERS IN THE GIVEN RANGE.

6. WRITE A PL/SQL PROGRAM TO CHECK THE GIVEN NUMBER IS PALLINDROME OR NOT.

7. THE HRD MANAGER HAS DECIDED TO RAISE THE EMPLOYEE SALARY BY 15%. WRITE A PL/SQL BLOCK TO ACCEPT THE EMPLOYEE NUMBER AND UPDATE THE SALARY OF THAT EMPLOYEE. DISPLAY APPROPRIATE MESSAGE BASED ON THE EXISTENCE OF THE RECORD IN EMP TABLE.

8. WRITE A PL/SQL PROGRAM TO DISPLAY TOP 10 ROWS IN EMP TABLE BASED ON THEIR JOB AND SALARY.

9. WRITE A PL/SQL PROGRAM TO RAISE THE EMPLOYEE SALARAY BY 10%, FOR DEPARTMENT NUMBER 30 PEOPLE AND ALSO MAINTAIN THE RAISED DETAILS IN THE RAISE TABLE.

10. WRITE A PROCEDURE TO UPDATE THE SALARY OF EMPLOYEE, WHO ARE NOT GETTING COMMISSION BY 10%
11. WRITE A PL/SQL PROCEDURE TO PREPARE AN ELECTRICITY BILL BY USING FOLLOWING TABLE

TABLE USED: ELECT

NAME	NULL?	TYPE
MNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)

PREV_READ	NUMBER(5)
NO_UNITS	NUMBER(5)
AMOUNT	NUMBER(8,2)
SER_TAX	NUMBER(8,2)
NET_AMT	NUMBER(9,2)

12. WRITE A PL/SQL PROCEDURE TO PREPARE AN TELEPHONE BILL BY USING FOLLOWING TABLE. AND PRINT THE MOTHLY BILLS FOR EACH CUSTOMER

TABLE USED : PHONE.

NAME	NULL?	TYPE
TEL_NO	NOT NULL	NUMBER(6)
CNAME		VARCHAR2(20)
CITY		VARCHAR2(10)
PR_READ		NUMBER(5)
CUR_READ		NUMBER(5)
NET_UNITS		NUMBER(5)
TOT_AMT		NUMBER(8,2)

13. WRITE A PL/SQL PROGRAM TO RAISE THE EMPLOYEE SALARY BY 10%, WHO ARE COMPLETED THERE 25 YEARS OF SERVICE AND STORE THE DETAILS AT PPROPRIATE TABLES (DEFINE THE RETAIR_EMP TABLE).

14. WRITE A PL/SQL PROCEDURE TO EVALUATE THE GRADE OF A STUDENT WITH FOLLOWING CONDITIONS:

FOR PASS: ALL MARKS > 40
FOR I CLASS: TOTAL%>59
FOR II CLASS: TOTAL% BETWEEN >40 AND <60
FOR III CLASS: TOTAL% =40
AND ALSO MAINTAIN THE DETAILS IN ABSTRACT TABLE.

TABLES USED
1. TABLE STD

NAME	NULL?	TYPE
NO	NOT NULL	NUMBER
NAME		VARCHAR2(10)
INTNO		NUMBER
CLASS	NOT NULL	VARCHAR2(10)
M1		NUMBER
M2		NUMBER
M3		NUMBER
M4		NUMBER
M5		NUMBER

2. TABLE ABSTRACT

NAME	NULL?	TYPE
STDNO		NUMBER
STDNAME		VARCHAR2(10)
CLASS		VARCHAR2(10)
MONTH		VARCHAR2(10)

INTNO (INTERNAL NUMBER)	NUMBER
TOT	NUMBER
GRADE	VARCHAR2(10)
PERCENT	NUMBER
DAT_ENTER	DATE

15. CREATE AN VARRAY, WHICH HOLDS THE EMPLOYEE PHONE NUMBERS (AT LEAST THREE NUMBERS)
16. CREATE AN OBJECT TO DESCRIBE THE DETAILS OF ADDRESS TYPE DATA.
17. WRITE A PL/SQL PROCEDURE TO READ THE DATA INTO THE TABLE AS PER THE FOLLOWING DESCRIPTION

Attribute Name	Data Type	DETAILS
EMPLOYEE NUMBER	NUMBER	
EMPLOYEE NAME	CHARACTER	
ADDRESS	OBJECT	STREET NUMBER
		STREET NAME
		TOWN
		DIST AND STATE
QUALIFICATION	CHARACTER	
PHONE NUMBER	OBJECT-VARRAY	HOLDS THREE PHONE NUMBER

MCA 208: COMMUNICATION SKILLS

Prescribed Books :

1. Raymond Murphy, “Essential English Grammar”, Second Edition, Cambridge University Press (2008)

2. Leena Sen, “Communication Skills”, Second Edition, PHI (2008)

Reference Books :

1. Aysha Viswamohan, “English for Technical Communication”, TMH (2008)

2. P. Kiranmai Dutt, Geetha Rajeevan, “Basic Communication Skills”, Foundation Books (2007)

3. T.M. Farhathullah, “Communication Skills for Technical Students”, Orient Longman (2002)

4. E.Suresh Kumar, P. Sreehari, “Communicative English”, Orient Longman (2007)

III SEMESTER

MCA 301: Object Oriented Programming with JAVA

UNIT I

Java Basics - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow-block scope, conditional statements, loops, break and continue statements, simple java program, arrays, input and output, formatting output, Review of OOP concepts, encapsulation, inheritance, polymorphism, classes, objects, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class, Enumerations, autoboxing and unboxing, Generics.

Inheritance – Inheritance concept, benefits of inheritance, Super classes and Sub classes, Member access rules, Inheritance hierarchies, super uses, preventing inheritance: final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

UNIT II

interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

Packages-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Files – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io.

UNIT III

Exception handling – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes, Guide lines for proper use of exceptions.

Multithreading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

UNIT IV :

Event Handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners,

Delegation event model, Semantic and Low-level events, Examples: handling a button click, handling mouse and keyboard events, Adapter classes.

Applets – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet - Four methods of an applet, Developing applets and testing, passing parameters to applets, applet security issues.

GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT,MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame, JApplet, JWindow, JDialog, Light weight containers – JPanel, A simple swing application, Overview of several swing components- Jbutton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, Java's Graphics capabilities – Introduction, Graphics contexts and Graphics objects, color control, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout manager types – border, grid, flow, box.

Prescribed Text Books:

1. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
2. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel ,8th edition, PHI.

Reference Text Books:

1. Core Java, Volume 1-Fundamentals, eighth edition, Cay S.Horstmann and Gary Cornell, Pearson education.
2. Thinking in Java, Bruce Eckel, PHP
3. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.

MODEL PAPER

MCA 301 : Object Oriented programming with JAVA

Time : 3 hrs **Max Marks : 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a) Inheritance vs polymorphism
   b) Define abstract class.
   c) Explain bytesteam
   d) explain java.io package
   e) Differences between multiple processes and multiple threads
   f) life cycle of an applet
   g) explain layout manager

UNIT – I

2. a) Explain about final classes, final methods and final variables?
   b) Explain about the abstract class with example program

OR

3. What are the basic principles of Object Oriented Programming? Explain with examples, how they are implemented in C++

UNIT – II

4. Is there any alternative solution for Inheritance. If so explain the advantages and disadvantages of it.

OR

5. (a) What is a package? How do we design a package?
   (b) How do we add a class or interface to a package?

UNIT – III

6. In JAVA, is exception handling implicit or explicit or both. Explain with the help of example java programs.

OR

7. (a) With the help of an example, explain multithreading by extending thread class.
   (b) Implementing Runnable interface and extending thread, which method you prefer for multithreading and why

UNIT – IV

8. Differentiate following with suitable examples:
   (a) Frame, JFrame (b) Applet, JApplet (c) Menu, Jmenu

OR

9. Explain the following:
   (a) Creating an applet (b) Passing parameters to applets
   (c) Adding graphics and colors to applets

MCA 302: COMPUTER NETWORKS

UNIT – I

Introduction : Uses of Computer Networks: Business Application, Home Applications, Mobile Users – Social Issues. Network Hardware : Local Area Networks – Metropolitan Area Networks – Wide Area Networks – Wireless Networks – Home Networks – Internetworks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection Oriented and Connectionless Services – Service Primitives – The relationship of Services to Protocols. Reference Models: The OSI Reference Model – The TCP/IP Reference Model – A Comparison of OSI and TCP/IP reference Model – A Critique of the OSI Model and Protocols – A Critique of the TCP/IP reference model. Example Networks: The Internet – Connection Oriented Networks:x.25, Frame Relay, and ATM – Ethernet – Wireless LANs Network Standardization: Who's who in the Telecommunication World – Who's who in the International Standards World – Who's who in the Internet Standards World.

Physical Layer: Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics

Data Link Layer: Data Link Layer Design Issues: Services Provided to the Network Layer – Framing – Error Control – Flow Control. Error Detection and Correction: Error correcting Codes – Error Detecting Codes. Elementary Data Link Protocols : An unrestricted Simplex Protocol – A simplex Stop- and – wait Protocol – A simplex Protocol for a Noisy channel. Sliding Window Protocols: A one-bit sliding Window Protocol – A Protocol using Go Back N – A Protocol using selective Repeat. Example Data Link Protocols: HDLC – The Data Link Layer in the Internet.

UNIT – II

The Medium Access Control Sublayer : Ethernet : Ethernet Cabling – Manchester Encoding – The Ethernet MAC sublayer Protocol – The Binary Exponential Backoff Algorithm – Ethernet Performance – Switched Ethernet – Fast Ethernet – Gigabit Ethernet – IEEE 802.2: Logical Link Control – Retrospective on Ethernet. Wireless Lans: The 802.11 Protocol Stack - The 802.11 Physical Layer - The 802.11 MAC sublayer Protocol - The 802.11 Frame Structure. Bluetooth: Bluetooth Architecture – Bluetooth Applications – The Bluetooth Protocol Stack – The Bluetooth Radio Layer – The Bluetooth Baseband Layer – The Bluetooth L2CAP layer – The Bluetooth Frame Structure. Data Link Layer Switching: Bridges from 802.x to 802.y – Local Internetworking – Spanning Tree Bridges – Remote Bridges – Repeaters, Hubs, Bridges, Switches, Routers and Gateways – Virtual LANs.

UNIT – III

The Network Layer: Network Layer Design Issues : Store – and Forward Packet Switching – Services Provided to the Transport Layer – Implementation of Connectionless Services – Implementation of Connection Oriented Services – Comparison Of Virtual Circuit and Datagram subnets. Routing Algorithms : The Optimality Principle – Shortest Path Routing – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing – Multicast Routing – Routing for Mobile Hosts. Internet Working : How Networks Differ – How Networks can be connected – Concatenated Virtual Circuits – Connectionless Internetworking – Tunneling – Internet work Routing – Fragmentation. The Network Layer in the Internet: The IP Protocol – IP address – Internet Control Protocols – OSPF – The Internet Gateway Routing Protocol – BGP – The Exterior Gateway Routing Protocol.

The Transport Layer: The Transport Service: Services provided to the Upper Layers – Transport Services Primitives – Berkeley Sockets. Elements of Transport Protocols : Addressing – Connection Establishment – Connection Release – Flow Control and Buffering – Multiplexing – Crash Recovery. The Internet Transport Protocols :UDP Introduction to UDP – Remote Procedure Call – The Real Time Transport Protocol. The Internet Transport Protocols: TCP Introduction to TCP – The TCP Service Model – the TCP Protocol – The TCP segment header – TCP connection establishment – TCP connection release – Modeling TCP connection management- TCP Transmission Policy – TCP congestion Control – TCP Timer Management – Wireless TCP and UDP – Transactional TCP.

UNIT – IV:

The Application Layer: DNS : The Domain Name System : The DNS Name Space – Resource Records – Name Servers. Electronic Mail : Architecture and Services – The User Agent – Message Formats – Message Transfer – Final Delivery. The World Wide Web: Architecture Overview – Static Web Documents – Dynamic Web Documents – HTTP – The Hyper Text Transfer Protocol – Performance Enhancements – The Wireless Web. Multimedia: Introduction to Digital Audio – Audio Compression – Streaming Audio – Internet Radio – Voice Over IP – Introduction to Video – Video Compression – Video on Demand.

Prescribed Book:

Andrew S. Tanenbaum, “Computer Networks”, Fourth Edition, PHI.

Chapters: 1.1 to 1.6, 2.2, 3.1 to 3.4, 3.6, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2.1 to 5.2.9, 5.5, 5.6.1 to 5.6.5, 6.1.1 to 6.1.3, 6.2, 6.4, 6.5, 7.1 to 7.4

Reference Books:

1. James F.Kurose, Keith W.Ross, “Computer Networking”, Third Edition, Pearson Education

2. Behrouz A Forouzan, “Data Communications and Networking”, Fourth Edition, TMH (2007)

3. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, Cengage Learning (2008)

MODEL PAPER

MCA 302 : Computer Networks

Time : 3 hrs **Max Marks : 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a) Difference between Protocol and Service.
   b) Describe Ethernet.
   c) Why Repeaters are required.
   d) Give any two applications of Bluetooth.
   e) What are the problems with Flooding.
   f) Where UDP protocol is used.
   g) Define HTTP.
   h) Define User Agent.

UNIT – I

2. a) Compare OSI and TCP/IP reference models. (7M)
   b) Describe Go Back N protocol. (7M)

(or)

3. a) Explain the architecture of the Internet (7M)
   b) Write about design issues of a Data Link layer. (7M)

UNIT – II

4. a) Explain Spanning tree Bridges. (7M)
   b) Give and explain 802.11 frame structure, services (7M)

(or)

5. a) Describe architecture,applications, protocol stack of Bluetooth (9M)
   b) Explain Switched Ethernet (5M)

UNIT – III

6. a) Explain IP Header Format and IP addresses (7M)
   b) Discuss about Tunneling and Fragmentation (7M)

(or)

7. a) Explain Distance Vector Routing Algorithm (7M)
   b) write about TCP Congestion Control (7M)

UNIT – IV

8. a) Explain about DNS (7M)
   b) Write about URL’s (7M)

(or)

9. a) Explain Electronic Mail concept (7M)
   b)Discuss JPEG Compression mechanism (7M)

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MCA 303 : OPERATION RESEARCH

UNIT I:

Linear Programming: Introduction, formulation of Linear Programming Models, Graphic solution of Linear programming Models, Maximization with Less-than-or-equal to constraints, equalities and Greater than or equal to constraints, Minimization of the objective function, the simplex Method, properties of simplex Method, transportation problem, Assignment Problem.

UNIT II:

Deterministic inventory Models: Introduction, Infinite Delivery Rate with No Backordering, Finite delivery Rate with no Backordering, Infinite Delivery Rate with Backordering, finite Delivery rate with Backordering.

UNIT III:

Game Theory: Introduction, Minimax -Maxmini pure strategies, Mixed Strategies and Expected Payoff, solution of 2x2 games, dominance, solution of 2xn games, solution of mx2 games, Brown's algorithm

UNIT IV:

PERT: Introduction, PERT Network, Time Estimates for Activities(ET), Earliest Expected completion of events(TE), Latest Allowable Event Completion time(TL), Event Slack Times(SE),Critical path

Prescribed book:

Belly E. Gillett, "Introduction to Operations Research - A computer-oriented algorithmic approach", TMH (2008).

Chapters: 3.2 to 3.7, 3.10 to 3.12, 6.1 to 6.5, 11.1 to 11.4, 11.6 to 11.9, 12.1 to 12.7

Reference Book:

J K Sharma, "Operation Research theory and applications", Third edition, MACMILLAN

Model Paper

MCA 303 : Operations Research

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a. Standard form of L.P.P.
   b. Degeneracy in Simplex Method.
   c. North-West Corner Rule.
   d. Unbalanced transportation problem.
   e. Dominance Property.
   f. Pay-Off matrix.
   g. Three time estimates of PERT.
   h. Total float and Free float.

Unit-I

2. a. Solve the following L.P.P by using Graphical Method.

Minimize $Z = 3x_1+5x_2$

Subject to constraints

$-3x_1+4x_2 \leq 12;$

$2x_1-x_2 \geq -2;$

$2x_1+3x_2 \geq 12$ and $x_1 \geq 0;\ x_2 \geq 0;$

b. Solve the following L.P.P by using simplex method.

Max $Z = 3x_1+2x_2$

Subject to the constraints

$4x_1+2x_2 \leq 12;$

$4x_1+x_2 \leq 8;$

$4x_1-x_2 \leq 8;$ and $x_1, x_2 \geq 0$

(or)

3. a. Explain the procedure for Hungarian Method.
   b. Given below is a table taken from the solution process for a transportation problem.

		Distribution centre Cost per unit(in rupees) 1	2	3	4	Availability
Factory	A	10	8	7	12	5000
	B	12	13	6	10	6000
	C	8	10	12	14	9000
Demand (in Units)		7000	5500	4500	3000	

Answer the following Questions :

(i) Is this solution feasible.

(ii) Is this solution degenerate.

(iii) Is this solution optimum ? If not find the Optimum Solution.

Unit-II

4.a. Explain the Finite delivery rate with No BACKORDERING.

b. Suppose a retailer has the following information Available :

D = 350 Units/Year

C_0 = \$50 per order

C_1 = \$13.75 per unit

C_2 = \$25 per unit

LT = 5 days.

To minimize the total annual inventory cost when back ordering is allowed, how many units should be ordered each time an order is placed, and how many backorders should be allowed ?

(or)

5. a. Explain infinite delivery rate with NOBACKORDERING.

b. Explain with Finite delivery rate with BACKORDERING.

Unit-III

6. a. Explain briefly how can you solve the 2x2 game.

b. Solve the following game by using graphical method.

		Player – B				
		I	II	III	IV	V
Player-A	1	3	0	6	–1	7
	2	-1	5	-2	-2	1

(or)

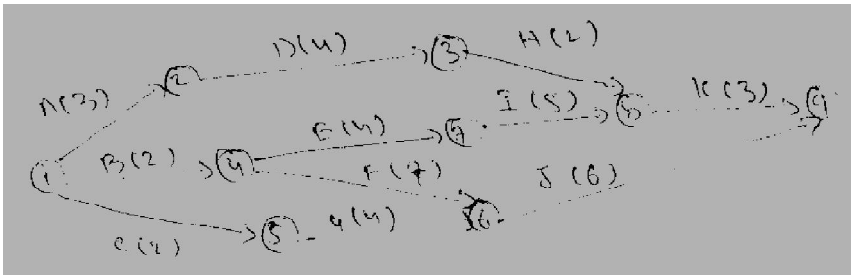
7. a. Explain the procedure for mx2 game in the case of graphical method.

b. Explain the Brown's algorithm.

Unit-IV

8. a. Explain the Time calculations in Critical path method.

b. For the following Network diagram, Identify the Critical path and find the total project duration.



(or)

9. The three time estimates of PERT Network are as follows :

Activity		Estimated duration (weeks)		
i	j	Optimistic time	Most likely time	Pessimistic time
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

(i) Draw the Project network

(ii) Find the expected duration and variance of each activity

(iii) Find the expected project length

(iv) Calculate the variance and standard deviation of the project length

(v) What is the probability that the project will be **completed at least 4 weeks earlier than expected.**

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MCA 304: COMPUTER GRAPHICS

Unit-I

Overview of Computer Graphics: Video Display Devices, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays, Raster Scan Systems, Random Scan Systems, Input Devices.

Graphical User Interfaces and Interactive Input Methods: The User Dialogue, Windows and Icons, Input of Graphical Data, Input Functions

Unit-II

Output Primitives: Points and Lines, Line-Drawing Algorithms: DDA Algorithm, Bresenham's Line Algorithm, Line Function, Circle Generation Algorithms, Ellipse Generation Algorithms

Attributes of output Primitives: Line Attributes, Color and GrayScale levels, Area Fill Attributes, Character Attributes, Bundled Attributes, Antialiasing.

Unit-III

Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representation and Homogenous Coordinates, Composite Transformations, Other Transformations.

Two Dimensional Viewing: The Viewing pipeline, Viewing Coordinates Reference Frame, Window to Viewport Coordinate Transformations, Two Dimensional Viewing Functions, Clipping Operations, Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland-Hodgeman Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping.

Unit-IV

Three Dimensional Concepts: Three Dimensional Display Methods.

Three Dimensional Object Representations: Polygon Surfaces, Quadric Surfaces, Superquadrics.

Three Dimensional Geometric and Modeling Transformations: Translation, Rotation, Scaling, Other Transformations, Composite Transformations, Three Dimensional Transformation Functions.

Three Dimensional Viewing: Viewing pipeline, Viewing Coordinates, Projections, Clipping

Prescribed Book:

Donald Hearn, M. Pauline Baker, “Computer Graphics”, Second Edition, Pearson Education (2004)

Chapters : 2.1 to 2.5, 8.1 to 8.3, 3.1, 3.2, 3.4 to 3.6, 4, 5.1 to 5.4, 6, 9.1, 10.1, 10.3, 10.4, 11, 12.1, 12.2, 12.3, 12.5

Reference Book:

1. Shalini Govil-Pai, ”Principles of Computer Graphics – Theory and Practice using open GL and Maya”, Springer (2007)

2. ISRD group, “Computer Graphics”, ace series, TMH (2006)

3. Amearendra N. Sinha, Arun D Udai, “Computer Graphics”, TMH (2008)

Model Paper

MCA 304: Computer Graphics

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: 7 x 2 = 14 M

Answer ONE Question from each unit: 4 x 14 = 56 M

1.a) What is the difference between Passive and Interactive Graphics?
b) What is Frame Buffer?
c) What are the drawbacks of DDA Algorithm?
d) What is world coordinate system?
e) Define typeface.
f) What are the attributes of a Line?
g) What is projection?
h) What is quadric surface?

UNIT-I

2.a) Discuss about Color Monitor?
b) What is Computer Graphics? What are the major considerations in the study of computer graphics?

(Or)

3.a) Discuss about various positioning devices.
b) Describe the difference between Random Scan Display devices and Raster scan display devices.

UNIT-II

4.a) Describe the generation of ellipse.
b) Illustrate the Bresenham's line algorithm with end points (10,10) and (10,20).

(Or)

5.a) What is an output primitive? Discuss about attributes of character.
b) Discuss about area filling styles.

UNIT-III

6.a) What are two-dimensional transformations? Explain.
b) Perform a 45^o rotation of a triangle A(0,0), B(1,1) and c(5,2)
i. About the origin
ii. About the point(-1,2)

(Or)

7. a) Write about Window-to-view port coordinate transformation.
b) Discuss about polygon clipping Algorithm

UNIT-IV

8. Discuss about 3D Projection.

(Or)

9. Derive the combined transformation matrix of the following:
A 3D Translation with 3 units along X-axis, 4 units along Y-axis, 5 units along Z-axis followed by a #D rotation by 30^o on XY Plane followed by 3D rotation of 45^o around Y-axis.

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MCA-305: ARTIFICIAL INTELLIGENCE

Unit-I :

What is AI? : The AI Problems, The Underlying Assumption, What is AI Technique?, The level of the Model, Criteria for Success.

Problems, Problem spaces & Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the design of Search Programs, Additional Problems.

Heuristic search techniques: Generate and Test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Means Ends Analysis.

Unit-II :

Knowledge Representation Issues: Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction

Representing knowledge using Rules: Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge

Unit-III :

Symbolic Reasoning under Uncertainity: Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation: Depth-First Search, Implementation: Breadth-First Search

Weak slot & filler Structures: Semantic Nets, Frames

Planning : Overview, An Example Domain : The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques

Unit-IV :

Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing

Commonsense: Qualitative Physics, Commonsense Ontologies, Memory Organisation, Case-Based Reasoning

Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition

Prescribed Book :

Knight K, “Artificial Intelligence”, TMH (1991)

Chapters : 1 through 7, 9, 13, 15, 10 and 20

Reference Book :

1. Michael Negnevitsky, “Artificial Intelligence – A Guide to Intelligent Systems”, Second Edition, Pearson Education (2008)

2. Winston P.H, “Artificial Intelligence”, Addision Wesley (1993)

Model Paper

MCA 305: Artificial Intelligence

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a. What is Abduction in Reasoning ?
   i. What is meant by Turing Test ?
   j. Advantages of Depth-First Search.
   k. Write about production system types and explain.
   l. Define and explain Inheritable knowledge.
   m. Define inferential Adequacy and Acquisional efficiency.
   n. What is meant by pragmatic Analysis ?
   o. Discuss the importance of knowledge representation in A.I. system development.

Unit-I

2. a. When you call a technique is a A.I technique ? What is meant by A.I problem explain in detail.
   b. Discuss about problem Reduction Algorithm.

(or)

3. a. Explain Depth-First search and Breadth –First search in Reasoning.
   b. Explain Non linear planning using constraint posting.

Unit-II

4.a. Advantages and disadvantages of Forward chaining. When compared to backward chaining.
   b. Explain Issues in knowledge Representation.

(or)

5. Write principles of resolution with example.

Unit-III

6. Explain conversion of Clause from with the help of Example.

(or)

7. Write Unification algorithm with the help of example.

Unit-IV

8. a. i) Define and explain below terms
   Morphological Analysis
   Syntactic Analysis
   Semantic Analysis
   Discourse Analysis
   Pragmatic Analysis
   ii) Explain Goal Stack planning.

(or)

9. Explain about Expert systems in detailed.

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MCA 306: Java Programming Lab

1. Write a Java Program to define a class, describe its constructor, overload the constructors and instantiate its object.

2. Write a Java Program to define a class, define instance methods for setting and retrieving values of instance variables and instantiate its object

3. Write a java program to practice using String class and its methods

4. Write a java program to implement inheritance and demonstrate use of method overriding

5. Write a java program to implement multilevel inheritance by applying various access controls to its data members and methods.

6. Write a program to demonstrate use of implementing interfaces

7. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.

8. Write a Java program to implement the concept of importing classes from user defined package and creating packages

9. Write a program to implement the concept of threading by implementing Runnable Interface

10. write a java program to store and read objects from a file

11. Write a Java program that displays the number of characters, lines and words in a text file.

12. write a java program to illustrate object serialization

13. Create a java program to illustrate user defined exception

14. Write a java program to create a thread using runnable interface

15. Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds

16. Write an applet To create multiple threads that correctly implements producer consumer problem using the concept of Inter thread communication

17. Write an applet To handling the mouse events

18. Write a Program That works as a simple calculator using Grid layout to arrange buttons for the digits and +,-,* % operations. Add a text field to print the result.

19. Build and run "CelsiusConverter" sample application using swings

20. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked

MCA 307: UNIX SHELL PROGRAMMING LAB

1) Write a shell script to accept two numbers and perform all arithmetic operations on it
2) Write a shell script to find largest of three numbers using conditional execution operators
3) Write a shell script to check whether a particular user has logged in or not. If he has logged in, also check whether he has eligibility to receive a message or not
4) Write a shell script to accept the name of the file from standard input and perform the following tests on it
   a) File executable
   b) File readable
   c) File writable
   d) Both readable & writable
5) Write a shell script which will display the username and terminal name who login recently in to the unix system
6) Write a shell script to find no. of files in a directory
7) Write a shell script to print the following format

   1
   12
   123
   1234

8) Write a shell script to print prime numbers up to a given range using arguments
9) Write a shell script which will display the number of days in the given month and year
10) Write a shell script to check whether a given number is perfect or not
11) Write a menu driven shell script to copy, edit, rename and delete a file
12) Write a shell script for concatenation of two strings
13) Write a shell script which will display fibonacci series up to a given number of argument
14) Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat

    Rules: avg>=80 then grade A
    Avg<80&&Avg>=70 then grade B
    Avg<70&&Avg>=60 then grade C
    Avg<60&&Avg>=50 then grade D
    Avg<50&&Avg>=40 then grade E
    Else grade F

15) Write a shell script to accept empno,empname,basic. Find DA,HRA,TA,PF using following rules. Display empno, empname, basic, DA,HRA,PF,TA,GROSS SAL and NETSAL. Also store all details in a file called emp.dat

    Rules: HRA is 18% of basic if basic > 5000 otherwise 550
    DA is 35% of basic
    PF is 13% of basic
    IT is 14% of basic
    TA is 10% of basic

16) Write a shell script to demonstrate break and continue statements

17) Write a shell script to satisfy the following menu options
    a. Display current directory path
    b. Display todays date
    c. Display users who are connected to the unix system
    d. Quit
18) Write a shell script to delete all files whose size is zero bytes from current directory
19) Write a shell script to display string palindrome from given arguments
20) Write a shell script which will display Armstrong numbers from given given arguments
21) Write a shell script to display reverse numbers from given argument list
22) Write a shell script to display factorial value from given argument list
23) Write a shell script which will find maximum file size in the given argument list
24) Write a shell script which will greet you “Good Morning”, ”Good Afternoon”, “Good Evening’ and “Good Night” according to current time
25) Write a shell script which will display total size of directories
26) Write a shell script to sort the elements in a array using bubble sort technique
27) Write a shell script to find largest element in a array
28) Write an awk program for display the lines in any file centre alignment
29) Write an awk program to print sum, avg of students marks list
30) Write an awk program to display total number of users and their names in unix system
31) Write an awk program to display students pass/fail report
32) Write an awk program to count the no. of vowels in a given file
33) Write an awk program which will find maximum word and its length in the
    given input File
34) Write a shell script to generate the mathematical tables.
35) Write a shell script to check whether given number is strong or not
36) Write a shell script to sort elements of given array by using selection sort.
37) Write a shell script to search given number using binary search.
38) Write a shell script to find number of vowels, consonants, numbers, white spaces and special characters in a given string.
39) Write a shell script to lock the terminal.
40) Write a shell script which merge the contents of file1, file2, file3, sort them and display the sorted output on the screen page by page.

IV SEMESTER

MCA 401: Principles of Programming Languages

UNIT-I

Preliminaries: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments.

Evolution of the Major Programming Languages: Zuse's Plankalkül, Pseudo codes, The IBM 704 and Fortran, Functional Programming: Lisp, The First Step Toward Sophistication: ALGOL 60, Computerizing Business Records: COBOL, The Beginnings of Timesharing: Basic, Everything for Everybody: PL/I, Two Early Dynamic Languages: APL and SNOBOL, The Beginnings of Data Abstraction: SIMULA 67, Orthogonal Design: ALGOL 68, Some Early Descendants of the ALGOLs, Programming Based on Logic: Prolog, History's Largest Design Effort: Ada, Object-Oriented Programming: Smalltalk, Combining Imperative and Object-Oriented Features: C++, An Imperative-Based Object-Oriented Language: Java, Scripting Languages, The Flagship .NET Language: C#, Markup-Programming Hybrid Languages.

Names, Bindings, and Scopes : Introduction, Names, Variables, The Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants.

Data Types: Introduction, Primitive Data Types, Character String Types, User-Defined Ordinal Types, Array Types, Associative Arrays, Record Types, Tuple Types, List Types, Union Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence, Theory and Data Types.

UNIT-II

Expressions and Assignment Statements : Introduction, Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short-Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment.

Statement-Level Control Structures: Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands, Conclusions.

Subprograms: Introduction, Fundamentals of Subprograms, Design Issues for Subprograms, Local Referencing Environments, Parameter-Passing Methods, Parameters That Are Subprograms, Calling Subprograms Indirectly, Design Issues for Functions, Overloaded Subprograms, Generic Subprograms, User-Defined Overloaded Operators, Closures, Coroutines.

Implementing Subprograms: The General Semantics of Calls and Returns, Implementing "Simple" Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping.

UNIT-III

Abstract Data Types and Encapsulation Constructs : The Concept of Abstraction, Introduction to Data Abstraction, Design Issues for Abstract Data Types, Language Examples, Parameterized Abstract Data Types, Encapsulation Constructs, Naming Encapsulations.

Support for Object-Oriented Programming : Introduction, Object-Oriented Programming, Design Issues for Object-Oriented Languages, Support for Object-Oriented Programming in Specific Languages SmallTalk, C++, Objective-C, Java, C#, Ada 95, Ruby, Implementation of Object-Oriented Constructs.

Concurrency : Introduction, Introduction to Subprogram-Level Concurrency, Semaphores, Monitors, Message Passing, Ada Support for Concurrency, Java Threads, C# Threads, Concurrency in Functional Languages, Statement-Level Concurrency.

UNIT-IV

Exception Handling and Event Handling: Introduction to Exception Handling, Exception Handling in Ada, Exception Handling in C++, Exception Handling in Java, Introduction to Event Handling, Event Handling with Java, Event Handling in C#.

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Languages, The First Functional Programming Language: Lisp, An Introduction to Scheme, Common Lisp, ML, Haskell, F#, Support for Functional Programming in Primarily Imperative Languages, A Comparison of Functional and Imperative Languages.

Logic Programming Languages : Introduction, A Brief Introduction to Predicate Calculus, Predicate Calculus and Proving Theorems, An Overview of Logic Programming, The Origins of Prolog, The Basic Elements of Prolog, Deficiencies of Prolog, Applications of Logic Programming.

Prescribed Book :

Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Pearson Education.

Reference Books:

1. Kenneth C. Louden, “Programming Languages Principles and Practice”, Second Edition, Cengage Learning (2008).

2. Terrence W. Pratt & Mervin V. Zelkowitz, “Programming Languages Design and Implementation”, Fourth Edition, Pearson Education (2008)

Model Paper

MCA 401: Principles of Programming Languages

Time:3Hrs. **Max. Marks : 70M**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a) Aliasing.
b) Structured programming.
c) Type of a variable.
d) Strong Typing.
e) Classes Vs Data types.
f) Coercion.
g) Encapsulation
h) Orthoganality.

Unit – I

2. a)Discuss about user defined data types.
b)Explain how arrays are implemented in a programming language of your choice.

(or)

3. a)Differentiate between static scope and dynamic scope with the help examples.
b)What is binding? Discuss about binding of attributes to variables.

Unit – II

4. a)Discuss about operator overloading.
b)Discuss about modern multiple selections.

(or)

5. a)Discuss about different parameter passing mechanisms.
b)What is referencing environment? Explain about different referencing environment.

Unit – III

6. a) Discuss about Abstraction and Encapsulation
b) Abstract data type in C++.

(or)

7. a) What are the design issues for OO Programming.
b) Monitors.

Unit – IV

8. a)What is exception handling? Explain how it is achieved in Java.
b)Usage of finally clause in Java.

(or)

9. a)Compare and Contrast functional and Imperative programming languages .
b)Discuss the features of logic oriented programming language.

MCA 402: OBJECT ORIENTED MODELING AND DESIGN USING UML

Unit-I

Introduction: what is Object Orientation, What is OO Development, OO Themes, Evidence for Usefulness of OO Development.

Modeling as Design Technique: Modeling, Abstraction, Three Models

Class Modeling: Object and Class Concepts, Link and Association concepts, Generalization and Inheritance, A Sample Class Model.

Advanced Class Modeling: Advanced Object and Class Concepts, Association Ends, N-Ary Association, Aggregation, abstract Classes, Multiple Inheritance, Metadata, Reification, Constraints, Derived data, Packages.

Unit-II

State Modeling: Events, States, Transitions and Conditions, state diagrams, state diagram behavior.

Advanced State Modeling: Nested State Diagrams, Nested states, signal generalization, concurrency, A Sample State Model.

Interaction Modeling: Use Case Models, Sequence Models, Activity Models.

Advanced Interaction Modeling: Use Case Relationships, Procedural Sequence Models, Special Constructs for Activity Models.

Unit-III

Process Overview: Development Stages, Development Life Cycle.

System Conception: Devising a system Concept, Elaborating a Concept, Preparing a Problem Statement.

Domain Analysis: Overview of analysis, Domain Class Model, Domain State model, Domain Interaction Model, Iterating the Analysis.

Application Analysis: Application Interaction Model, Application Class Model, Application State Model, Adding Operations.

Unit-IV

System Design: Overview of system Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Subsystem, Identifying Concurrency, Allocation of Subsystems, Management of data storage, Handling Global Resources, Choosing a Software Control Strategy, Handling Boundary Conditions, Setting Trade-off priorities, Common Architecture of ATM System.

Class Design: Overview of Class Design, Realizing Use Cases, Designing Algorithms, Recursing Downward, Refactoring, Design Optimization, Reification of Behavior, Adjustment of Inheritance, Organizing a class design.

Implementation Modeling: Overview of Implementation, Fine Tuning classes, fine tuning Generalization, Realizing Associations, Testing.

Programming Style: Object Oriented Style, Reusability, Robustness, Extensibility, Programming-in the Large.

Prescribed Book:

Michael Blaha, James Rumbaugh, "Object Oriented Modeling and Design with UML", Second Edition, PHI.

Chapters : 1.1 to 1.4, 2, 3.1 to 3.4,4, 5, 6.1 to 6.5, 7, 8, 10, 11, 12, 13, 14, 15, 17, 20

Reference Books:

1. Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML", Pearson Education (2008).

3. Hans-Erik Eriksson, "UMLZ Took Kit", Wiley (2008).

4. Pascal Roques, "Modeling Software Systems Using UML2", Wiley (2008).

5. Simon Benett, Steve Mc Robb, "Object Oriented Systems Analysis and Design using UML", Second Edition, TMH (2007).

6. Mark Priestley, "Practical Object Oriented Design with UML", Second Edition, TMH (2008).

7. Grady Booch, James Rumbaugh "The Unified Modeling Language User Guide", Pearson (2008).

Model Paper

MCA 402: Object Oriented Modeling and Design with UML

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Distinguish between object diagram and ER-diagram.
b) Define Meta class.
c) Distinguish between Aggregations versus generalization.
d) Explain Constraints.
e) What is analysis document?
f) Need for State-transition diagram?
g) Define modeling?
h) What is multiplicity?

Unit-I

2.a) What is Modeling? What are different Object Modeling Techniques.
b) Discuss how was object oriented development methodology is different from Traditional approach.

(or)

3. Explain the following terms:
i. Association.
ii. Aggregation.
iii. Generalization.
iv. Composition.

Unit-II

4.a) What is State modeling? How does dynamic behavior of a system Represented ?
b) What is an Event? Discuss about types of Events with example?

(or)

5.a) What is Use Case? How was Use Case diagrams were helpful in Analysis of a System.
b) What is Concurrency? Discuss the concurrency with the help of an example.

Unit-III

6. Discuss about the steps involved in Analysis of a System.

(or)

7. a) Define state diagram for ATM Model.
b) Discuss about nested state diagram.

Unit-IV

8.a) What is the task of a design? How would you differentiate a good design from bad design?
b) Discuss about System Testing?

(or)

9.a) Discuss the programming style in the large complex systems.
b) Discuss about good programming style.

MCA 403: WEB TECHNOLOGIES

UNIT I

HTML: Common Tags: List, Tables, images, forms, Frames, Cascading Style Sheets;
Java Script: Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

UNIT II

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX
CGI Scripting: What is CGI? – Developing CGI applications – Processing CGI – Returning a Basic HTML page – Introduction to CGI.pm – CGI.pm methods – Creating HTML pages dynamically.

UNIT III

JDBC: Introduction to JDBC – Connections – Internal Database Connections – Statements – Results Sets - Prepared Statements - Callable Statements.

Network Programming and RMI: why networked Java – Basic Network Concepts – looking up Internet Addresses – URLs and URIs – UDP Datagrams and Sockets – Remote Method Invocation.

Unit –IV

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

Prescribed Textbooks

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (units I, II)
2. Java Programming with JDBC ;Donald Bales, O'Reilly (Unit III)
3. Java Network Programming, elliotte Rusty Harold, 3rd Edition, O'Reilly (Unit III)
4. Java Server Pages – Hans Bergsten, SPD O'Reilly (Unit IV)

Reference Textbooks

1. Robert W. Sebesta, “Programming the World Wide Web”, Third Edition, Pearson Education (2007).
2. Anders Moller and Michael schwartzbach, ”An Introduction to XML and Web Technologies”, Addison Wesley (2006)
3. Chris Bates, “Web Programming–Building Internet Applications“, Second Edition, Wiley (2007).
4. Jeffrey C. Jackson, “Web Technologies – A Computer Science Perspective”, Pearson Education (2008).
5. H.M.Deitel, P.J.Deitel, “Java How to Program”, Sixth Edition, Pearson Education (2007)
6. Debasish Jana,“Java and Object Oriented Programming Paradigm”, PHI (2005).
7. ISRD Group, “Introduction to Object Oriented Programming through Java”, TMH (2007).

Model Paper

MCA 403: web technologies

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. (a) What are HTML tags?
   (b) What are the features of JavaScript?
   (c) What is XML? How is it different from HTML?
   (d) What is DTD?
   (e) What is meant by Session?
   (f) List the JSP implicit objects?
   (g) Define Servlet

2. (a) Create a simple HTML page which demonstrates the use of the various types of lists. Try adding a definition list which uses an unordered list to define terms.
(b) Develop a javascript to determine whether a given number is an 'ARMSTRONG NUMBER' or not.

OR

3. (a) How how group and alignment of tables rows and columns is achieved using HTML.
(b) Describe the various Date Objects with suitable examples.

4. (a) Explain the five possible keywords in a DTD declaration with suitable examples.
(b) Define an XML schema. Show how an XML schema can be created.

OR

5. (a) explain CGI.pm module
(b) explain clearly the steps involved in executing a CGI program

6. (a) Discuss the four types of JDBC drivers.
(b) Give a note on javax.sql package.

OR

7. What is the RMI layer model. What are the steps involved in writing an RMI
Application?

8. (a) What are the limitations of Servlets? How JSP over comes these Problems.
(b) Discuss about Tomcat Server.

OR

9. Explain the components of JSP and how application data can be shared in JSP? Explain

MCA 404 : SOFTWARE ENGINEERING

Unit-I:

Introduction to Software Engineering: The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software: The Quality of legacy software, Software Evolution, Software Myths.

A Generic View of Process: Software Engineering-A Layered Technology, A Process Frame Work, The capability Maturity Model Integration (CMMI), Process Patterns, Process Assessment, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP), Process Technology, Product and Process.

Process Models: Prescriptive Models, The Waterfall Model, Incremental Process Models: The Incremental Model, The RAD Model, Evolutionary Process Model: Prototyping, The Spiral Model, The Concurrent Development Model, Specialized Process Models: Component Based Development, The formal Methods Model, The Unified Process.

An Agile View of Process: What is Agility? What is Agile Process? Agile Process Models: Extreme Programming, Adaptive Software Development, Dynamic Systems Development Method, Scrum, Crystal, Feature Driven Development, Agile Modeling.

Unit-II

Software Engineering Practice: Software Engineering Practice, communication practices, Planning Practices, Modeling Practices, Construction Practices, Deployment.

System Engineering: Computer Based Systems, The System Engineering Hierarchy, Business Process Engineering: An Overview, System Modeling.

Building the Analysis Model: Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Object Oriented Analysis, Scenario Based Modeling, Flow Oriented Modeling, Class Based Modeling, Creating a Behavioral Model.

Design Engineering: Design within the context of Software Engineering, Design Process and Design Quality, Design Concepts, The Design Model, Pattern Based Software Design.

Unit-III

Testing Strategies: A strategic Approach to Software Testing, Strategic Issues, Test Strategies for conventional Software, Testing Strategies for Object Oriented Software, Validation Testing, System Testing, the Art of Debugging.

Testing Tactics: Software Testing Fundamentals, Black Box and White Box Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black Box Testing, Object Oriented Testing Methods, Testing Methods Applicable at the class level, InterClass Test Case Design, Testing for Specialized Environments, Architectures and Applications, Testing Patterns.

Project Management: The Management Spectrum, The People, The Product, The Process, The Project, The W5HH Principles.

Metrics for Process and Projects: Metrics in the Process and Project Domains, Software Measurement¸ Metrics for Software Quality, Integrating Metrics within Software Process, Metrics for Small Organizations, Establishing a Software Metrics Program.

Unit-IV

Estimation: Observations on Estimations, The project planning process, Software Scope and Feasibility, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimations for Object Oriented Projects, Specialized Estimation Techniques, The Make/Buy Decision

Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, the SQA Plan

Formal Methods: Basic Concepts, Object Constraint Language (OCL), The Z specification language, The Ten Commandments for Formal Methods.

Cleanroom Software Engineering: The Cleanroom Approach, Functional Specification, Cleanroom Design, Cleanroom Testing.

Prescribed Book:
Roger S Pressman, “Software Engineering–A Practitioner’s Approach”, Sixth Edition, TMH International.

Chapters : 1,2,3,4,5,6,8,9,13,14,21,22,23,26,28,29

Reference Books:

1. Sommerville, “Software Engineering”, Seventh Edition Pearson Education (2007)
2. S.A.Kelkar, “Software Engineering – A Concise Study”, PHI.
3. Waman S.Jawadekar, “Software Engineering”, TMH.
4. Ali Behforooz and Frederick J.Hudson, “Software Engineering Fundamentals”, Oxford (2008).

Model Paper

MCA 404: Software Engineering

Time: 3 Hr **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Define is Software Crisis?
b) List the advantages of Formal Methods?
c) What is meant by "Product is Right"?
d) Give the characteristics of a good design?
e) Explain top-down integration?
f) Goals of Software Engineering?
g Difference between Error and Bug?
h) What is the importance of Certification?

Unit-I

2.a) Describe Software Characteristics.
b) Explain agile software process.

(or)

3.a) Explain Spiral Model and its suitability
b) Why Software Myths becomes constraints to software process.

Unit-II

4.a) What is Use Case? Discuss about the importance of Use Cases in Software Engineering.
b) What is Class? Explain Class Responsibility Collaborator Modeling.

(or)

5. Discuss different Levels of Data Flow Diagrams with the help of an example.

Unit-III

6.a) What is the role of Basis Path Testing in software testing?
b) What is Test Case? Prepare a Test Case for Factorial of a number.

(or)

7.a) Discuss about Function Oriented Metrics.
b) What is Debugging? Explain about Debugging Strategies.

Unit-IV

8.a) What are the attributes of the Quality?
b) Explain Clean room software engineering approach.

(or)

9.a) Describe the COCOMO Model?
b) Why software Quality Assurance is important?

MCA 405.1 : GRID AND CLUSTER COMPUTING

Unit-I

Introduction : The Data Centre, the Grid and the Distributed / High Performance Computing, Cluster Computing and Grid Computing, Metacomputing – the Precursor of Grid Computing, Scientific, Business and e-Governance Grids, Web Services and Grid Computing, Business Computing and the Grid – a Potential Win – win Situation, e-Governance and the Grid.

Technologies and Architectures for Grid Computing : Clustering and Grid Computing, Issues in Data Grids, Key Functional Requirements in Grid Computing, Standards for Grid Computing, Recent Technological Trends in Large Data Grids

World Wide Grid Computing Activities, Organizations and Projects : Standard Origanizations, Organizations Developing Grid Computing Tool Kits, Framework, and Middleware, Grid Projects and Organizations Building and Using Grid Based Solutions, Commercial Organizations Building and Using Grid Based Solutions.

Unit-II

Web Services and the Service Oriented Architecture (SOA) : History and Background, Service Oriented Architecture, How a Web Service Works, SOAP and WSDL, Description, Creating Web Services, Server Side.

OGSA and WSRF: OGSA for Resource Distribution, Stateful Web Services in OGSA, WSRF (Web Services Resource Framework), Resource Approach to Stateful Services, WSRF Specification.

Globus Toolkit : History of Globus Toolkit, Versions of Globus Toolkit, Applications of GT4-Cases, GT4-Approaches and Benefits, Infrastructure Management, Monitoring and Discovery, Security, Data, Choreography and Coordination, Main Features of GT4 Functionality – a Summary, GT4 Architecture, GT4 Command Line Programs, GT4 Containers

The Grid and the Databases : Issues in Database Integration with the Grid, The Requirements of a Grid-enabled Database, Storage Request Broker (SRB), How to Integrate the Databases with the Grid?, The Architecture of OGSA-DAI for Offering Grid Database Services

Unit-III

What is Cluster Computing? : Approaches to Parallel Computing, How to Achieve Low Cost Parallel Computing through Clusters, Definition and Architecture of a Cluster, What is the Functionality a Cluster can Offer? Categories of Clusters

Cluster Middleware : An Introduction : Levels and Layers of Single System Image (SSI), Cluster Middleware Design Objectives, Resource Management and Scheduling, Cluster Programming Environment and Tools

Early Cluster Architectures and High Throughput Computing Clusters : Early Cluster Architectures, High Throughput Computing Clusters, Condor

Networking, Protocols & I/O for Clusters : Networks and Inter-connection/Switching Devices, Design Issues in Interconnection Networking/Switching, Design Architecture-General Principles and Trade-offs, HiPPI, ATM (Asynchronous Transmission Mode), Myrinet, Memory Channel (MC), Gigabit Ethernet

Unit-IV

Setting Up and Administering a Cluster : How to Set Up a Simple Cluster?, Design Considerations for the Front End of a Cluster, Setting Up Nodes, Clusters of Clusters or Metaclusters, System Monitoring, Directory Services Inside the Clusters & DCE, Global Clocks Sync, Administering Heterogeneous Clusters

Cluster Technology for High Availability : Highly Available Clusters, High Availability Parallel Computing, Mission Critical (or Business Critical or Business Continuity) Applications, Types of Failures and Errors, Cluster Architectures and Configurations for High Availability, Faults and Error Detection, Failure Recovery, Failover/Recovery Clusters

Load Sharing and Load Balancing : Load Sharing and Load Balancing, Strategies for Load Balancing, Modelling Parameters

Distributed Shared Memory : Issues in DSM, Write Synchroni- zation for Data Consistency, Double Faulting, Application/Type Specific Consistency, Issues in Network Performance in DSM

Prescribed Book:

C.S.R.Prabhu – “Grid and Cluster Computing”-PHI(2008)

Chapters: 1 to 13, 16, 17.

Reference Book:

Jankiram, “Grid Computing Models : A Research Monograph”, TMH (2005)

Model Paper

MCA 405.1 : Grid and Cluster Computing

Time: 3Hrs. **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.
a) What is e-science?
b) Compare Globus and Legion.
c) What is a Web Service?
d) Write different categories of Clusters.
e) Define Cluster middleware.
f) Compare Gigabit Ethernet with ATM.
g) What is a Watchdog timer?
h) What is double faulting?

UNIT – I

2. a) What is metacomputing? What is its relationship with the grid?
b) What is datagram architecture? Explain its main features.

(or)

3.a) Compare and contrast Condor, CondorG, Nimrod, NimrodG and NMI.
b)What are the objectives, functions and achievements of Global Grid Forum (GGF)?

UNIT - II

4. a) Explain what is SOA and how it functions?
b) What is WSRF? What are its benefits? Where is it available?

(or)

5.a)Explain the architecture and functionality modules of Globus Toolkit (GT4).
b)How does grid enable a DBMS?

UNIT - III

6. a) What is Cluster computing ? Why is it needed?
b) Explain Cluster middleware design objectives.

(or)

7. a)Explain Condor architecture.
b)What are the different design issues in interconnection Networking/Switching?

UNIT - IV

8. a) How to setup a simple cluster? What are the design considerations for the front end of a cluster?
   b) Explain the various cluster architectures and configuration for high availability.

(or)

9. a) Explain static and dynamic load sharing approach.
   b) What is DSM? Why is it required in cluster and what are the various issues in DSM?

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MCA 405.2: CRYTOGRAPHY AND NETWORK SECURITY

Unit-I

Introduction: Security trends, the OSI security architecture, security attacks, security services, security mechanisms, a model for network security.

Classical encryption techniques: **Symmetric cipher model,Substitution techniques, Transposition techniques, Rotor machines, Steganography.**

Block cipher and the data encryption standard: Blockcipher principles, the strength of DES, Differential and linear cryptanalysis, Block cipher design principles.

Confidentiality using Symmetric Encryption: Placement of encryption function, Traffic confidentiality, key distribution, random number generator.

UNIT-II

Public key cryptography and RSA: Principles of public key crypto systems, The RSA algorithm

Key management:Other public-key crypto systems: Key management, Diffie-Hellman key exchange.

Message authentication and hash functions: Authentication requirements, Authentication functions, message authentication codes, Hash functions, security of hash functions and MACs.

Digital signatures and authentication protocols: Digital signatures, Authentication protocols, Digital Signature standard.

UNIT-III

Authentication Applications: Kerberos, X.509 authentication service

Email Security: Pretty good privacy, S/MIME

IP security: IP security overview, IP security architecture, Authentication header, Encapsulating security payload, combining security associations, key management.

Web security: Web security considerations, Secure Socket Layer and transport layer security, Secure electronic transaction.

UNIT-IV

Intruders: Intruders, Intrusion detection, password management

Malicious Software: Viruses and related threads, virus counter measures, distributed denial of service attacks.
Firewalls: Firewall Design principles, trusted systems, common criteria for information technology, security evaluation.

Prescribed Book:

William Stallings, "Cryptography and Network Security",
Fourth edition, PHI.

Chapters : 1,2,3,7,9,10,11,13,14,15,16,17,18,19,20

Reference Books:

1. William Stallings, "Network Security Essentials – Applications and Standards", Third Edition, Pearson Education (2007).

2. Chris McNab, "Network Security Assessment", 2nd Edition, OReilly (2007).

3. Jon Erickson, "Hacking – The Art of Exploitation", SPD, NOSTARCH Press (2006).

4. Neal Krawety, "Introduction to Network Security", Thomson (2007).

5. Ankit Fadia, "Network Security – A Hackers Perspective", Macmillan (2008)

Model Paper

MCA 405.2: Cryptography and Network Security

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: 7 x 2 = 14 M
Answer ONE Question from each unit: 4 x 14 = 56 M

Section-A

1.a) Abbreviate VIRUS.
b) What is meant by interception?
c) What are the various places where the data can get hacked?
d) What is the difference between authentication and authorization?
e) Explain the role played by the certificate management authority in providing security for the data.
f) SEPP architecture.
g) What are the different elements involved in cryptography?
h) Digital signatures.

Section-B
Unit- I

2.a) Discuss various ways of hacking the data.
b) Discuss the way to encrypt data using substitution techniques. Explain it with suitable example.

(or)

3.a) Write the structure of stream cipher.
b) Discuss the process of encryption using triple DES method.

Unit- II

4.a) Explain Diffie-Hellman key exchange algorithm.
b) What is hashing? Write the procedure to calculate the hash value in brief.

(or)

5. Discuss different authentication protocols.

Unit-III

6.a)Discuss S-MIME functionality. Explain how it differs from MIME?
b) What is dual signature? Explain the process of calculating it.

(or)

7. Discuss in detail about the IP security.

Unit-IV

8. a) Write the rules for selecting passwords. Also explain how a password can be managed?
b) Discuss various virus prevention measures.

(or)

9. Describe firewall design principles.

MCA 405.3: SIMULATION MODELING AND ANALYSIS

UNIT I:

Basic simulation Modeling: Systems , models and simulation, Discrete-Event simulation , Simulation of an inventory system, Problem statements, program organization and Logic, C program, simulation output and discussion, Steps in a Sound Simulation Study
Other types of simulation: Continuous simulation, Combined Discrete continuous simulations, Monte Carlo Simulation, Spreadsheet simulation, Advantages , disadvantages and Pitfalls of Simulation

UNIT II:

Modeling Complex Systems: Introduction, List Processing in Simulation, A simple Simulation Language: simlib, Single Server Queueing Simulation with simlib, Time-Shared Computer Model, Multiteller Bank with Jockeying, Job-Shop Model, Efficient Event List Manipulation.

UNIT III:

Simulation Software: Introduction, Comparison of simulation packages with Programming languages , Classification of Simulation Software. General purpose versus Application Oriented Simulation Packages, Modeling Approaches, Common Modeling Elements, Desirable Software features, General Capabilities, Statistical capabilities, Customer support and documentation, Object-Oriented Simulation.

UNIT IV:

Random-Number Generators: Introduction, Linear Congruential generators , Mixed generators, Multiplicative generators, Composite generators, Empirical Tests, Theoretical tests,
Generating random variates: General approaches to generating random variates, Inverse Transform, Acceptance –Rejection , Generating continuous Random variates, Uniform , Exponential, weibull and normal.

Prescribed Book:

1. Averill M Law, “Simulation Modeling and Analysis”, Fourth Edition, TMH (2008)

Chapters: 1, 2, 3, 7, 8

Reference Book :

Jerry Banks, John S.Carson And Berry L. Nelson & David M. Nicol, “Discrete Event System Simulation”, 3rd Edition, Pearson Education

Model Paper

MCA 405.3: Simulation Modeling And Analysis

Time: 3 Hrs **Max. Marks:70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Give any four applications of Simulation?
  b) Define System State.
  c) Compare the Simulation Packages with Programming Languages.
  d) What is the difference between verification and validation?
  e) What is Random Variable?
  f) Describe the candidate generation in queuing system?
  g) Define Bernouli Principle for Random Variate.
  h) What is Hypothesis?

Unit-I

2.a) Discuss about steps involved in simulation study?
  b) Explain the simulation of Inventory System?

(or)

3.a) What is Discrete Event Simulation? Discuss about simulation process of any real world system.
  b) What are the advantages and disadvantages of simulation.

Unit-II

4. Discuss about the simulation of single server queueing process.

(or)

5. Ships arrive at a harbor with interarrival times that are IID exponential random variables with a mean of 1.25days. The harbor has a dock with two berths and two cranes for unloading the ships; ships arriving when both berths are occupied join a FIFO queue. The time for one crane to unload a ship is distributed uniformly between 0.5 and 1.5 days. If only one ship is in the harbor, both cranes unload the ship and the (remaining) unloading time is cut in half. When two ships are in the harbor, one crane works on each ship. If both cranes are unloading one ship when a second ship arrives, one of the cranes immediately begins serving the second ship and the remaining service time of the first ship is doubled. Assuming that no ships are in the harbor at time 0, run the simulation for 90 days and compute the minimum, maximum, and average time that ships are in the harbor (which includes their time in berth). Also estimate the expected utilization of each berth and of the cranes. Use stream I for the interarrival times and stream 2 for the unloading times.

UNIT III

6. Describe about different classifications of Simulation Software.

(or)

7. Give the features of System Simulation Software?

Unit-IV

8. Discuss about different kinds of testing methods to check the Random Number Generators.

(or)

9. Explain the following distributions
   i. Normal Distribution.
   ii. Poisson Distribution.

MCA 406 : WEB TECHNOLOGIES LAB

1. Develop and demonstrate a HTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the tag.

2. Write HTML code to provide intra document linking.

3. Create a form with the following specifications:

   a) Our form uses frames, one to hold the links bar at the top of the browser window.
   b) Other is a larger frame that provides the main view.
   c) The links bar should contain 5 links, which when clicked, should display the appropriate HTML file in the larger frame.

4. to create a webpage with the following using html

   a. to embed an image in web page

   b. to fix the hot spots

   c. show all the related information when a hot spot is clicked in the map

5. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.

6. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.

7. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)

8. Write a JavaScript code to find factorial of N. (Use recursive function)

9. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.

10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the images. Use the onMouseOver and onMouseOut event handlers.

11. Design an XML document to store information about a student in an engineering college affiliated to ANU. The information must include college id, Name of the College, Brach, Year of

Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.

12. Create an XML document, which contains 10 users information. Implement a program, which takes User Id as an input and returns the user details by taking the user information from the XML document

13. write a program for implementing student information using XML

14. write a java program to illustrate java to database connectivity using JDBC

15. Write a program to print the Fibonacci numbers using RMI.

16. Write a program using RMI to access the database using the primary key value and return the data to the client.

17. Write a html program for invoking servlet from applet

18. write a java servlet program to conduct online examination and to display student mark list available in a database

19. Create a java program to create an airline reservation service and a travel agent and the travel agent is searching for an airline using web services and database.

20. Write a JSP program to calculate income tax, login and data capture.

MCA 407 : VISUAL PROGRAMMING LAB

1. Develop an Visual Basic Application to display the Profile of a Valid User.

   Conditions:

   i. Check the User with his User Name and Pass Word.
   ii. Display the Profile of the User. (Note: Profile of the user will be any of “READ”, “WRITE” and “READ AND WRITE”

2. Develop an Visual Basic Application to search an item from list of items using Binary Search.

3. Develop an Visual Basic Application to demonstrate the Stack Operations.

4. Develop an Visual Basic Application to demonstrate the Queue Operations.

5. Develop an Visual Basic Application to check the given string is palindrome or not.

6. Develop an Visual Basic Application to find out the factorial of the given number by using functions

7. Develop an Visual Basic Application to Check the given number in one of categories like
   i. Strong Number.
   ii. Perfect Number.
   iii. Palindrome.
   (Note: Use Sub Program Concept)

8. Develop an Visual Basic Application for copying the elements from one list to the other list and Vice-versa. (Note: Implement Single Element, Multiple Element Transfer between the lists)

9. Develop an Visual Basic Application to implement the Calculator operations by using Control Array.

10. Develop an Visual Basic Application to Implement the Traffic Signal Operations by using the following conditions

    i. Three Traffic Signal named “RED”, “GREEN” and “YELLOW”
    ii. Signal Flow should be RED->YELLOW->GREEN.
    iii. Time Out for Red signal is 10, Green signal is 10 and Yellow signal is 5.
    iv. Always Yellow Signal follows either Red or Green.
    v. Red and Green Signals will not appear one by one.

11. Develop an Visual Basic Application to sort the given list of numbers. (D’t use the Sort option of the List Control)

12. Develop an Visual Basic Application to read and Print the user data by using Input Box and Message Box.

13. Develop an Visual Basic Application to Read the Details of the Candidate using following Conditions

    i. Read the Name, Father Name, Address, Qualifications and respective percentages and Experience if any.
    ii. Candidate may choose any TWO OS Types (MAX)
    iii. Candidate may Choose any THREE Database (MAX)
    iv. Candidate may choose any FIVE Programming Languages (MAX)

    (Note: No Control in the Form will be NULL)

14. Develop an Visual Basic Application to generate the Telephone Bill.

15. Develop a Visual Basic Application to make survey on different age groups.

    Example:
Age groups may be (25-34), (35-44), (45-54) and >=55 and display the no of people on a particular age group.

16. Develop an Visual Basic Application to implement the Arithmetic operations.

    i. Project Consists of Four Forms
    ii. Form1 is used to Read the numbers and read the operation.
    iii. Operations are partitioned into two categories like Integer Arithmetic and Real Arithmetic should follow the normalization principles.
    iv. Choose the appropriate arithmetic operation under Integer and Real arithmetic under Addition, Subtraction, Multiplication and Division.
    v. Form2 is for doing Integer Arithmetic and Form3 is for doing Real Arithmetic.
    vi. Form 4 is for Display the result.

17. Develop an Visual Basic Application to make the following database operations by using ADO,

    i. Insert an New Employee into the database.
    ii. Delete an Existing Employee from the database.
    iii. Update the employee information on the basis of Employee number.
    iv. Search an employee details on the basis of department number.

18. Develop an Visual Basic Application to make the following operations on Employee database.

    i. Search an Employee on the basis of Employee number.
    ii. Navigate and display the records on MOVE FIRST, MOVE NEXT, MOVE PREVIOUS, MOVE LAST.

19. Develop an Visual Database application by using Data Environment and PL/SQL procedures.
    i. Insert the employee details into the database by using PL/SQL Procedure.
    ii. Update the employee information in basis of employee number by using PL/SQL procedure.
    iii. Delete a employee information in basis of employee number by using PL/SQL procedure.
    iv. Generate a report for
        a. Recently joined employees
        b. Department wise and in the order of experience.
        c. Complete Employee Details.

20. Develop an Database application for Telephone Billing System.

MCA 408 : SOFT SKILLS

Prescribed Books :

1. Wallace, Masters, “Personality Development”, Cengage Learning (2008)
2. Edgar Thorpe, Showick Thorpe, “Winning at Interviews”, Second Edition, Pearson Education (2007)

Reference Books :

1. Peter Urs Bender, Dr. Robert A. Tracz, “Secrets of Face to Face Communication”, Macmillan (2007)
2. Deepika Nelson, “Essential Key for Corporate Threshold”, BS Publications (2008)

V SEMESTER

MCA 501 : DATA MINING AND BIG DATA

Unit – I

Data Warehouse and OLAP Technology: An Overview: What is Data Warehouse? - A Multidimensional Data Model - Data warehouse Architecture - From Data Warehousing to Data Mining

Data mining – Introduction, Data mining on what kind of data , Data mining functionalities classification of Data mining systems, Major issues in Data mining

Unit – II

Mining Association rules in large databases - Association rule mining, Mining single-Dimensional Boolean association rules from Transactional databases, Mining multi-Dimensional Association rules from relational Databases and Data Warehouses

Classification and Prediction - Introduction classification by decision tree induction, Bayesian Classification. Other classification methods, classification by back propagation, Prediction, classifier accuracy

Unit – III

Cluster analysis – Introduction types of data in cluster analysis a categorization of major clustering methods portioning methods, hierarchical methods, Density based methods,: DBSCAN, Grid-based method : STRING , Model based clustering method: Statistical Approach, outlier analysis.

Unit – IV

Big Data: Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications.

Hadoop: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., Hadoop MapReduce paradigm. Writing Hadoop MapReduce Programs

Prescribed Books :

1. Jiawei Han Micheline Kamber, “Data mining & Techniques”, Morgan Kaufmann publishers
2. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
3. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.
4. Tom White, “HADOOP: The definitive Guide” , O Reilly 2012.

Model Paper

MCA 501 : Data Mining and Big Data

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a) Mention different OLAP operations
   b) Define Data Mining
   c) Explain in brief "Association Rule Mining"
   d) What is Prediction?
   e) Name the two data structures used in cluster analysis
   f) define primary and secondary name nodes.
   g) explain file read and write commands in hadoop

UNIT – I

2. a) What are the different data partitioning techniques and explain the importance of data partitioning?
   b) What is ETL Process and explain the ETL Architecture

OR

3. a) Explain the major issues in data mining
   b) Explain data mining as a step in the process of knowledge discovery

UNIT – II

4. a) How can we mine multilevel Association rules efficiently using concept hierarchies? Explain.
   b) Explain Apriori algorithm with example and how the efficiency of Apriori algorithm can be improved.

OR

5. a) Write a brief on classification of data mining systems
   b) Can we design a method that mines the complete set of frequent item sets without candidate generation? If yes, explain with example.

UNIT – III

6. a) Explain different grid-based clustering methods
   b) What are the typical requirements of clustering in data mining? Explain

OR

7. Write algorithms for k-Means and k-Medoids and explain how they work with example.

UNIT – IV

8. a) What is Bigdata? and discuss in detail why big data is more important with real time examples
   b) Discuss Bigdata in terms of three dimensions, volume, variety and velocity

OR

9. a) Discuss the design of Hadoop distributed file system and concept in detail
   b) Explain in detail about map-reduce in detail and discuss partitioning and combining

MCA 502 : .NET PROGRAMMING

UNIT-I: Visual basic 2005:

Getting started with Visual Basic 2005: Arithmetic Operators, Data type, Statements, Control Statements, Loops, Arrays, Structures,Val and Structure functions, Creating Visual studio Applications, Saving Visual Basic 2005 Application.

Object Oriented Programming: Basic Principles of Object Oriented Programming, Member Access Modifiers, Define Class, creating Objects, Constructors, Inheritance, Abstract Classes, Interfaces, Polymorphism

Windows Forms: Introduction to the windows forms, Setting the title Bar Text, Minimizing and Maximizing a form, Setting initial position of a form, Working with multiple forms, Creating adding controls to a form, Setting controls Tab order, Naming Controls, Setting Properties at design time, Setting properties at run time, Creating a message box, Creating a Input box, Creating MDI Applications, Creating Dialog box, Commenting the code

Label, TextBox, Button, ComboBox and ListBox Controls: Label Control, Button Control, ComboBox Control, ListBox Control, Project

Panel, PictureBox, Progress Bar and Timer Controls: Panel Control, Picture box Control, Progress Bar Control, Timer Control, Project

Checkbox, radio button, and group box controls : Checkbox control, Radio button control, Progress bar control, Timer control, Project.

Menus, built-in dialog box, printing and tree view controls: Menus, Folder Browser Dialog Control, Open File Dialog Control Save File Dialog Control, Font File Dialog Control, Color File Dialog Control, Print Document Control, Tree View Control, Project

Mouse Events and Keyboard Events: Mouse Events, Keyboard Events

Handling Errors and Exceptions: Errors, Exceptions

UNIT-II : ASP.NET 2.0

ASP.NET 2.0 Essentials: Introduction to Asp.NET, Benefits of Asp.NET, What's new Asp.NET?, Introduction Asp.NET 2.0 IDE

Developing a Web Application :HTML, DHTML, PHP, JSP, PERL, ASP.NET 2.0 Provider Model, ASP.NET 2.0 Coding Model, Code Sharing, Compilation in ASP.NET

Standard Controls: Introduction to standard controls, Label Control, TextBox Control, Button Control, Image Button Control ListBox Control, Radio Button Control

Navigation Controls: Introduction to Navigation Controls, Site Map Path Controls, Menu Controls, Tree View Controls

Validation Controls: Introduction to validation control, Base validator class, Required field validator control, Range validator control, Regular Expression validator control, Compare validator control, Custom validator control, Validation summary control

Login controls: Introduction to login controls, Login control Login view control, Login name control, Login status control Password recovery control

Master pages and Themes: Need for Master Pages and Themes, Creating a Simple Master Page, Creating a Nested Master Page Themes, Creating Themes, Applying Themes on controls at Run time

UNIT-III: C# 2005

Introduction to Visual C# 2005: Introduction, Features of Visual C# 2005, Creating Visual C# 2005, Key words, Identifiers, Data Types, Variables, Scope of Variables, Constants, Operators Operator Precedence and Associativity, Expressions, Punctuators Control Statements, Loops, Interrupting Loops using Jump Statements, Creating Arrays, Creating Enumerations, Creating Structures, Methods

Object Oriented Programming : Basic Principles of Object Oriented Programming, Member Access Modifiers, Defining a Class, Creating Objects, Constructors, Static Members, Inheritance, Abstract Class,Interfaces, Polymorphism, Operator Overloading

Windows Forms : Introduction to Windows form, Setting the title bar Text, Minimizing or Maximizing a forms, Working with multiple Forms, Setting the startup form, Adding controls to a form, Setting controls Tab order, Setting properties at Design time, Setting properties at Run time, Showing and Hiding controls and Forms, Creating a message box, Commenting the code, Handling Events.

Label, TextBox, Button, ComboBox and ListBox Controls: Label Control, TextBox Control, Button Control, ComboBox Control ListBox Control, Project

Panel, PictureBox, Progress Bar and Timer Controls: Panel Control, Picture box Control, Progress bar Control, Timer Control Project

Checkbox, Radio button and Group box controls : Checkbox control, Radio button control,GroupBox Control, Project

Menus, built-in dialog box, printing and tree view controls: Menus, Folder Browser Dialog Control, Open File Dialog Control Save File Dialog Control, Font File Dialog Control, Color File Dialog Control, Print Document Control, Tree View Control, Project

Mouse Events and Keyboard Events: Mouse Events, Keyboard Events

Handling Errors and Exceptions: Errors, Exceptions

UNIT-IV : ADO.Net & Data Binding :

Accessing Data using ADO.NET (C# 2005): What are Databases? Basic SQL Statements, Working with ADO.NET, Overview of ADO.NET Objects Data Grid View Control, Accessing Data using Server Explorer, Creating a new data connection, Accessing data using data adaptors and data sets, Previewing data from data adaptors Connecting to an MS Jet database

Data Binding(C# 2005): Introduction, Simple Data Binding, Complex Data Binding, Implementing Data Binding, Project

Working with Databases (ASP.NET 2.0): What are Databases? Working with ADO.NET, Overview of ADO.NET Objects, Basic SQL statements, ASP.NET 2.0 data display controls, ASP.NET 2.0 data source controls, Accessing data with server explorer, Creating a web applications using data display controls

Accessing data using ADO.NET (Visual Basic 2005): What are Databases?, Basic SQL statements, Working with ADO.NET, Overview of ADO.NET objects, Data Grid View Control, Accessing data using server explorer, Creating a new data connection, Accessing data using Data Adapters and Datasets, Previewing data from Data Adapters, Connecting to an MS Jet database

Data Binding (Visual Basic 2005): Introduction, Simple Data Binding, Complex Data Binding, Implementing Data Binding, Project

Prescribed Book:

Vikas Gupta, ".Net Programming", Dream Tech (2008).
Chapters :

UNIT – I - 1 to 8, 11 chapters in Visual Basic 2005
UNIT – II – 1 to 7, 9 chapters in ASP.NET 2.0
UNIT – III – 1 to 8, 11 chapters in C# 2005
UNIT – IV – 9, 10 chapters in Visual Basic 2005, 8 chapter in ASP.NET 2.0, 9, 10 chapters in C# 2005

Reference Books:

1. Xue Bai, Michael Ekedah, "The Web Warrior Guide to Web Programming", Thomson (2006).

2. Kogent Solutions Inc.,".Net Programming", Black Book, Dream Tech (2008).

3. Joe Duffy, "Professional.Net Programming 2.0", Wiley.

4. George Stepherd, "ASP.NET 3.5 Microsoft", PHI (2008).

Model Paper

MCA 502: .Net Programming

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Define data binding
b) Explain login controls
c) What is master page
d) Describe Data Adapter
e) Explain docking and anchoring controls
f) Give the difference between check box radio button and group box controls
g) Define event and write different types of event
h) What are the characteristics of interface

Unit-I

2.a) Briefly explain about data types and keywords.
b) Write the procedure for an application which checks whether the entered user is valid or not.

(or)

3. a) Explain the following controls
i. Menus
ii. Timer
iii. PictureBox
iv. Tree view
b) Explain mouse events and key board events.

Unit-II

4. a) Explain all the validation controls.
b) Write the procedure to design the application which allows the valid user to enter into it.

(or)

5. a)Briefly explain about master pager and themes
b) With suitable example explain the navigation controls.

Unit-III

6.a) What are the concepts of object oriented programming.
b) Explain the following controls
i. ComboBox
ii. ListBox
iii. Panel
iv. Builtin dialogBox

(or)

7.a) Explain the steps involved in windows form design and interface
b) Write the procedure for coffee shop billing application (use checkbox)

Unit-IV

8.a) What is data binding? Explain the types of data binding how data binding can be implemented.

b) What are the ADO.NET objects.

(or)

9. Develop an application for student details which

i. Can access database

ii. Can bound to the controls

iii. Can display the details in a form

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MCA 503: DESIGN AND ANALYSIS OF ALGORITHMS

Unit-I

Introduction : What is Algorithm – Algorithm Specification : Pseudocode Conventions – Recursive Algorithms ; Performance Analysis: Space Complexity – Time Complexity – Asymptotic notation – Performance Measurement; Randomized Algorithms : Basics of probability theory – Randomized algorithms – Identifying the repeated element, Primality Testing – Advantages and Disadvantages.

Elementary Data Structures: Stacks and Queues ; Trees : Terminology – Binary Trees ; Dictionaries : Binary Search Trees ; Priority Queues : Heaps – Heapsort ; Sets and disjoint set Union : Introduction – union and find operations. ; Graphs: Introduction – Definitions – Graph Representations.

Divide – and – conquer: General Method – Defective Chess Board – Binary Search – Finding Maximum and Minimum – Merge Sort – Quick sort – Selection Problem ; Strassen's Matrix Multiplication, Convex Hull: some geometric Primitives – The Quick Hull Algorithm – Graham's scan – An 0(nlogn) divide – and – conquer algorithm.

Unit–II

The Greedy Method : The general Method – Container loading – Knapsack Problem – Tree Vertex Splitting – Job sequencing with deadlines ; Minimum cost spanning trees : Prim's Algorithm – Kruskal's Algorithm – Optimal Storage on tapes – Optimal Merge patterns – Single Source shortest paths.

Dynamic Programming : The general method – Multi-stage graphs – All pairs shortest paths – Single source shortest paths – Optimal Binary Search Trees – String editing – 0/1 Knapsack – Reliability design – The traveling sales person problem – Flow shop Scheduling

Unit–III

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for graphs : Breadth First Search and Traversal – Depth First Search ; Connected Components and Spanning Trees – Bi-connected components and DFS

Back Tracking : The general method – The 8-queens problem – sum of subsets – Graph coloring – Hamiltonian Cycles – Knapsack Problem .

Unit–IV

Branch and Bound : The Method: Least Cost search – The 15 puzzle – control abstractions for LC search – Bounding – FIFO Branch – and – Bound – LC Branch and Bound; 0/1 knapsack problem: LC Branch and Bound solution – FIFO Branch and Bound solution; Traveling Sales person.

NP-Hard and NP – complex problems : Basic concepts : Non deter-ministic algorithms –The classes NP hard and NP complex ; Cook's theorem – NP hard graph problems : Clique Decision Problem – Node cover decision problem – chromatic number decision problem – Directed Hamiltonian cycle – Traveling sales person decision problem – and/or graph decision problem; NP-hard scheduling Problems: scheduling identical processors – flow shop scheduling – jop shop scheduling; NP-hard code generation problems:code generation with common subexpressions – Implementing parallel assignment instructions; Some simplified NP-hard problems.

Prescribed Book:

Sartaj Sahni,"Fundamentals of Computer Algorithms", Second Edition, Universities Press (2008)

Chapters : 1 to 8 and 11

Reference Books :

1. Anany Levitin, "Introduction to the Design & Analysis of Algorithms", Second Edition, Pearson Education (2007).

2. I.Chandra Mohan, "Design and Analysis of Algorithms", PHI.

3. Prabhakar Gupta, Vineet Agrawarl, "Design and Analysis of Algorithms", PHI.

4. Parag Himanshu Dave, "Design and Analysis of Algorithms", Pearson Education (2008)

Model Paper

MCA 503: Design And Analysis Of Algorithms

Time : 3 hrs **Max Marks : 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. a) What are Huffman codes ?
   b) Explain dominance rule.
   c) State the general method for dynamic programming.
   d) Write the difference between divide-and-conquer and the greedy method.
   e) State the principle of optimality ?
   f) Write the formulae developed by strassen to multiply matrices ?
   g) What is the average time complexity for constructing a heap tree ?

UNIT – I

2. a) Explain control abstraction for divide – and – conquer strategy. (7M)
   b) Explain the process of constructing convex hull. Also write its algorithm and complexity . (7M)

(or)

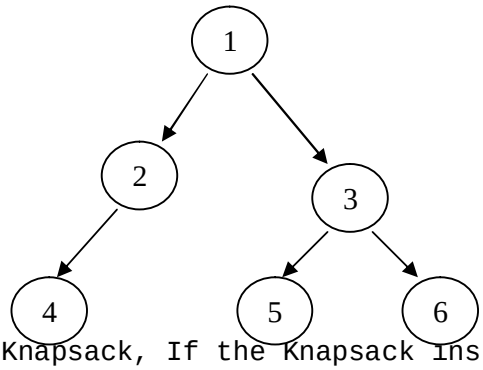
3.a) Derive the average time complexity for quick sort. (7M)
   b) Write a randomized algorithm to perform primality testing. (7M)

UNIT – II

4. a) State the problem of "optimal storage on tapes". If three programs of length (l1,l2,l3)= (5,10,3).Find the optimal way to store those programs on tapes using greedy method. (7M)
   b) Find optimal binary search tree for the identifiers (do, if, while). Let p(1:3) = (3,3,1) and q(0:3)=(2,3,1,1). Solve it using dynamic programming (7M)

(or)

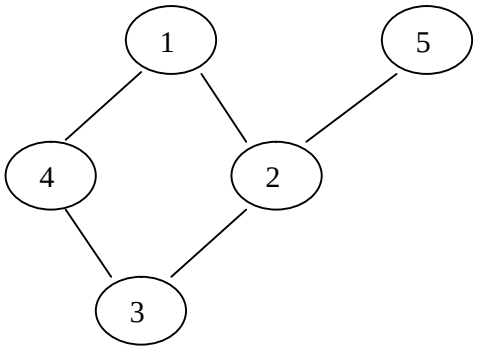
5. a) Write the problem of tree vertex splitting. Find the places where boosters are needed for the following tree, for δ=5 (7M)



   b) Solve O/I Knapsack, If the Knapsack instance n=3 (w1,w2,w3)=(2,3,4) & (p1,p2,p3)=(1,2,5) and m=6. (7M)

UNIT – III

6. a) Solve sum of subsets problem for n=6,m=30, w[1:6]={5,10,12,13,15,18}. (7M)
   b) Find connected components & spanning tree for : (7M)



(or)

7. a) Solve 8-queues problem. (7M)
   b) Write different traversal techniques for graphs. (7M)

UNIT – IV

8. a) Write a complete LC branch and bound algorithm for Knapsack problem (7M)
   b) Write an non-deterministic algorithm to sort array elements. (7M)

(or)

9. a) Explain the principles of (7M)
      i) control abstraction for LC search
      ii) Bounding
      iii) FIFO branch & bound
      iv) LC branch and bound
   b) Write the relationship between P,NP and NP-complete, NP-hard problems. (7M)

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MCA 504.1: EMBEDDED SYSTEMS

Unit I

Introduction.: Embedded system overview,Design challenges,Processor technology.,IC technology,Design technology,Trade offs.

Custom single purpose processors: Hardware: Introduction, Combinational logic, Sequential logic, Custom single purpose processor design,RT-level custom single purpose processor design, Optimizing custom single purpose processor design.

Unit II

General purpose processors : Software : Introduction, Basic architecture, Operation, Programmer's view, Development environment, Application specific instruction set processors, Selecting a microprocessor, General purpose processor design

Standard single purpose processors: Peripherals: Introduction, Timers, Counters, Watchdog timers, UART, Pulse width modulators, LCD controllers, Keypad controllers, Stepper motor controller, Analog to digital converters, Real time clocks.

Unit III

Memory: Introduction, Memory write ability and storage permanence, Common memory types, Composing memory, Advanced RAM

Interfacing: Introduction, Communication basics, Microprocessor interfacing –I/O addressing, Microprocessor interfacing – Interrupts, Microprocessor interfacing – DMA, Arbitration, Multi level bus architectures, Advanced communication principles, Serial protocols, Parallel protocols, Wire less protocols

Unit IV

Digital camera example: Introduction, Introduction to simple digital camera, Requirements specifications, Design

State machine and concurrent process models: Introduction, Models Vs languages, text Vs graphics, An introductory example, A basic state machine model-FSM, Finite state machine with data path model-FSMD, Using state machine, HCFSM and stack charts languages, Program state machine model –PSM, The role an appropriate model and language, Concurrent process model, Concurrent processes, Communication among the processes, Synchronization among the processes, Implementation, Data flow model, Real time systems

Prescribed Book:

Frank Vahid / Tony Givargis, "Embedded System Design", Third edition, Wiley (2008). **Chapters** : 1 to 8.

Reference book:

Raj Kamal, "Embedded Systems", Second Edition , TMH (2008).

Model Paper

MCA 504.1: Embedded Systems

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: 7 x 2 = 14 M
Answer ONE Question from each unit: 4 x 14 = 56 M

1.(a) Define three main characteristics of Embedded Systems.
(b) What is a design metric?
(c) Describe why a general purpose processor could cost less than a single – purpose processor.
(d) Compose 1K X 8 ROMS into 1K X 32 ROM.
(e) Define Real-Time clock.
(f) Explain the difference between port based I/O and bus-based I/O.
(g) Define Real-Time systems and real time operating system.
(h) Difference between FSM and FSMD.

Unit-I

2. a) Describe common Design metrics of an embedded system.
b) Explain the importance of processor technology, IC technology and Design technology in designing a Embedded System.

(or)

3. a) What are the steps involved in designing custom single – purpose processor.
b) Explain RT-level custom single purpose processor design.

Unit-II

4. a) Describe steps involved in designing a general-purpose processor.
b) Explain different software design tools that are used by embedded system designers.

(or)

5. a) Explain pulse width modulators.
b) Explain stepper Motor controllers.

Unit-III

6. a) Discuss different types of ROM’s and RAM’s.
b) What is Cache ? Explain Cache mapping techniques.

(or)

7. a) Describe different types of serial, parallel and wireless protocols.
b) Discuss different arbitration methods.

Unit-IV

8. Illustrate the Design of a Digital Camera.

(or)

9. a) Explain communication and synchronization among processes.
b) Describe FSM with example.

MCA 504.2: MOBILE COMPUTING

Unit – I

Introduction: Mobility of bits and bytes, Wireless – the beginning, mobile computing, dialogue control, networks, middleware and gateways, applications and services, developing mobile computing applications, security in mobile computing, standards – why is it necessary, standard bodies, players in the wireless space

Mobile computing architecture: History of computers, history of Internet, Internet – ubiquitous network, Architecture of mobile computing, three tier architecture, design considerations for mobile computing, mobile computing through Internet, making existing applications mobile – enabled

Mobile computing through telephony: Evolution of telephony, multiple access procedure, mobile computing through telephone, developing an IVR application, voice XML, telephony application programming interface (TAPI)

Unit – II

Emerging technologies: Introduction, Bluetooth, radio frequency identification {RFid}, wireless broadband {WiMAX}, mobile IP, Internet protocol version 6 {IPv6}, java card

Global system for mobile communications (GSM): Global system for mobile communications, GSM Architecture, GSM Entities, Call routing in GSM, PLMN Interfaces, GSM Addresses and identifiers, network aspects in GSM, GSM frequency allocation, Authentication and security

Short message service (SMS): Mobile computing over SMS, short message services (SMS), value added services through SMS, accessing SMS bearer

Unit – III

General packet radio service (GPRS): Introduction, GPRS and packet data network, GPRS network architecture, GPRS network operations, data services in GPRS, applications for GPRS, limitations of GPRS, billing and charging in GPRS

Wireless application protocol (WAP): Introduction, WAP, MMS, GPRS applications

CDMA and 3G: Introduction, spread – spectrum technology, Is – 95, CDMA Vs GSM, wireless data, third generation networks, applications on 3G

Unit –IV

Wireless LAN: Introduction, wireless LAN advantages, IEEE 802.11 standards, wireless LAN Architecture, mobility in wireless LAN, deploying wireless LAN, mobile Ad Hoc networks and sensor networks, wireless LAN security, Wi- Fi vs. 3G

Voice over Internet protocol and convergence: Voice over IP, H.323 frame work for voice over IP, Session initiation protocol (SIP),comparison between H.323 and SIP, real time protocols, convergence technologies, call routing, voice over IP applications, IP Multi media subsystem (IMS), mobile VoIP

Security issues in mobile computing: Introduction, information security, security techniques and algorithms, security protocols, public key infrastructure, trust, security models, security frameworks for mobile environment

Prescribed Book:

Asoke K Talukder and Roopa R Yavagal, "**Mobile Computing**" TMH (2008)

Chapters: 1 to 10, 17,18.

Reference Book :

Rajkamal, "Mobile Computing", Oxford (2008).

Model Paper

MCA 504.2 Mobile computing

Time : 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.
(a)Wireless PAN.
(b)How can we produce different tones?
(c)Define inter leaving.
(d)SMS vs. MMS.
(e)What is transport layer protocol that supports Internet Telephony?
(f)What are Ad Hoc networks?
(g)Write some of the applications of GPRS.

Unit – I

2.(a)Write the architecture of mobile computing.
(b)Write the middle ware software and gateways needed in mobile computing.

(or)

3.(a)Develop a theatre booking application.
(b)Compare wireless networks with wired networks.

Unit –II

4.(a)Explain the Bluetooth protocol stack.
(b)How can we perform value added services through SMS?

(or)

5. Explain tunneling operations in mobile IP and also the relation ship between mobile IP and cellular IP.

Unit – III

6. (a)Explain MMS environment.
(b)List out 3G applications.

(or)

7. (a)Explain WAE logical model.
(b)Explain the applications for GPRS.

Unit –IV

8. (a)Compare between H.323 and SIP.
(b)Discuss the features of Wi – Fi.

(or)

9. Discuss the various security models in mobile computing.

MCA 504.3: CLOUD COMPUTING

UNIT-I

Introduction: Cloud computing at a glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies.

Principles of Parallel and Distributed Computing: Eras of Computing, Parallel Vs Distributed computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing.

Virtualization: Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

UNIT-II

Cloud Computing Architecture: Introduction, Cloud reference model, Types of clouds, Economics of the cloud, open challenges.

Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud programming and Management.

Concurrent Computing: Thread Programming : Introducing Parallelism for Single machine Computation, Programming Application with Threads, Multithreading with Aneka, Programming Applications with Aneka Threads.

UNIT-III

High- Throughput Computing: Task Programming: Task Computing, Task-based Application Models, Aneka Task-Based Programming.

Data Intensive Computing: Map-Reduce Programming: What is Data-Intensive Computing, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

UNIT-IV

Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Observations.

Cloud Applications: Scientific Applications, Business and Consumer Applications.

Advanced Topics in Cloud Computing: Energy Efficiency in Clouds, Market Based Management of Clouds , Federated Clouds/ InterCloud, Third Party Cloud Services.

Prescribed Book:

Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, "Mastering Cloud Computing", Mc Graw Hill Education.

REFERENCES:

1. Michael Miller, “Cloud Computing”, Pearson Education, New
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. Cloud Application Architectures, George Reese, ISBN: 8184047142,Shroff/O' Reilly, 2009.

Model Paper

MCA 504.3: Cloud Computing

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.
a) What is Service-Oriented Computing?
b) Define a Distributed System?
c) Give an example for full virtualization and brief about it.
d) What is a hybrid cloud?
e) Scalability
f) Give two examples of cloud applications in CRM and ERP.
g) What is a MOCC?

UNIT – I

2. Discuss about the historic developments from early computing to the contemporary cloud computing.

or

3. a) What are characteristics of Virtualization?
b) Discuss about Machine Reference Model.

UNIT – II

4. a)Discuss about the cloud architecture.
b) What are different types of clouds? Explain.

or

5. a) Explain about Aneka Framework overview.
b) Discuss about Aneka SDK.

UNIT - III

6. a)What is Task computing and what are its frame works?
b)Discuss about Task based application models.

or

7. a) What is Data Intensive Computing? Explain about its characteristics.
b) What are the technologies required for Data Intensive computing? Explain about them.

UNIT – IV

8. Discuss about Amazon Web Services.

or

9.Give a reference model for MOCC. What are the technologies for MOCC?

MCA 505.1: IMAGE PROCESSING

UNIT I:

Introduction, Image Shape, Human Vision System, Image Acquisition – Intensity Images, Real Time Capture, Colour Images, Video Camera, Capture, Analogue To Digital Conversion, Scanners, Character Recognitions Devices, Satellite Imaginary, Ranging Devices, Calibration, Image Presentation-Raster Screen, Printers (Matrix, Laser, Ink-Jet, Wax Thermal),Patterns, Dithering, Three-Dimensional Image.

UNIT II:

Statistical Operations-Introduction, Gray-Level Transformations, Histogram Equalization, Multi-Image Operations, Spatial Operations And Transformations-Introduction, Spatial Dependent Transformations, Templates And Convolution, Edge Detection, Other Window Operations, Two-Dimensional Geometric Transformations, Segmentation And Edge Detection-Introduction, Region Operations, Basic Edge Detection, Second-Order Edge Detection, Pyramid Edge Detection, Crack Edge Relaxation.

UNIT III:

Morphological And Other Area Operations-Introduction, Basic Morphological Operations, Opening And Closing Operations, Finding Basic Shapes-Combining Edges, Hough Transforms, Bresenhams Algorithms; Labeling Lines And Regions-Flat Surface And Straight Line Labeling, Dealing With Curves, Labeling Regions.

UNIT IV:

Frequency Domain-Introduction, Hartley Transform, Fourier Transform, Optical Transformation, Power And Autocorrelation Functions; Image Compression-Introduction, Types And Requirements, Statistical Compression, Spatial Compression, Contour Coding, Quantizing Compression , Real-Tme Image Transmission, Quadtrees; Texture-Introduction, Identifying Textures, Texture Gradient, Texture Segmentation.

Prescribed Book

Introductory Computer Vision And Image Processing – Adrian Low:, MC Graw Hill International Editions

Reference Book

1. Digital Image Processing – Gojelez – Addison Wesley.
2. B.Chanda, D.Dutta Majunder, “Digital Image Processing”, PHI (2008).

MCA 505.2: MICROPROCESSORS AND INTERFACING

UNIT - I

Introduction : Overview of Microcomputer Systems: Hardware – Software, Addresses – General Operation of a Computer – Microprocessors in Digital System Design.

8086 Architecture: CPU Architecture – Internal Operation , Machine Language Instruction: Addressing modes – Instruction Formats.

Assembler Language Programming: Assembler Instruction Format – Data Transfer Instructions , Arithmetic Instructions: Binary Arithmetic – Packed BCD Arithmetic – Unpacked BCD Arithmetic, Branch Instructions: Conditional Branch Instructions - Unconditional Branch Instructions, Loop Instructions – NOP and HLT Instructions – Flag Manipulation Instructions – Logical Instructions – Shift and Rotate Instructions , Directives and Operators: Data Definition and Storage allocation – Structures – Records – Assigning Names to Expressions – Segment Definitions – Program Termination – Alignment Directives – Value returning attribute operators.

UNIT - II

Modular Programming: Linking and Relocation: Segment Combination – Access to External Identifiers, Stacks , Procedures: calls, returns, and Procedure Definitions – Saving and Restoring Registers – Procedure Communication – Recursive Procedures, Interrupts and Interrupt Routines, Macros: ASM-86 Macro Facilities – Local Labels – Nested Macros – Controlled Expansion and Other Functions.

I/O Programming: Fundamental I/O Considerations – Programmed I/O – Interrupt I/O – Block Transfers and DMA.

UNIT - III

System Bus Structure: Basic 8086/8088 Configurations: Minimum Mode – Maximum Mode, System Bus Timing, Interrupt Priority Management: Interrupt System Based on a Single 8259A.

I/O Interfaces: Serial Communication Interfaces: Asynchronous Communication – Synchronous Communication – Physical Communication Standards – 8251A Programmable Communication Interface, Parallel Communication: 8255A Programmable Peripheral Interface - A/D and D/A Example, Programmable Timers and Event Counters: Intel’s 8254 Programmable Interval Timer – Interval Timer Application to A/D, DMA Controllers.

UNIT - IV

Advanced Microprocessors: The 80386 : Introduction – Operating Modes – Processor Model – Programming Model, The 80486 : Introduction – Processor Model – Programming Model, The Pentium : Introduction – Processor Model – Programming Model – The Pentium Evolves – The Pentium MMX, The P6 Processors : Introduction – Overview – Processor Model – New Architectural Features.

Prescribed Books :

1. Yu-Cheng Liu, Glenn A Gibson, "Microcomputer Systems: The 8086/8088 Family", Second Edition, Pearson Education (2008)

Chapters : 1.1, 1.3 – 1.5, 2.1 - 2.3, 3.1 – 3.10, 4.1 – 4.5, 6.1 – 6.4, 8.1 – 8.2, 8.3.1, 9.1.1, 9.1.2, 9.1.4, 9.2, 9.3, 9.5

2. John Uffenbeck, "The 80x86 Family Design, Programming and Interfacing", Third Edition, Pearson Education (2006)

Chapters: 3.3, 3.5 – 3.7

Reference Book:

1. Douglas V Hall, "Microprocessors and Interfacing", Second Edition, TMH
2. N.Mathivanan, "Microprocessors, PC Hardware and Interfacing", PHI (2007).
3. Kenneth J. Ayala, " The 8086 Microprocessor : Programming & Interfacing The PC", Cengage Learning (2008)
4. Barry B. Brey, "The Intel Microprocessors", Seventh Edition, PHI

Model Paper

MCA 505.2: Microprocessors and Interfacing

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1.a) Role of address lines.
b) Difference between control flag and status flag.
c) Give and explain the instruction to access stack pointer.
d) Difference between INT and INTO instructions.
e) Why an interfacing is required.
f) Difference between Pentium and Pentium MMX.
g) What is the width of Pentium address bus?

UNIT - I

2.a) Explain addressing modes of 8086 with suitable example.
b) Describe the memory segmentation in 8086.

(or)

3.a) With suitable example explain data transfer and logical group instructions of 8086.
b) Explain different assembler directives of 8086 assembler.

UNIT - II

4.a) Explain the concept of stack.
b) How 8086 macro's are declared and used in the program.

(or)

5. Describe interrupt I/O.

UNIT – III

6.a) Draw and explain timing diagram for input operation in 8086 minimum mode.
b) Explain operation of 8086 in its maximum mode.

(or)

7. Draw and explain functions of 8255A programmable peripheral interface.

UNIT - IV

8. Described Architectural details of Pentium processor.

(or)

9. Described the architectural details of 80486.

MCA 505.3 : WEB ENGINEERING

Unit-I

Web-Based Systems: The Web, Web Applications

Web Engineering: What is Web Engineering, The Components of Web Engineering, Web Engineering Best Practices

A Web Engineering Process: Defining the Framework, Incremental Process Flow, Generic Actions and Tasks for the WebE Framework

Communication: The Communication Activity, Formulation Elicitation, Identifying WebApp Increments, Negotiation

Unit-II

Planning : Understanding Scope, Refining Framework Activities, Building a WebE Team, Managing Risk, Developing a Schedule, Managing Quality, Managing Change, Tracking the Project, Outsourcing WebE Work.

Analysis Modeling for WebApps: Understanding Analysis in the Context of WebE, Analysis Modeling for WebApps, Understanding the Users, The Content Model, The Interaction Model, The Functional Model, The Configuration Model, Relationship-Navigation Analysis.

WebApp Design : Design for WebApps, Design Goals, Design and WebApp Quality, The Design Process, Initial Design of the Conceptual Architecture, Initial Design of the Technical Architecture

Unit-III

Interaction Design : Interface Design Principles and Guidelines, Interface Design Workflow, Interface Design Preliminaries, Interface Design Steps, Aesthetic Design, Usability, Design Issues.

Information Design : Information Architecture, Organizing Content, Structuring the information Space, Blueprints : Adding Detail to a structure, Accessing Information, Wireframe Models, Navigation Design : Creating the Detailed structure, Summarizing the Design Process.

Functional Design : WebApp Functionality, The Nature of WebApp Functionality, Functional Design in the Design Process, Functional Architecture, Detailed Functional Design

Unit-IV

Construction and Deployment : Construction and Deployment within the WebE Process, Construction, Construction Principles and Concepts, Deployment, Construction and the Use of Components, Component-Level Design Guidelines, Component Design Steps

Technologies and Tools : General Issues, Implementation Tools and Technologies, Development Tools and Technologies

Testing WebApps : Testing Concepts, The Testing Process-An Overview, Content Testing, User Interface Testing, Usability Testing, Compatibility Testing, Component-Level Testing, Navigation Testing, Configuration Testing, Security and Performance Testing

Prescribed Book:

Roger S Pressman, David Lowe, “Web Engineering A Practitioner’s Approach”, TMH (2008)

Chapters: 1 to 5, 7 to 12, 14, 15.

Model Paper

MCA 505.3:Web Engineering

Time: 3 Hrs **Max. Marks: 70**

Answer Question No.1 Compulsory: **7 x 2 = 14 M**
Answer ONE Question from each unit: **4 x 14 = 56 M**

1. Write short notes on
   a) Agile
   b) Modelling
   c) Elicitation
   d) Managing risks
   e) Usability
   f) Construction
   g) Content Testing
   h) Organizing content

Unit - I

2.(a)Explain different components of Web Engineering.
(b)Describe Incremental Process Flow.

(or)

3.(a)What is the importance communication Activity ? Why ?
(b)Explain mechanism for Identifying WebApp Increments.

Unit - II

4.(a)How to Redefine Framework Activities.
(b)Discuss steps involved in Building a WebE Team.

(or)

5.(a)Briefly explain analysis Modelling for WebApps.
(b)Explain Content Model.

Unit - III

6.(a)Explain about Interface Design Steps.
(b)Describe the importance of functional design in design process.

(or)

7.(a)Describe the Information Architecture.
(b)Describe the Accessing Information.

Unit - IV

8.(a)Explain about Component Design Steps.
(b)Explain about Implementation Tools & Technologies.

(or)

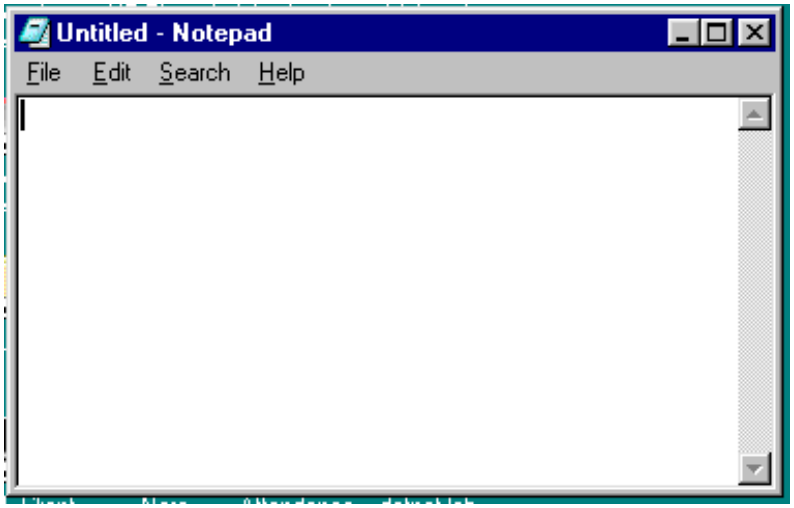
9.(a)Explain about Usability Testing.
(b)Explain about Component – Level Testing.

* * * * *

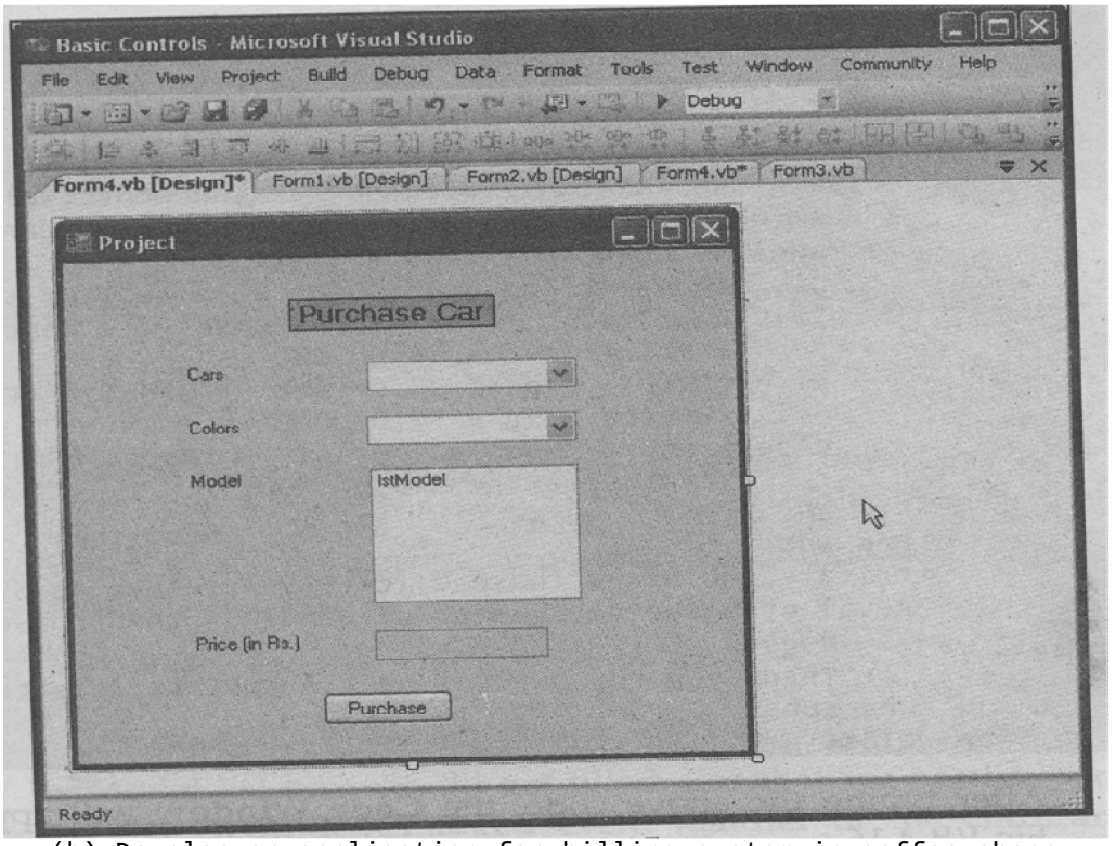
MCA 506 : .NET PROGRAMMING LAB

VB .NET:

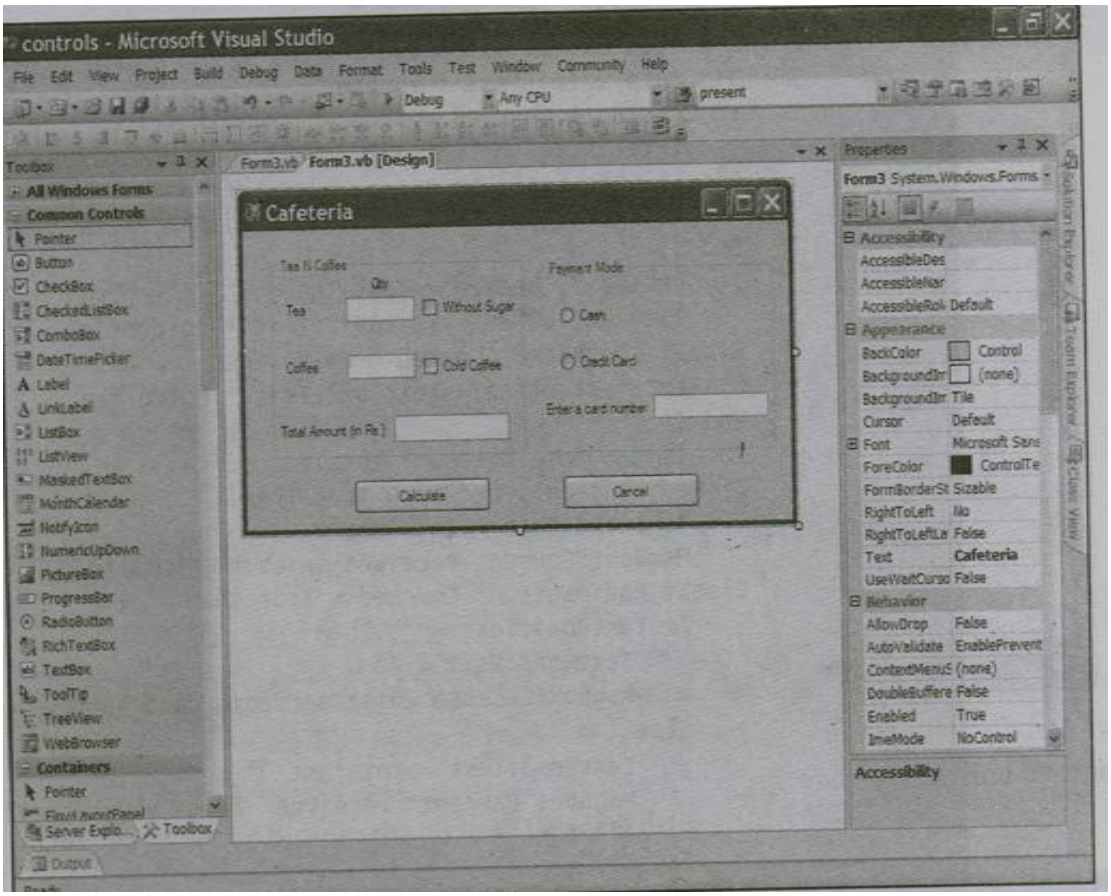
1) Develop an application which is similar to “Notepad” using menus.



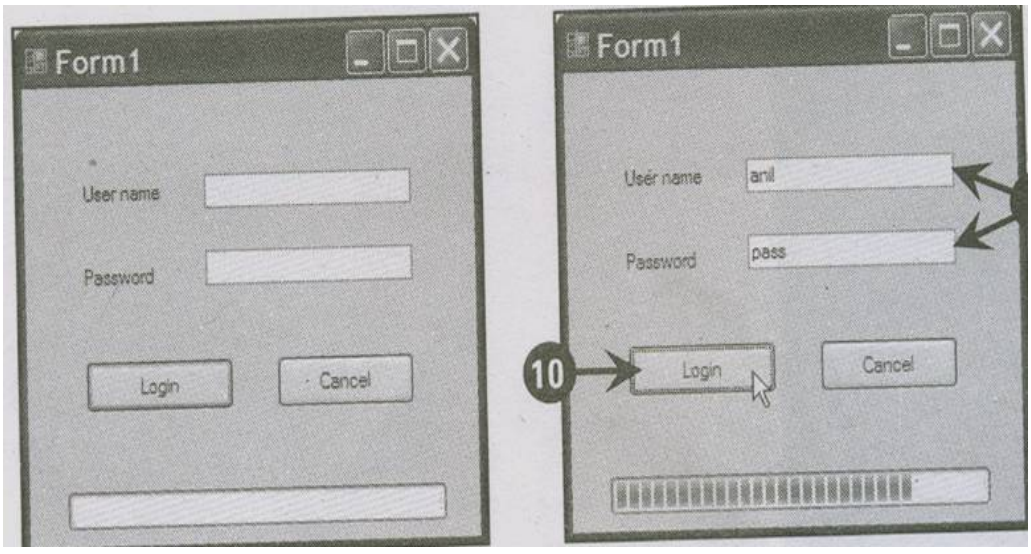
2) (a) Develop an application for facilitating purchasing order which will look like as shown below :



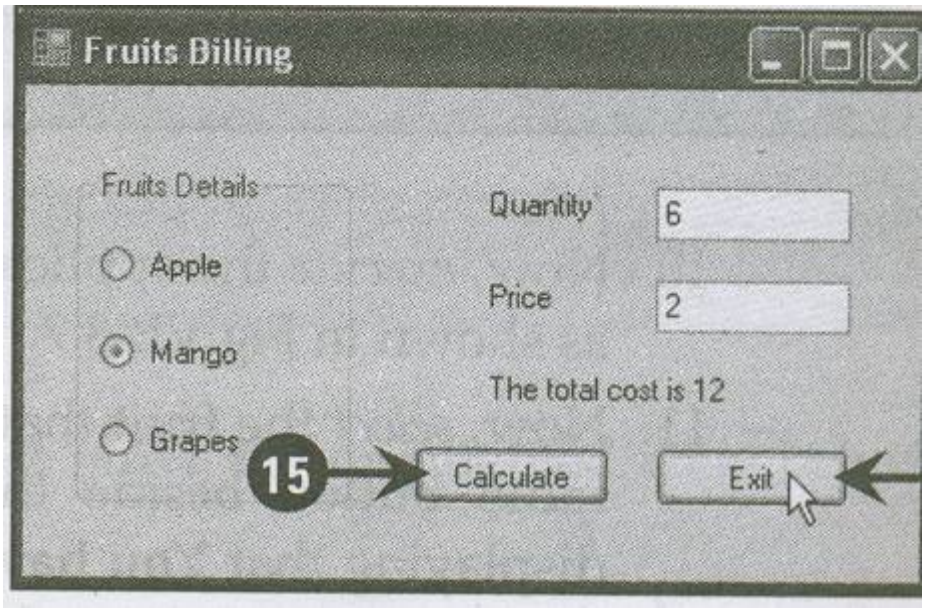
(b) Develop an application for billing system in coffee shops which will look like as shown below :



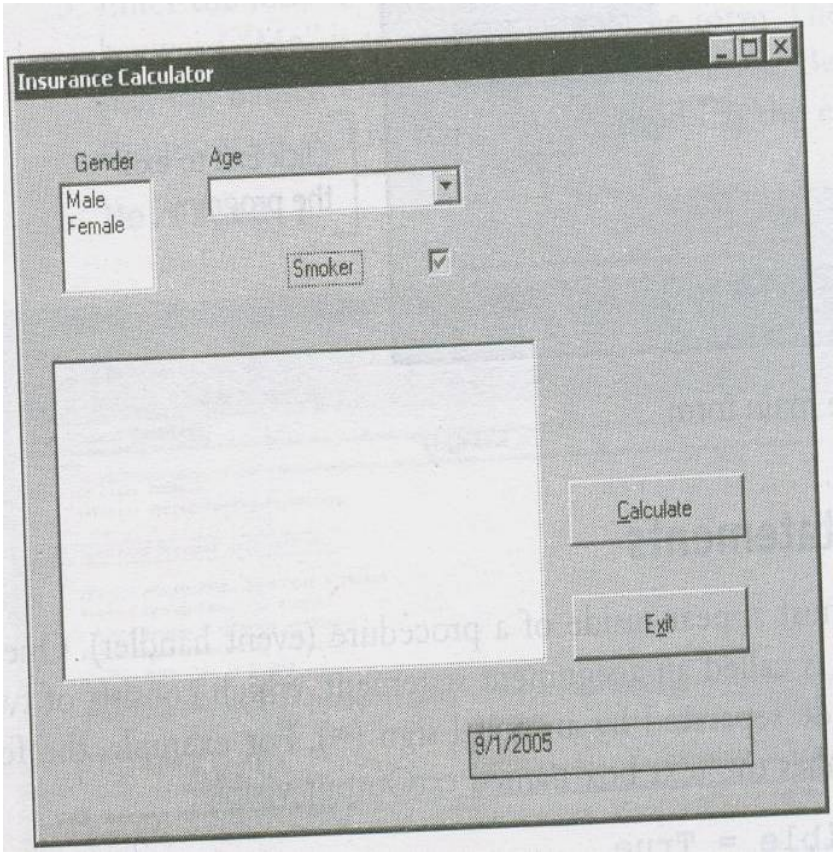
3) (a)Develop an application which is similar to login form including the progress bar controls.



(b) Develop an application for fruits billing system which will look like as shown below :



4) Develop an application which is helpful for calculating the insurance.



5) (a) Develop an application using font dialog control

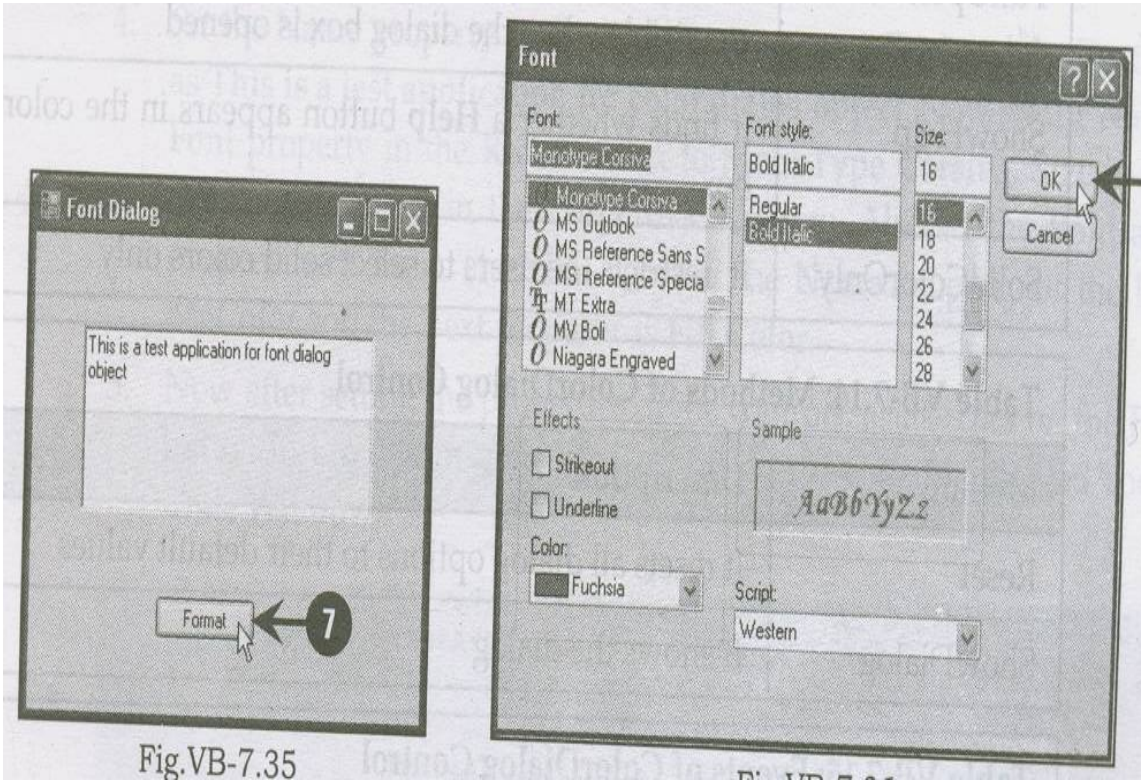


Fig.VB-7.35

(b) Develop an application using color dialog control

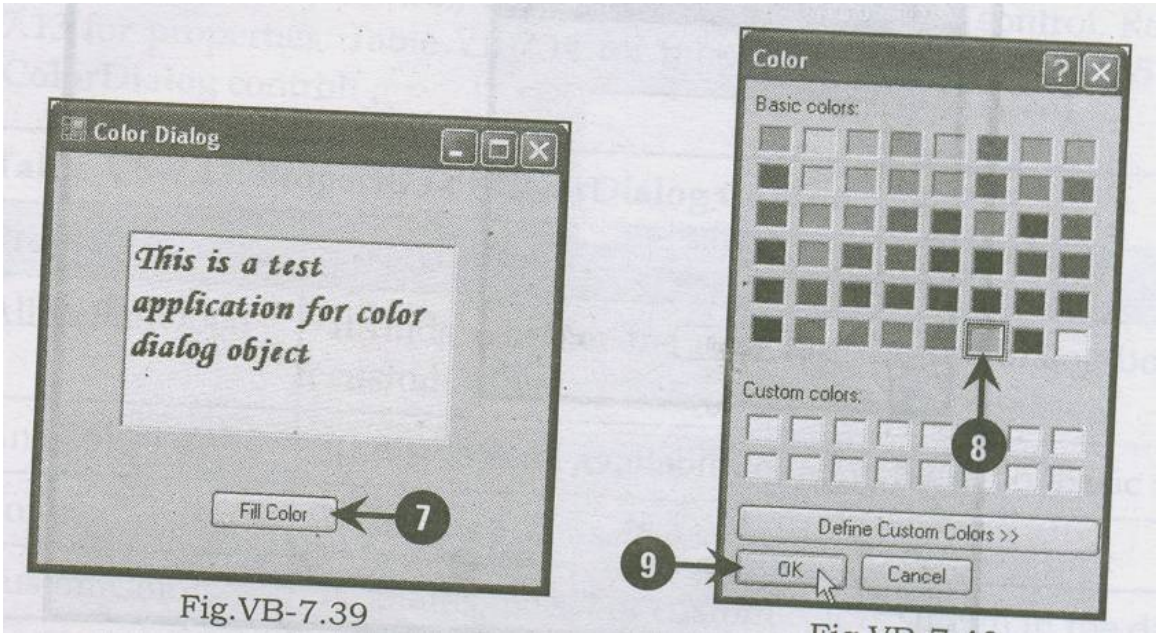


Fig.VB-7.39

6) Develop an application to display the file selected by the user in a web browser control.

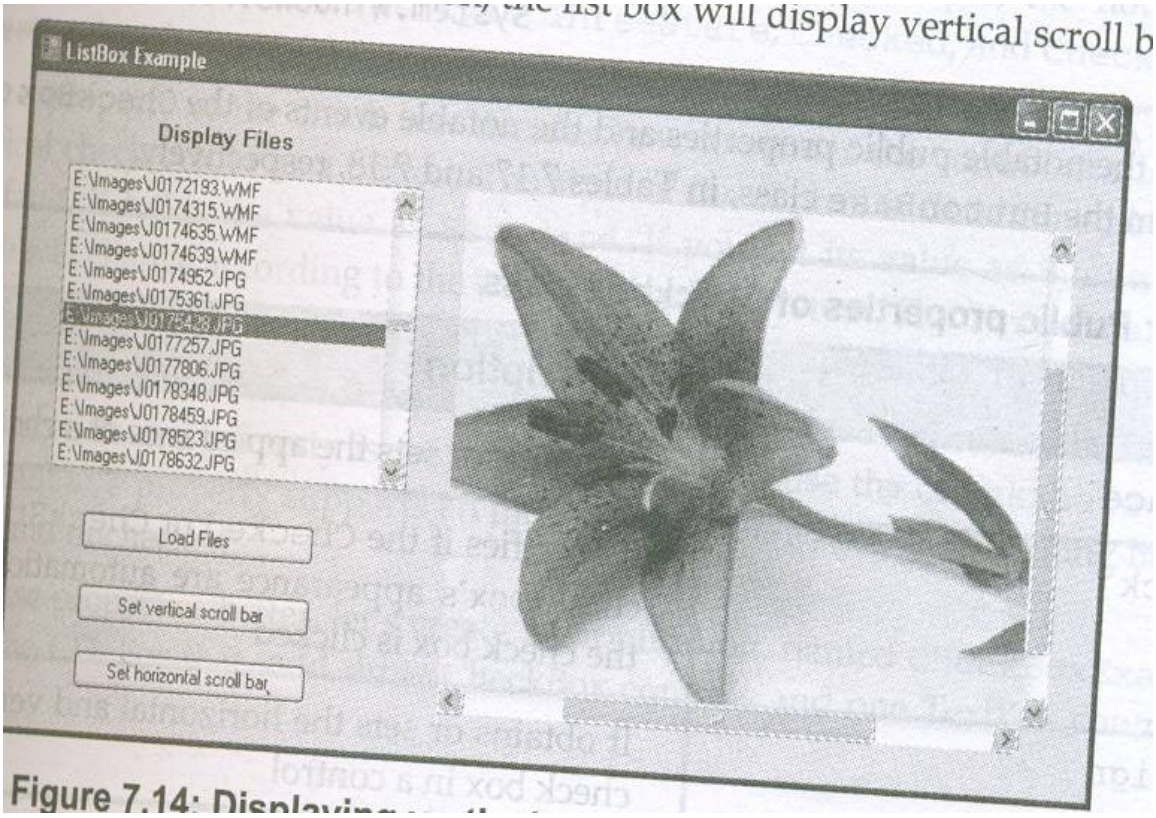
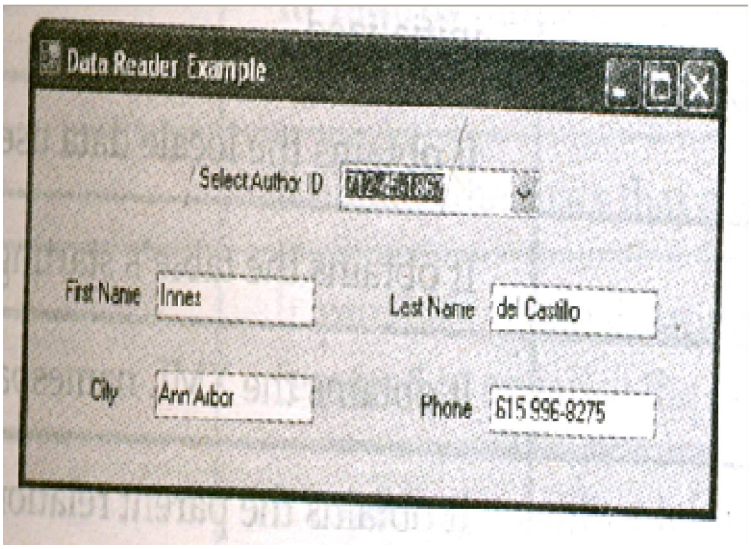


Figure 7.14: Displaying

7) Develop an application using the data reader to read from a database.



ASP.NET:

8) Design an application for dynamically populating a checkbox list.

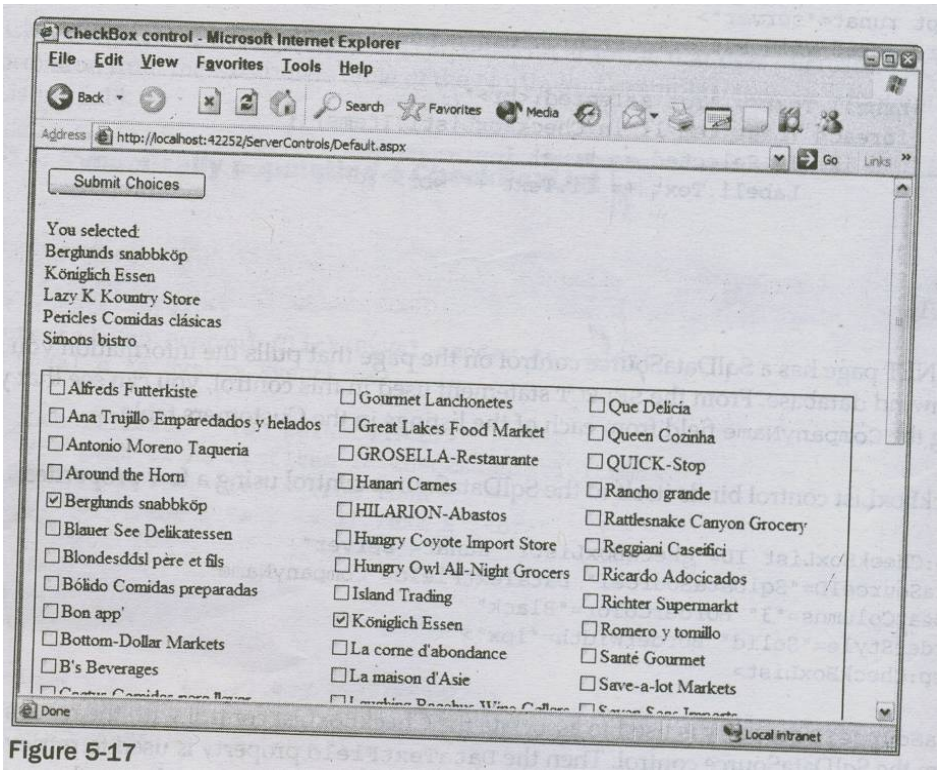


Figure 5-17

9) Develop an application for selecting a single day in the calendar control.

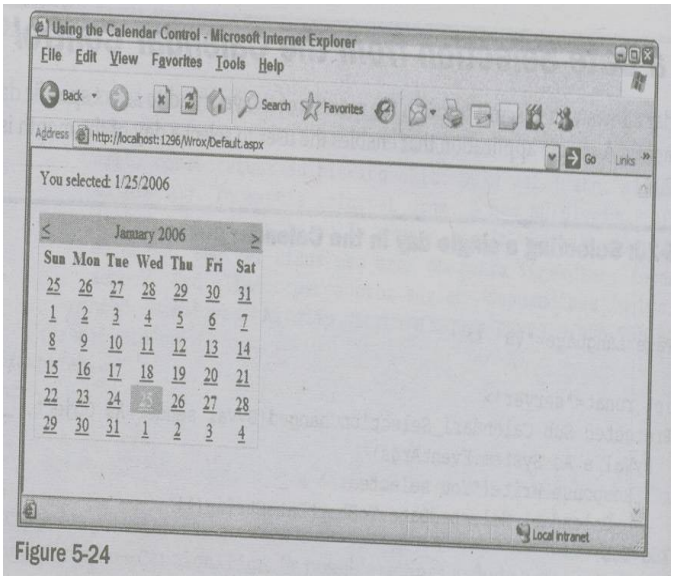
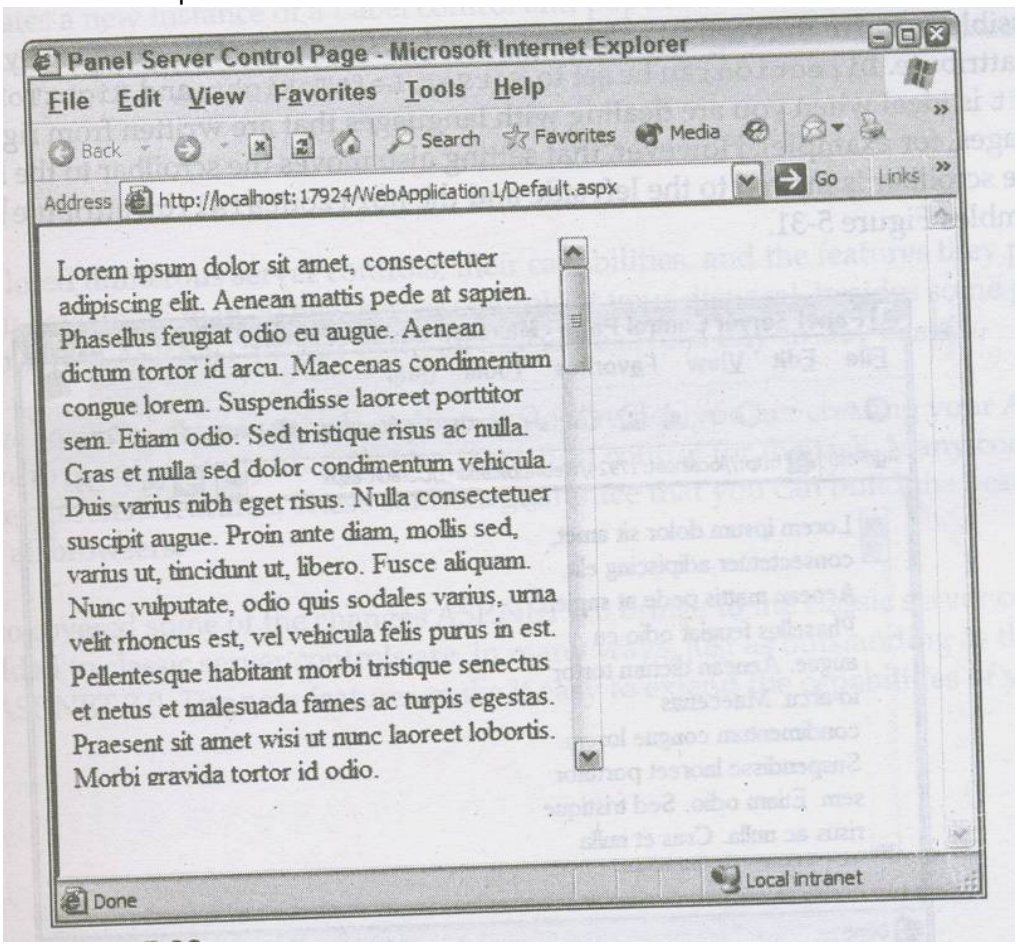


Figure 5-24

10) Design an application by using the new scroll bar feature with the panel server control.



11) Design an application with simple bulleted list control.

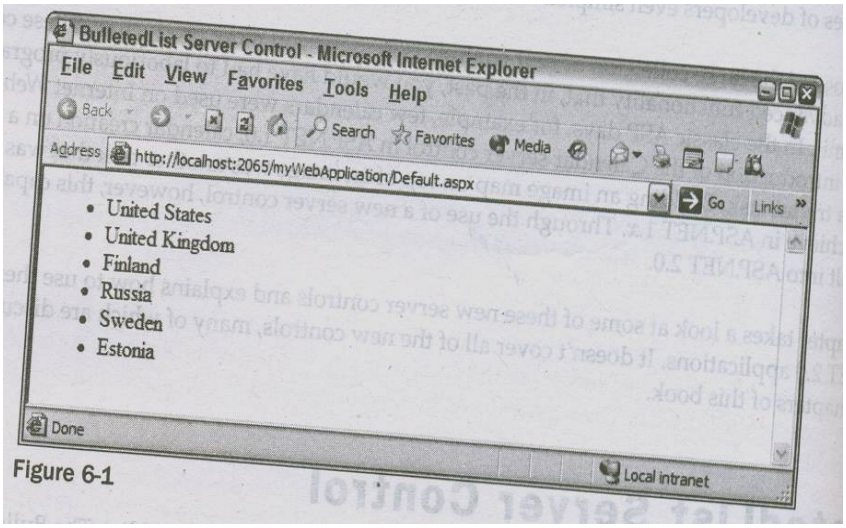
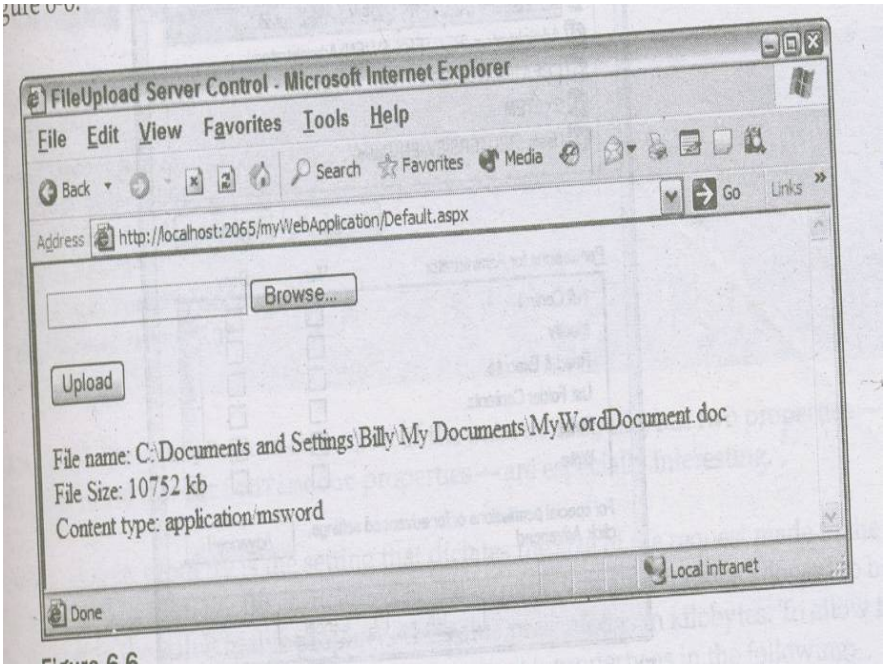
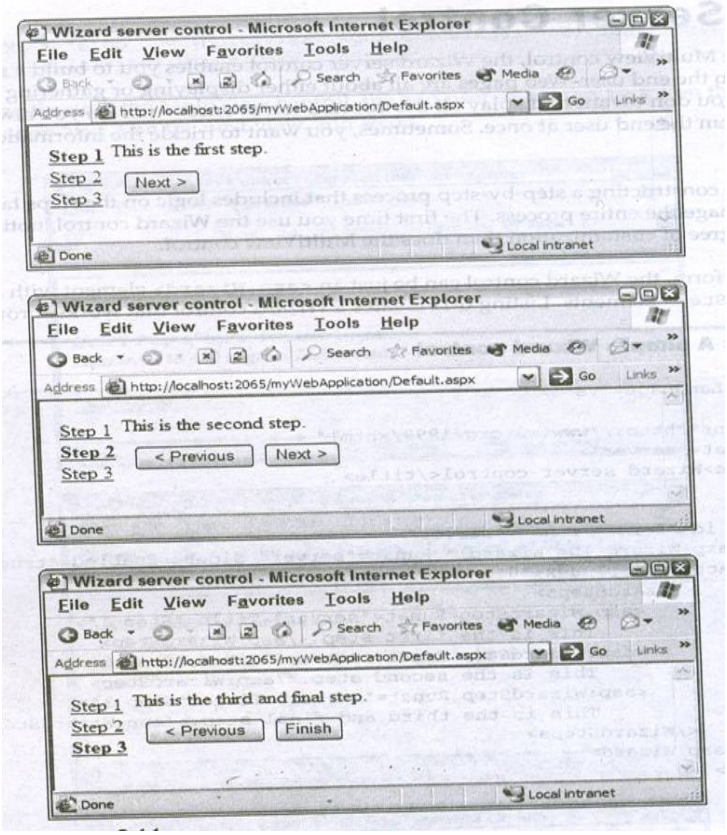


Figure 6-1

12) Design an application for uploading files using new file upload control.



13)Design an application for building a form in the wizard control.



14)Design an application by using the compare validator to test values against control values.

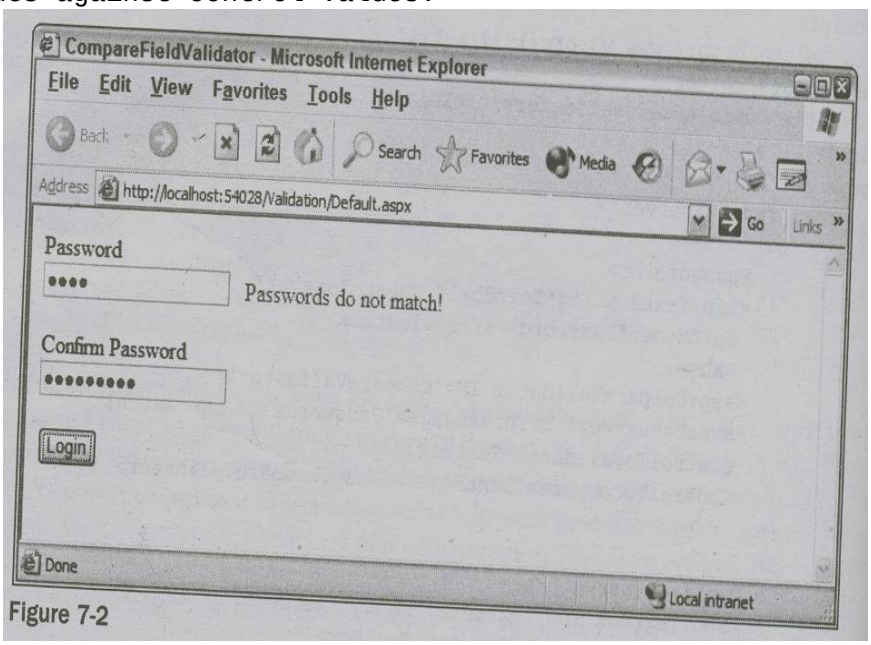


Figure 7-2

15)Design an application using the images, sounds for error notifications.

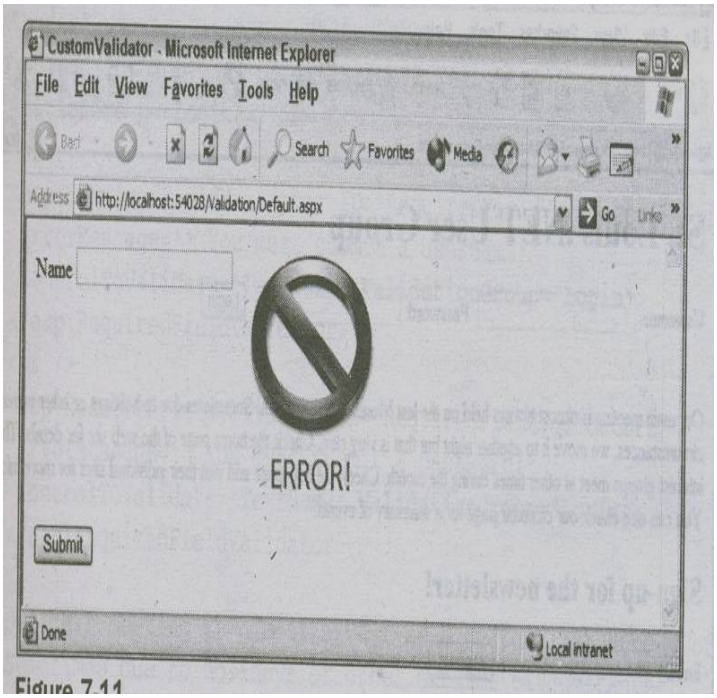
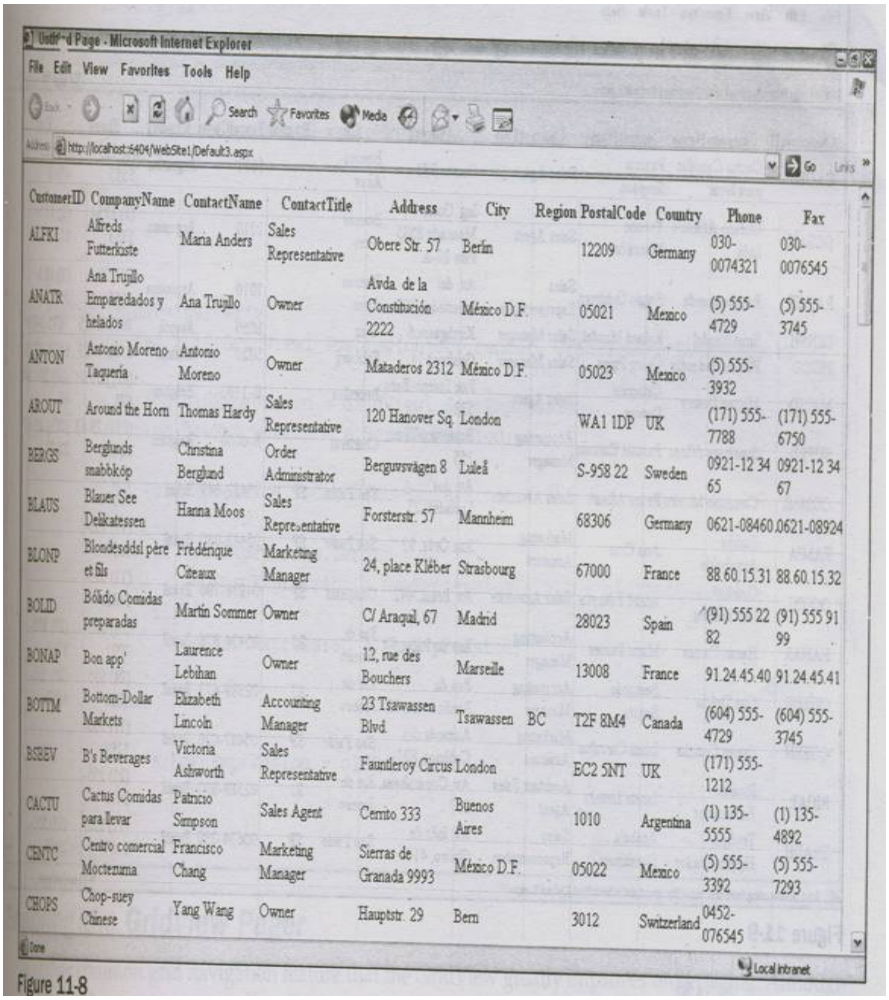


Figure 7.11

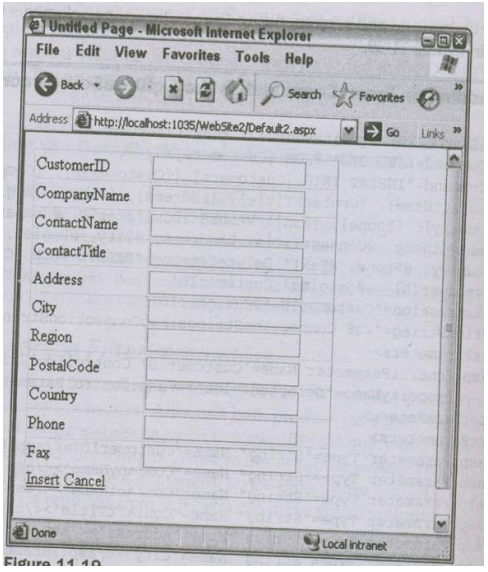
16)Design an application using the grid view control in an ASP.Net web page.

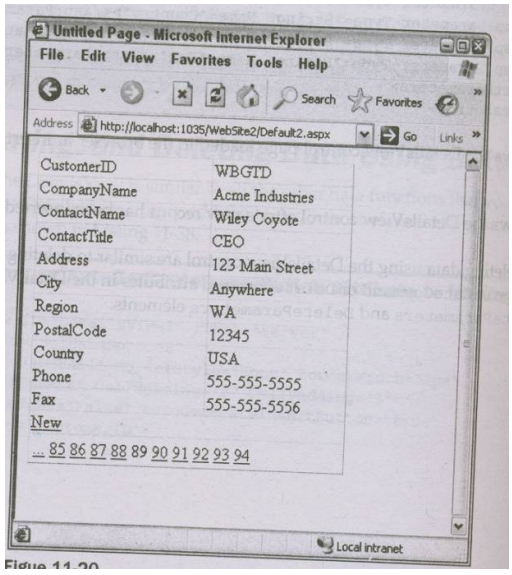


CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region	PostalCode	Country	Phone	Fax
ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Obere Str. 57	Berlin		12209	Germany	030-0074321	030-0076545
ANATR	Ana Trujillo Emparedados y helados	Ana Trujillo	Owner	Avda. de la Constitución 2222	México D.F.		05021	Mexico	(5) 555-4729	(5) 555-3745
ANTON	Antonio Moreno Taquería	Antonio Moreno	Owner	Mataderos 2312	México D.F.		05023	Mexico	(5) 555-3932	
AROUT	Around the Horn	Thomas Hardy	Sales Representative	120 Hanover Sq.	London		WA1 1DP	UK	(171) 555-7788	(171) 555-6750
BERGS	Berglunds snabbköp	Christina Berglund	Order Administrator	Berguvsvägen 8	Luleå		S-958 22	Sweden	0921-12 34 65	0921-12 34 67
BLAUS	Blauer See Delikatessen	Hanna Moos	Sales Representative	Forsterstr. 57	Mannheim		68306	Germany	0621-08460	0621-08924
BLONP	Blondesddsl père et fils	Frédérique Citeaux	Marketing Manager	24, place Kléber	Strasbourg		67000	France	88.60.15.31	88.60.15.32
BOLID	Bólido Comidas preparadas	Martín Sommer	Owner	C/ Araquil, 67	Madrid		28023	Spain	(91) 555 22 82	(91) 555 91 99
BONAP	Bon app'	Laurence Lebihan	Owner	12, rue des Bouchers	Marseille		13008	France	91.24.45.40	91.24.45.41
BOTTM	Bottom-Dollar Markets	Elizabeth Lincoln	Accounting Manager	23 Tsawassen Blvd.	Tsawassen	BC	T2F 8M4	Canada	(604) 555-4729	(604) 555-3745
BSBEV	B's Beverages	Victoria Ashworth	Sales Representative	Fauntleroy Circus	London		EC2 5NT	UK	(171) 555-1212	
CACTU	Cactus Comidas para llevar	Patricio Simpson	Sales Agent	Cerrito 333	Buenos Aires		1010	Argentina	(1) 135-5555	(1) 135-4892
CENTC	Centro comercial Moctezuma	Francisco Chang	Marketing Manager	Sierras de Granada 9993	México D.F.		05022	Mexico	(5) 555-3392	(5) 555-7293
CHOPS	Chop-suey Chinese	Yang Wang	Owner	Hauptstr. 29	Bern		3012	Switzerland	0452-076545	

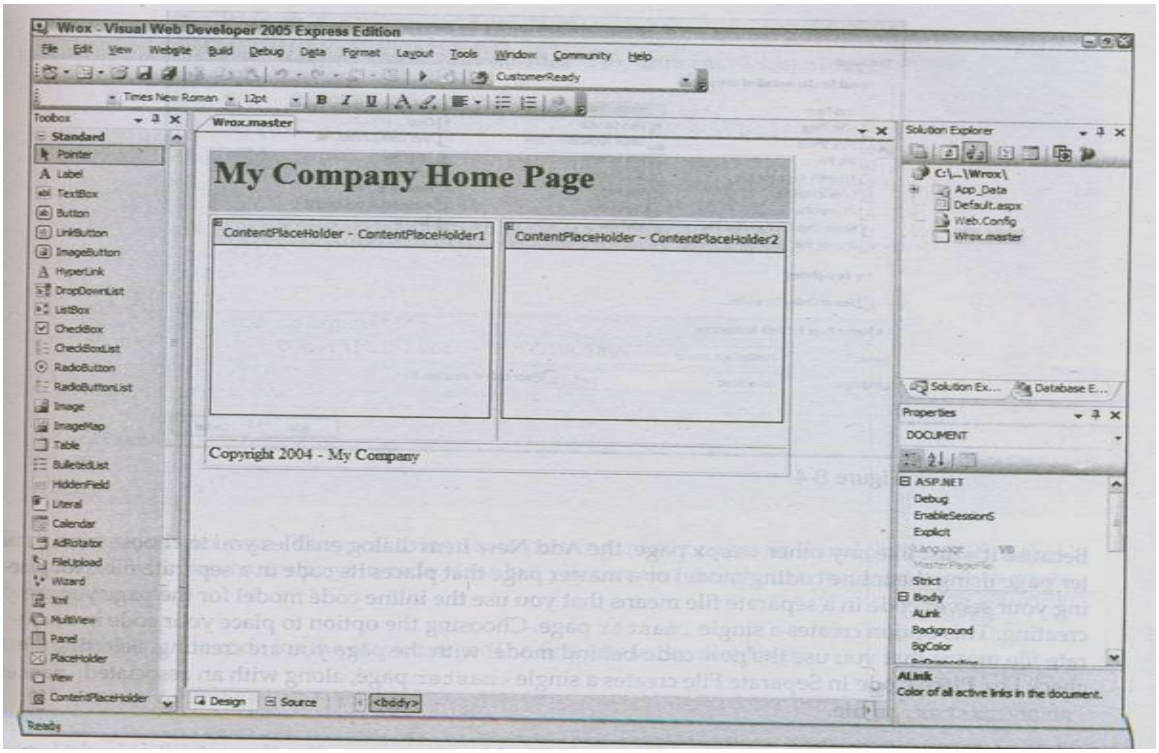
Figure 11-8

17)Design an application for adding an insert command to the sql data source control.





18) Design a web site using the concept of master pages.



C#.NET:

19) Develop a project for performing arithmetic, relational, logical operations.
20) Develop a project for demonstrating polymorphism, abstraction.
21) Develop a project for demonstrating switch statements.
22) Develop a project for implementing inheritance using abstract classes.
23) Develop a project for implementing interfaces using multiple inheritance.
24) Create a form that is the main window of a program using window class.
25) Create a form that is the main window with button program.
26) Create a form that is the main window of a program using the standard controls.
27) Create a form which displays the given inputs in the form of a tree view structure.
28) Develop a project for implementing exception handling in C#.
29) Develop a project which displays the student information in the relevant fields from the database which already exists.

MCA 507: DATA MINING AND HADOOP LAB

Data Mining (Using Java, WEKA or any open source data mining tool)

Write a program to Generate Association rules by using Apriori algorithm

Write a program to implement naïve Bayesian classification

Write a program to implement k-means clustering algorithm

Write a program to implement k-mediods clustering algorithm

Write a program to implement dbscan algorithm

Hadoop

Implement the following Data structures in Java a)Linked Lists b) Stacks c) Queues d) Set e) Map

Study and configure hadoop for big data

Hadoop commands

Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Implement Matrix Multiplication with Hadoop Map Reduce

MCA 508 : SEMINAR

MCA 601: PROJECT WORK

The Master of Computer Applications (MCA) programme prepares the students to take up positions as Systems Analysts, Systems Designers, Software Engineers, Programmers and Project Managers in any field related to information technology. The MCA students are encouraged to spend at least five months working on a project preferably in a software industry or any research organization.

The following suggested guidelines must be followed in preparing the Final Project Report:
Good quality white executive bond paper A4 size should be used for typing and duplication.

Page Specification :(Written paper and source code)
Left margin - 2.5 cms
Right margin- 1.5 cms
Top margin - 2.5 cms
Bottom margin - 2.5 cms
Page numbers - All text pages as well as Program source code listing should be numbered at the bottom center of the pages.

Normal Body Text: Font Size : 12, Times New Roman, Double Spacing, Justified. 6 point above and below para spacing
Paragraph Heading Font Size: 14, Times New Roman, Underlined, Left Aligned. 12 point above & below spacing.
Chapter Heading Font Size: 20, Times New Roman, Centre Aligned, 30 point above and below spacing.
Coding Font size : 10, Courier New, Normal

Submission of Project Report to the University : The student will submit his/her project report in the prescribed format.

The project documentation may be about 100 to 125 pages (excluding coding). The project documentation details should not be too generic in nature. Appropriate project report documentation should be done, like, how you have done the analysis, design, coding, use of testing techniques/strategies, etc., *in respect of your project*. To be more specific, whatever the theory in respect of these topics is available in the reference books should be avoided as far as possible. The project documentation should be in respect of your project only. The project documentation should include the topics given below. Each and every component shown below carries certain weightage in the project report evaluation.

- Table of Contents/Index with page numbering
- Introduction/Objectives
- System Analysis
    - ♦ Identification of Need
    - ♦ Preliminary Investigation

- ♦ Feasibility Study
- ♦ Project Planning
- ♦ Project Scheduling (PERT Chart and Gantt Chart both)
- ♦ Software requirement specifications (SRS)
- ♦ Software Engineering Paradigm applied
- ♦ Data models (like DFD), Control Flow diagrams, State Diagrams/Sequence diagrams, Entity Relationship Model, Class Diagrams/CRC Models/Collaboration Diagrams/Use-case Diagrams/Activity Diagrams depending upon your project requirements

- System Design
  - ♦ Modularisation details
  - ♦ Data integrity and constraints
  - ♦ Database design, Procedural Design/Object Oriented Design
  - ♦ User Interface Design
  - ♦ Test Cases (Unit Test Cases and System Test Cases)
- Coding
  - ♦ Complete Project Coding
  - ♦ Comments and Description of Coding segments
  - ♦ Standardization of the coding

  - ♦ Code Efficiency
  - ♦ Error handling
  - ♦ Parameters calling/passing
  - ♦ Validation checks
- Testing
  - ♦ Testing techniques and Testing strategies used
  - ♦ Testing Plan used
  - ♦ Test reports for Unit Test Cases and System Test Cases
  - ♦ Debugging and Code improvement
- System Security measures (Implementation of security for the project developed)
  - ♦ Database/data security
  - ♦ Creation of User profiles and access rights

- Cost Estimation of the Project along with Cost Estimation Model
- Reports (sample layouts should be placed)
- Future scope and further enhancement of the Project
- Bibliography
- Appendices (if any)
- Glossary.
- Should attach a copy of the CD containing the executable file(s) of the complete project.