ACHARYA NAGARJUNA UNIVERSITY

3 Year P.G. Degree Course
(Semester System)
w.e.f. 2012-2013

MASTER OF COMPUTER APPLICATIONS
SYLLABUS

R.V.R. & J.C. COLLEGE OF ENGINEERING
(AUTONOMOUS)
CHOWDAVARAM, GUNTUR-522 019

R.V.R. & J.C. COLLEGE OF ENGINEERING

(Autonomous)

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The First Engineering College in A.P.
with four times accreditation
for Seven Engineering Courses
from National Board of Accreditation,
AICTE, New Delhi

Course structure and syllabus effective from 2012-2013
as prescribed by
Acharya Nagarjuna University

MASTER OF COMPUTER APPLICATIONS
SYLLABUS

THE INSTITUTION

Established in 1985, Rayapati Venkata Ranga Rao & Jagarlamudi Chandramouli College of Engineering, Guntur is the 'Jewel in the Crown' of Nagarjuna Education Society, which took upon itself the responsibility of enriching the society through promotion of education, literature and culture. As it always happens, the genuine intentions of the promoters of the society received the support of the Almighty. Today eight educational institutions are functioning under the banner and patronage of Nagarjuna Education Society, with R.V.R. & J.C. College of Engineering, being the flag-ship of them, of course.

The Mission

An integrated development of manpower possessing technological and managerial knowledge and skills, values and ethics needed to make an honourable living and contribute to the socio-economic development and welfare of the society.

The Genesis and Growth

Like all great institutions, the college too had a humble beginning with just 180 intake and a barely adequate infrastructure in1985, it is the determination and commitment of the Management that made the college one of the largest among engineering institutions in South India with excellent infrastructure, facilities and competent human resources. Today, it offers eight B.Tech., Degree Courses with an intake of 1020 plus 204 through lateral entry into the II Year for Diploma Holders. Further, the college offers MBA, MCA and M.Tech. in five specializations.

In 1998 it has become the youngest College to have been accredited and as on date all the seven eligible B.Tech. Degree Courses have been accredited in 2002,2007 and again in 2012. It has became the first engineering college in the state to have been accredited fourth time by N.B.A., New Delhi. Further in the Academic Audit and Grading done by Andhra Pradesh State Council of Higher Education, Govt. of A.P., the institute is rated as the SECOND best among Private Engineering Colleges of A.P. and FOURTH best amongst all Engineering Colleges of A.P. including University Engineering Colleges. It has also figured among the "Top-100" Engg. Colleges in independent surveys conducted in 2006 & 2007 by the popular magazine the 'OUTLOOK'. Also the institute is graded as AA+ by the CAREERS 360 magazine in 2012. The College

received first prize for Best Performing Professional UG College in University Examination Results for the last FIVE consecutive years. The College is a typical example of meticulous planning, resource scheduling, human endeavour and institutional management.

COURSES OFFERED

1) Under-Graduate: B.Tech.

i)	Civil Engineering (1985)	120
ii)	Mechanical Engineering (1985)	180
iii)	Electronics & Communication Engg. (1985)	180
iv)	Electrical & Electronics Engg. (1994)	120
v)	Computer Science & Engineering (1994)	180
vi)	Chemical Engineering (1996)	60
vii)	Information Technology (1998)	120
viii)	Bio-technology (2006)	60

2) Post-Graduate:

i)	Management Sciences (MBA) (1995)	120
ii)	Computer Applications (MCA) (1995)	120
iii)	M.Tech in CSE (2003)	25
iv)	M.Tech in Power Systems Engineering (2004)	18
v)	M.Tech in Structural Engineering (2004)	18
vi)	M.Tech in CAD/CAM (2004)	18
vii)	M.Tech in Communication Engineering And Signal Processing(2011)	18

The Campus

A built up area of 59,077 sq.m. on a 37.41 acres plot houses, 61 laboratories and 18 Computer Centres besides amenities like canteen, seminar halls, auditorium, Open Air Theatre, gymnasium, e-classrooms and conference halls etc. to make life in the classroom and outside easy and comfortable. Continuous power supply is provided from 200 KVA, 250 KVA and 500 KVA modern Generator sets. Andhra Bank Branch is located in the campus. A fleet of 24 buses save the staff and students from the vagaries of public transport.

The aesthetically designed structures, the hill slopes on the West, a well laid out campus dotted with roads, trees and gardens merge into a stunning landscape that inspires the minds to "Think Better, Work Better".

The Work Culture

The management and the staff are a group of uncompromising people who stretch beyond reasonable limits to attain their objective - Excellence in everything they do. The people of RVR & JC have learnt that meeting of the minds and joining hands is the easier way to success. They do meet and interact frequently to set new starting lines than to celebrate the finishing lines reached.

The People

The College is possessive of its intellectual property; a 257-strong faculty with diversity in specialization and heterogeneity in abilities, have unity in their objective of enriching the students with up-to-date technical information, data and skills. The teachers adopt a very professional attitude and commitment in imparting instruction, counselling and personality development in which the student has the final say. The emphasis is more on learning of the student than on teaching. All our teachers are rated 90% good by the students.

The 165-odd administrative and supporting people provide the logistics to run academic and administrative operations, with silent efficiency.

Discipline

Insulating the students from the vulnerable influence due to the society's contemporary aberrations is our endeavor. The institution had become the choice of the parents for its track-record of campus discipline. The ambience and the exemplary orderliness of behavior of the staff induces a self-imposed discipline in the students. The temporary abnormalities if any, are disciplined, of course.

Computer Centres

The computer facilities are vast. About 1500 terminals with latest configuration are located in fourteen central and department computer centres, all air conditioned. Software necessary for effective training and instruction as well as for consultancy are in place. All the computers in the campus have been interconnected through campus-wide intranet using Fibre Optic cables and switches. The City Computer Centre is an off-time facility for students & staff. Currently,16Mbps Internet connectivity in the college and in the city computers.

Library

The four-storied library of 87,468 volumes of 25,910 titles, 3,267 CDs and educational films is the biggest learning resource in the campus. 257 National and International Journals provide up-to-date information on any topic the students and staff look for. Orderly stacking, computerized information and the seven qualified library staff facilitate easy location of any information needed. The Digital Library is providing internet facility to all the students with 17 systems. Comfortable seating arrangement and large reading spaces provide a serene atmosphere for spending long hours in the library. The City Centre too has a reference library that is open upto 10.00 p.m.

Hostels

The college is having a four storeyed Girls hostel with 6,040 sq.m. accommodating 400 girl students in the city and a newly constructed four storied boys hostel with a 11,152 sq.m. accommodating 500 students with modern facilities in the College campus.

The Students

From the day of induction, the staff do everything to naturalize the students to the culture of R.V.R. & J.C. College of Engineering i.e. single minded pursuit of the objective. The part played by the students in making the college, into an ideal seat of learning is significant. The students of this college consistently produce the best of the results in the University.

Extra-curricular Activities

NCC, NSS Units were established in the college. Opportunities are a plenty for those with extracurricular talent. Numerous competitions are held for various levels of students, who have proved their superiority in various inter-collegiate competitions conducted by public organizations and other institutions. The students prove their leadership qualities and co-operative skills by organizing colorful functions at regular intervals.

Campus Recruitment

About 50 renowned industries / IT Organizations regularly visit the College to recruit the final years for employment. A training and placement cell monitors recruitment, short term training and personality development programmes. During the last four years the Campus recruitment steadily grew up.

DEPARTMENT OF COMPUTER APPLICATIONS

Department of Computer Applications started functioning from 1995 and is offering Masters Degree in Computer Applications.

In the culturally and intellectually rich environment of R.V.R & J.C College of Engineering, the department educates thinkers who do and doers who think broadly and strategically about problem solving methods and process that manipulate and transform information through computers. By providing a rigorous formal education while allowing a maximum intellectual flexibility and diversity, the department equips its students with know - how for technical innovation and vision for leadership.

The Department has modern laboratories to serve the teaching and research needs of the students and faculty of the department. Substantial computing resources that include high end servers with 130 MNC branded systems and all the necessary licensed software, giving students a diversity of experience in Operating Systems are exclusively provided for the department. All systems are fully networked within the department and to the institute's campus using High End CISCO Switches and Fiber Optic Cables. Currently,16 MBPS leased line Internet connectivity is provided by B.S.N.L. The Department has mail server, which provides mail accounts to all students and staff of the College. Laboratories will upgrade and modernize from time to time.These facilities are maintained by the department's staff of programmers and technicians.

With a right blend of young and experienced staff, the department demonstrates high level of entrepreneurial spirit and a student centered approach. The faculty is dedicated to providing students with a challenging and rewarding course of study in a caring & sharing environment.

The skills associated within teams are learnt and assessed in individual projects. Post graduate research is strongly encouraged through seminars, projects, theses and through the different guest lectures given by the experienced people from industry and academia.

The department encourages and nurtures the innate talents of students through the Computer and Information Science Association (CISA) by organizing several activities like student meets, seminars, guest lectures by the industry and academic experts. CISA organizes a National Level Technical Students Meet CIS'SOIREE every year.

It is planned to submit the program for accreditation in the year 2012-2013.

ACHARYA NAGARJUNA UNIVERSITY : GUNTUR

Rules And Regulations Of Semester System In Post-graduate Degree Courses Effective From The Academic Year 2012-2013 Onwards.

1. **Admission :**
   Candidates shall be admitted into P.G.Degree Courses strictly in accordance with the rank secured at the entrance test, if any, or rank determined on the basis of the marks other criteria determined by the University from time to time, following the rules of reservation of seats for various categories of students.

2. **Duration and Course of Study:**
   The duration of the P.G.Degree Course is of one/two/three academic years. Each academic year is divided into two semesters. The two semesters in the first academic year are referred to as Semester I and Semester II and the two semesters in the second academic year are referred to as Semester III and Semester IV. For three year course, the third academic year will have semester V and VI. Each semester shall comprise of 16 weeks of instruction.

3. **Time For The Completion of The Course :**
   The candidates have to complete three years of P.G.Course within 6years from the year of joining the course.

4. **Award Of Degree:**
   The Post Graduates Degree in the concerned faculty will be conferred on a candidate who has pursed a regular course of study for one /two /three academic years as prescribed in the scheme of instruction and has passed all the examinations as prescribed in the scheme of examination.

5. **Attendance:**

5.1. Candidates shall put in attendance of not less than 75% in aggregate in the prescribed subjects in each semester including field work , practical, project work, seminars, extension work etc. Condonation of shortage of attendance may be granted by the Principal of the college to the candidate who have put in 60% and above (but less than 75%) attendance of Medical Grounds on production of medical Certificate from a registered Medical Practitioner and also on payment of prescribed condonation fees.

5.2. Participants in N.C.C/N.S.S. Special/N.I Camps or Inter-collegiate or Inter-University or Inter-State or National or International Matches or Debates, Youth festivals or Educational tours, if they form part of the curriculum, or such other Inter-University , Inter-College activities as absence . However , the total period of such absence shall not exceed four weeks in a semester.

5.3. Candidates who have put in les than 60% of attendance are not eligible for grant of condonation on shortage of attendance and also they are not eligible to appear in the University examination of that semester. Such candidates shall have to repeat the regular course of study of the corresponding semester in subsequent academic year in order to become eligible to appear for the examination . The seats of candidates admitted for repetition of the semester be treated as extra seats over and above the sanctioned strength.

5.4. Attendance shall be reckoned from the date of commencement of instruction as per the academic calendar. However , in the case of candidates admitted later (but within the stipulated time) the attendance will be reckoned from the date of admission.

5.5. To enable students to know their attendance at the end of each month, the concerned Heads of Departments shall display cumulative attendance for information.

6. Scheme of Instruction and Examination:

6.1. Instruction in various subjects shall be provided by the college as per the Scheme of instructions and syllabi prescribed.

6.2. At the end of each semester, University examinations shall be held as prescribed in the scheme of examination.

6.3. Each theory paper carries 100 marks of which 70 marks are earmarked for semester-end examination and 30 marks are earmarked for internal assessment to be awarded by the teacher concerned on the basis of two internal tests for 20 marks, 5 marks for class room performance and 5 marks for attendance. Two internal tests are conducted and the performance of the best of two will be taken. However if a student fails to take the tests/ seminar/group discussion, no supplementary internal tests/

seminar/group discussion, will be conducted. No minimum qualifying marks is prescribed in case of internal assessments.

6.4. If any student fails to get marks in internal assessments or abstains for the internal assessments test, he/she has to get required marks in the semester -end examination for a pass.

6.5. There will be double valuation of theory papers of semester-end examination. In case of difference of above 20% of marks between the two valuations, it will be sent for a third valuation. In such cases the nearest two beneficial to the student will be taken for the purpose of declaring the results. There is no provision for revaluation /personal verification of answer scripts.

6.6. Candidates who have put in the necessary attendance in a semester shall be permitted to continue the subsequent semester, irrespective of whether they have appeared or not at the semester-end examination, provided they have registered in all papers for the semester-end examinations. Registration means obtaining a hall ticket for the said examination.

6.7. Practical examination in the even numbered semester (II,IV&VI) of Post-graduate courses may be conducted by external examiner appointed by the university from the panel of experts. The practical examinations in the remaining semesters (I,III&V)may be conducted by the internal examiners drawn from the same department/college.

6.8. Under semester system there will be no supplementary examinations.

7. PASSING STANDARDS.

. **M.C.A Course** :

A candidate should secure a minimum of 40% of marks in each semester-end theory paper of university examination/practical (i.e. 28 marks out of 70 marks) and a minimum of 40% of total marks of each theory paper/ practical (i.e. 40 marks out of 100 marks) and an aggregate of 50% marks of all the semesters for a pass. Further, a candidate should secure a minimum 50% marks in seminar /project work for a pass.

8. **AWARD OF DIVISION :**

Candidates who have passed all the examinations of the P.G.Degree course shall be awarded classes/ divisions in accordance with the total aggregate marks secured by them in all semester examinations taken together.

1. First Class with distinction - 70% and above.
2. First Class - 60% and above but less than 70%
3. Second Class - 50% and above but less than 60%
4. Third Class - 40% and above but less than 50%

First Class/ Second Class is awarded to a candidate as per the above classification, provided he/she completes the course within the three years from the year of joining the Two Year P.G. course and Four years from date of joining the three year P.G. course.

There is no third class in courses of Master of Laws, Master of Education, Science Faculties and M.C.A.

However, candidates who have passed the examinations in the first attempt along with the batch in which they are admitted will be eligible for the award of First Class with Distinction.

8.1. In case of one year P.G. Diploma course First Class/Second Class is awarded to a candidate who completes the course within two years from the year of joining the P.G. Diploma Course.

9. **AWARD OF RANKS :**

Only those candidates who appear and pass the examination in all the papers of each semester at first appearance are eligible for the award of ranks provided they have secured a minimum of Second Class.

10. **Award Of Gold Medals/Prizes :**

Only those candidates who appear and pass the examination in all the papers of each semester at first appearance are eligible for the award of Gold Medals and Prizes. The award of Gold Medals/ Prizes is also subject to the other conditions prescribed for the respective Gold Medals/Prizes.

11. **Betterment Examination :**

The candidates are eligible to improve their aggregate % of marks in each semester separately or in all the semesters put together,

provided they have passed the whole examination but secured less than 60% on the aggregate. Candidates who seek improvement in the aggregate % of marks (in a semester or in all the semester put together) to 60% and above are eligible to betterment examinations even in individual papers in which they have already secured 60% or above. But, no candidate who has already secured 60% or more marks in the aggregate either in the normal course or through betterment examination shall be eligible to appear for betterment examinations. Regular study candidates can appear for betterment examinations for each semester along with subsequent examinations only after passing in all papers of preceding semester - end examination. They can also appear betterment examinations of any semester after passing the course, subject to other conditions prescribed. However, there is no provision for betterment of marks secured at internal tests.

Three chances are given for betterment examinations. For purpose of classification, only such examination, betterment or otherwise, which is completed within the period of three years from the date of joining Two year P.G. course and Four years from the date of joining Three year P.G. course shall be taken into account. After above prescribed period marks secured at the betterment examination shall not be taken into account for awarding a class. However, these marks will be added for improvement of the percentage of marks of the candidate. The candidates have to pay prescribed betterment fees for every appearance.

MCA SEMESTER SYSTEM FORM & COURSES

FIRST SEMSTER OF MCA

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	Hours/ Week
MCA101	Fundamentals of Computers	30	70	100	4
MCA102	Programming with C	30	70	100	4
MCA103	Computer Organization	30	70	100	4
MCA104	DiscreteMathematical Structures	30	70	100	4
MCA105	Accountancy and Financial Management	30	70	100	4
MCA106	PC Software Lab	30	70	100	6
MCA107	C Programming Lab	30	70	100	6
MCA108	Seminar	50	--	50	3
	TOTAL	260	490	**750**	**35**

SECOND SEMSTER OF MCA

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	Hours/ Week
MCA201	Language Processors	30	70	100	4
MCA202	Data Base Management Systems	30	70	100	4
MCA203	Data Structure Using C++	30	70	100	4
MCA204	Operating System Principles	30	70	100	4
MCA205	Probability & Statistics	30	70	100	4
MCA206	Data Structures using C++ LAB	30	70	100	6
MCA207	DBMS LAB	30	70	100	6
MCA208	Communication Skills	50	--	50	3
TOTAL		260	490	**750**	**35**

THIRD SEMSTER OF MCA

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	Hours/ Week
MCA 301	Object Oriented Programming through JAVA	30	70	100	4
MCA 302	Computer Networks	30	70	100	4
MCA 303	Operations Research	30	70	100	4
MCA 304	Computer Graphics	30	70	100	4
MCA 305	Artificial Intelligence	30	70	100	4
MCA 306	Java Programming Lab	30	70	100	6
MCA 307	Unix Shell Programming LAB	30	70	100	6
MCA 308	Seminar	50	--	50	3
TOTAL		**260**	**490**	**750**	**35**

FOURTH SEMSTER OF MCA

Sub Code	Name of the Subject	Int.Marks	Ext.Marks	Total Marks	Hours/ Week
MCA 401	Principles of Programming Languages	30	70	100	4
MCA 402	Object Oriented Modeling and Design Using UML	30	70	100	4
MCA 403	Web Technologies	30	70	100	4
MCA 404	Software Engineering	30	70	100	4
Elective-I	**(one to be chosen)**	30	70	100	4
MCA 405.1	Grid and Cluster Computing				
405.2	Crytography and Networks Security				
405.3	Simulation Modeling and Analysis				
MCA 406	Web Technologies Lab	30	70	100	6
MCA 407	Visual Programming Lab	30	70	100	6
MCA 408	Soft Skills	50	--	50	3
TOTAL		**260**	**490**	**750**	**35**

FIFTH SEMSTER OF MCA

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	Hours/ Week
MCA 501	Data Ware Housing and Data Mining	30	70	100	4
MCA 502	.Net Programming	30	70	100	4
MCA 503	Design and Analysis of Algorithms	30	70	100	4
Elective-II MCA 504.1 504.2 504.3	**(one to be Choosen)** Embedded Systems Mobile Computing Cloud Computing	30	70	100	4
Elective-III MCA 505.1 505.2 505.3	**(one to be Choosen)** Image Processing Microprocessors and Interfacing Web Engineering	30	70	100	4
MCA 506	.Net Programming Lab	30	70	100	6
MCA 507	Advanced Java Lab	30	70	100	6
MCA 508	Seminar	50	--	50	3
TOTAL		260	490	**750**	**35**

SIXTH SEMSTER OF MCA

Sub Code	Name of the Subject	Int. Marks	Ext. Marks	Total Marks	Hours/ Week
MCA 601	Project Work	--	150	150	Five Months Duration

TOTAL MARKS FOR MCA COURSE : 3900

MCA 101 FUNDAMENTALS OF COMPUTERS

Unit - I

Computer Basics: Algorithms, A Simple Model of a Computer, Characteristics of Computers, Problem Solving Using Computers.

Data Representation: Representation of Characters in Computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error Detecting Codes.

Input / Output Units: Description of Computer Input Units, Other Input Methods, Computer Output Units.

Computer Memory: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to Construct memories, Magnetic Hard Disk, Floppy Disk Drives, Compact Disk Read Only Memory (CDROM), Magnetic Tape Drive.

Unit - II

Processor: Structure of Instructions, Description of a Processor, A Machine Language Program, An Algorithm to Simulate the Hypothetical Computer.

Computer Architecture: Interconnection of Units, Processor to Memory Communication, I/O to Processor Communication, Interrupt Structures, Bus Architecture of Personal Computers, Multiprogramming, Processor Features, Reduced Instruction Set Computers (RISC), Virtual Memory.

Programming Languages: Why Programming Language?, Assembly Language, High Level Programming Languages, Compiling High Level Language Program, Some High Level Languages.

Operating System: Why Do We Need an Operating System?, Batch Operating System, Multiprogramming Operating System, Time Sharing Operating System, Other Facilities Provided by Operating Systems, Personal Computer Operating System, The UNIX Operating System, Microkernel based Operating System, On - line and Real - time Systems.

Unit - III:

Microcomputers: An Ideal Microcomputer, An Actual Microcomputer, Memory Systems for Microcomputers, A Minimum Microcomputer Configuration, Evolution of Microcomputers, Special Purpose Microprocessors, Special Purpose Microcomputer Software, Special Purpose Applications of Microcomputers, Smart Cards and RFID.

Computer Generations and Classifications: First Generation of Computers, The Second Generation, The Third Generation, The Fourth Generation, The Fifth Generation, Moore's Law, Classification of Computers, Distributed Computer System, Parallel Computers.

Voice and Data Communications: Types of Communications with and Among Computers, Characteristics of Communication Channels, Allocation of Channel, Physical Communication Media, Public Switched Telephone Networks, Multiplexing Techniques in Wireless Communication, Cellular Communication System, Establishing Communication Paths, ATM Networks.

Computer Networks: Need for Computer Communication Networks, Internet and the World Wide Web, Communication Protocols, Local Area Networks, Token Ring Local Area Network, Interconnecting Networks, The Future of Internet Technology.

Unit - IV

Computer Graphics: Computer Graphics Applications, Display Devices, Overview of Display Method, Raster Scan Display Processing Unit, Input Devices for Interactive Graphics, Programmers' Model of Interactive Graphics Systems, Image Acquisition and Storage, Storage Formats for Pictures, Image Acquisition with a Digital Camera.

Multimedia Data Acquisition and Processing: Capturing a Moving Image with a Video Camera, Compression of Video Data, MPEG Compression Standard, Acquiring and Storing Audio Signals, Audio Signal Processing, Speech Processing.

Emerging Computing Environments: Current Computing Scenario, Peer to Peer Computing, Grid Computing, Cloud computing, Utility Computing.

Prescribed Book:

Fundamentals of Computers, by V.Rajaraman, PHI, Fifth Edition, April 2010.

Reference Book:

Fundamentals of computers , E.Balagurusamy, TMH, second reprint 2010. Chapters: 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17.

MCA 102 : PROGRAMMING WITH 'C'

UNIT-I

1. Introductory Concepts: Types of Programming Languages, Introduction to C, Desirable Program Characteristics
2. Introduction to C Programming: The C Character Set, Writing First Program of C, Identifiers and Keywords, Datatypes, Constants, Variables and Arrays, Declarations, Expressions Statements, Symbolic Constants
3. Operators and Expressions: Arithmetic Operators, Unary Operators, Relational and Logical Operators, Assignment Operators, The Conditional Operator, Library Functions.
4. 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
5. Preparing and Running A Complete C Program: Planning a C Program, Writing a C Program, Error Diagnostics, Debugging Techniques

UNIT-II

6. 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.
7. Functions: A Brief Overview, Defining a Function, Accessing a Function, Function Prototypes, Passing Arguments to a Function, Recursion
8. Program Structure: Storage Classes, Automatic Variables, External (Global) Variables, Static Variables.

UNIT-III

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

10. 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
11. 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
12. 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

13. Low-Level Programming: Register Variables, Bitwise Operations, Bit Fields
14. Some Additional Features of C: Enumerations, Command Line Parameters, More About Library Functions, Macros, The C Processor
15. Appendix H Library Functions

Prescribed Book:

1. 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)

MCA 103 : COMPUTER ORGANIZATION

UNIT-I

1. Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.
2. Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.
3. Data Representation: Data Types, Complements, Fixed Point Representation, Floating Point Representation, Other Binary Codes, error Detection Codes.

   (Chapters:)

UNIT-II

4. 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
5. Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupt.

UNIT-III

6. Microprogrammed Control: Control Memory, Address Sequencing, Micro Program Example, Design of Control Unit.
7. Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Format, Addressing Modes, Data Transfer and Manipulation, Program Control.

   (Chapters:

UNIT-IV

8. Computer Arithmetic: Addition, Subtraction, Multiplication, Division Algorithms, Floating Point Arithmetic Operations.
9. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt.
10. 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)

MCA 104 : DISCRETE MATHEMATICAL STRUCTURES

UNIT-I :

1. **The Foundations:** Logic and Proofs: Propositional Logic - Propositional Equivalences - Predicates and Quantifiers - Nested Quantifiers - Rules of Inference - Introduction to Proofs - Proof Methods and Strategy
2. **Basic Structures:** Sets, Functions, Sequences and Sums: Sets - Set Operations - Functions - Sequences and Summations
3. **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
4. **Introduction and Recursion :** Mathematical Induction - Strong Induction and Well-Ordering - Recursive Definitions and Structural Induction - Recursive Algorithms - Program Correctness

UNIT-II :

5. **Counting:** The Basics of Counting - The Pigeon Hole Principle - Permutations and Combinations - Binomial Coefficients - Generalized Permutations and Combinations - Generating Permutations and Combinations
6. **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 :

7. **Relations :** Relations and Their Properties - n-ary Relations and Their Applications - Representing Relations - Closures of Relations - Equivalence Relations - Partial Orderings
8. **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 :

9. **Trees:** Introduction to Trees - Applications of Trees - Tree Traversal - Spanning Trees - Minimum Spanning Trees
10. **Boolean Algebra:** Boolean Functions - Representing Boolean Functions - Logic Gates - Minimization of Circuits

Prescribed Book :

1. 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).

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

2.1 cost sheet

2.2 marginal costing (problems)

2.3 budget and budgetary control

2.4 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 :

1. 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)

MCA 106 : PC SOFTWARE LAB

(Lab Cycle)

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 atleast 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

MCA 107 : C PROGRAMMING LAB

(Lab Cycle)

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 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

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 Book :

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).

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 .

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 Books :

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).

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.

MCA 206: DATA STRUCTURES USING C++ LAB

(Lab cycle)

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

(Lab cycle)

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	

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.

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)

MCA 301: OBJECT ORIENTED PROGRAMMING WITH JAVA

Unit-I

Object Oriented Programming : Introduction to OOP, Objects and Classes, Characteristics of OOP, Difference between OOP and Procedure Oriented Programming, Summary

Introduction to Java Programming : Introduction, Features of Java, Comparing Java and other languages, Applications and Applets, Java Development Kit, More Complex Programs, Java Source file structure, Prerequisites for Compiling and Running Java Programs.

Java Language Fundamentals : The building Blocks of Java - Data types - variable declarations - wrapper classes - Operators and Assignment - Control structures - Arrays - Strings - The String Buffer Class.

Unit-II

Java as an OOP Language : Defining classes - Modifiers - Packages - Interfaces.

Exception Handling : Introduction - Basics of Exception Handling in Java - Exception Hierarchy - Constructors and Methods in Throwable class - Unchecked and checked exceptions - Handling exceptions in Java - Exception and Inheritance - Throwing User defined Exceptions - Redirecting and Rethrowing Exceptions - Advantages of Exception - Handling Mechanism.

Unit-III

Multithreading : Introduction : An Overview of Threads - Creating Threads - Thread Life - cycle - Thread priorities and Thread scheduling - Thread synchronization - Thread groups - Communication of Threads.

Files and I/O Streams : An Overview of I/O streams - Java I/O - File streams - File Input stream and File output stream - Filter streams - Random Access File - Serialization.

Applets : Introduction - Java applications versus Java Applets - Applet Life cycle - Working with Applets - The HTML Applet Tag.

Unit-IV

Database Handling Using JDBC : An Overview of DBMS - JDBC Architecture - Working with JDBC

Servlets : Introduction - How to run servlets - The Life - cycle of the servlet - servlet API - Multitier Applications using JDBC from a servlet.

Networking and Remote Method Invocation : Introduction to Networking - Understanding Ports - Networking classes in JDK - Introduction to RMI - RMI Architecture - Implementing Remote class and interface - security.

Prescribed Book:

P. Radha Krishna, "Object Oriented Programming through Java", Universities Press (2008)

Chapters:1,2,3,4,5,6.1-6.5,6.7,6.8,7,8.1-8.5,9.1-9.3, 12.1-12.5, 13

Reference Books:

1. Cay S. Horstmann Gray Cornell, "Core Java - Volume 1 Fundamentals", Eighth Edition, Pearson Education
2. E.Balagurusamy, "Programming with Java", 3e, TMH (2007)
3. H.M.Deitel, P.J.Deitel, "Java How to Program", Sixth Edition, Pearson Education (2007)
4. Debasish Jana,"Java and Object Oriented Programming Paradigm", PHI (2005).
5. ISRD Group, "Introduction to Object Oriented Programming through Java", TMH (2007).

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)

MCA 303 : OPERATIONS 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

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 Books :

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)

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 Books :

1. Michael Negnevitsky, "Artificial Intelligence - A Guide to Intelligent Systems", Second Edition, Pearson Education (2008)
2. Winston P.H, "Artificial Intelligence", Addision Wesley (1993)

MCA 306: JAVA PROGRAMMING LAB

(Lab Cycle)

1. Program to Demonstrate labeled looping Statements.
2. Find Volume of a box using classes.
3. Program to guess a coin flip.
4. Count the number of heads and tails in a series of a coin flips.
5. Demonstrate type conversions.
6. Implement operations on complex numbers.
7. Implement the following bank operations

   i) withdraw ii) deposit iii) Transfer
8. Demonstrate date class.
9. Implement Method Overloading.

   10.Implement Constructor Overloading.
11. Program to Demonstrate on Static variables and methods.
12. Product Company Modeling - Multilevel Inheritance.
13. Payroll System - Hierarchical Inheritance.
14. Implement Method Overloading.
15. Demonstrate Constructor chaining in Inheritance.
16. Program that demonstrates fields shadowing.
17. Demonstrate the use of final.
18. Implementation of base class reference (Implement Dynamic Binding).
19. Student database using Interfaces.
20. Implement string sorting using command line arguments.
21. Implement any sorting technique for sorting given 'n' elements.
22. Implement possible operations on matrix.
23. Sorting the characters of a given string.

24. Program that demonstrate Exception Handling.
25. Program that demonstrate wrapper classes.
26. Convert an ordinary text file to HTML file.
27. Copies the content of one file to another file.
28. Perform DML commands on a particular table.
29. Implement authentication technique using applets.
30. Implement event handling in Applets.
31. Program for Deadlock Handling.
32. Program for Producer - Consumer problem.
33. Implement Process Synchronization.
34. Program that demonstrate process state.
35. Construct servlet using httpservlet class
36. Illustration of Initializing, implementing and destroying the servlet.
37. Program for establishing a socket connection.

MCA 307: UNIX SHELL PROGRAMMING LAB

(Lab Cycle)

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.

MCA 401: PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT - I

Introduction : What is a programming language, Abstractions in programming languages, Computational paradigms, Language definition, Language translation, Language design.

History : Early History : The first programmer, The 1950s : The first programming languages, The 1960s : An explosion in programming languages, The 1970s : Simplicity, abstraction, study, The 1980s : New directions and the rise of object -orientation, The 1990s : Consolidation, The Internet, libraries and scripting, The future.

Language Design Principles : History and design criteria, Efficiency, regularity, Further language design principles, C++ : A Case study in language design.

Syntax : Lexical structure of programming languages, Context-free grammars and BNFs, Parse trees and Abstract syntax trees, Ambiguity, Associativity and precedence, EBNFs and syntax diagrams, Parsing techniques and tools, Lexical vs Syntax vs Semantics.

Basic Semantics : Attributes, binding and semantic functions, Declarations, blocks and scope, The symbol table, Name resolution and overloading, Allocation, Lifetimes and the environment, Variables and Constants, Aliases, Dangling references and garbage.

Data Types : Data types and type information, Simple types, Type constructors, Type equivalence, Type Checking, Type conversion, Polymorphic type checking, Explicit polymorphism.

UNIT - II

Control - I : Expressions and Statements : Expressions, Conditional Statements and Guards, Loops and Variation on "while", The "goto" controversy, Exception handling.

Control - II : Procedures and Environments : Procedure definition and activation, Procedure semantics, Parameter passing mechanisms, Procedure environments, activations and allocation, Dynamic memory management, Exception handling and environments.

Abstract data types and Modules : The algebraic specification of abstract data types, Abstract data type mechanisms and modules, Separate compilation in C, C++ name spaces and Java packages, Ada

packages, Modules in ML, Modules in earlier languages, Problems with abstract data type mechanisms, The mathematics of abstract data types.

UNIT - III

Object - Oriented Programming : Software reuse and independence, Java : objects, Classes and methods, Inheritance, Dynamic binding, C++, Small Talk, Design issues in object - oriented languages, Implementation issues in object - oriented languages.

Functional Programming : Programs as functions, Functional programming in an imperative language, Scheme : A Dialect of LISP, ML : Functional programming with static typing, Delayed Evaluation, Haskell - A fully curried lazy language with overloading, The Mathematics of functional programming I : Recursive functions, The Mathematics of functional programming II : Lambda calculus.

Logic Programming : Logic and Logic programs, Horn clauses, Resolution and Unification, The language Prolog, Problems with logic programming, Extending logic programming : Constraint logic programming and Equational systems.

UNIT - IV

Formal Semantics : A Sample small language, Operational semantics, Denotational semantics, Axiomatic semantics, Proofs of program corrections.

Parallel programming : Introduction to parallel processing, Parallel processing and programming languages, Threads, Semaphores, Monitors, Message passing, Parallelism in non-imperative languages.

Prescribed Book :

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

Chapters : 1 through 14

Reference Books:

1. Terrence W. Pratt & Mervin V. Zelkowitz, "Programming Languages Design and Implementation", Fourth Edition, Pearson Education (2008)
2. Robert W. Sebesta, "Concepts of Programming Languages", Seventh Edition, Pearson Education (2007)

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).

MCA 403: WEB TECHNOLOGIES

Unit-I:

Introduction: What is Internet, History of Internet, Internet services and accessibility, uses of the Internet, protocols, web concepts - the client/ server model of the web, retrieving data from the web, How the web works?, web browsers, searching information on the web, Internet standards

Internet protocols: Introduction, Internet protocols - Internet protocol (IP), Transmission control protocol (TCP), User datagram protocol (UDP), host names, Internet applications and application protocols - Datagram Vs. Stream, Trivial file transfer protocol (TFTP), FTP - File Transfer Protocol, Telnet, HTTP (Hyper Text Transfer Protocol), e - mail protocols SMTP (Simple Mail Transfer Protocol), POP (Post Office Protocol, version 3),IMAP

Java network programming: Introduction, UDP/IP and TCP/IP communications, I/O streams - types of streams, character and byte streams, input stream, output stream, filter streams, readers and writers, data streams, object streams, sockets - creating client sockets, server socket, datagram socket, a simple example, Multicast sockets - multicast groups and addresses, a simple example, remote method invocation, protocol handler - developing a protocol handler, a simple protocol handler, content handlers - developing a content handler, a simple content handler, the "Grid Content Handler" class, the "Get Grid Application" program

Unit -II

HTML: Introduction, SGML - DTD, DTD elements, attributes, outline of an HTML document, head section - prologue, link, base, meta, script, style, body section - headers, paragraphs, text formatting, linking, internal linking, embedded images, lists, tables, frames, other special tags and characters, HTML forms

Java Script : Introduction - need of a scripting language, language elements - identifiers, expressions, java script keywords, operators, statements, functions, objects of a java script - the "window" object, the

"Document" object, forms object, text boxes and text areas, buttons, radio buttons, check boxes, the "Select" object, other objects - the "date" object, the "math" object, the "string" object, regular expressions, arrays, worked examples

VB Script : Introduction, embedding VB script code in an HTML document, comments, variables - array variables, operators - assignment operator, numerical operators, string concatenation, procedures - sub procedure, function procedure, conditional statements, looping statements, object and VB script, cookies: cookie variables, creating a cookie, a cookie with multiple values, reading cookie value

Unit - III

Dynamic HTML (DHTML): Introduction, cascading style sheets (CSS) : coding css, properties of tags, property values, other style properties, in - line style sheets, Embedded style sheets, External Style Sheets, grouping, inheritance, class as selector, ID as selector, contextual selectors, pseudo classes and pseudo elements, positioning, backgrounds, element dimensions, DHTML document object model and collections - using the collections "all", moving objects around the document, event handling - assigning event handlers, event bubbling, filters and transitions - filters, transitions, data binding - using tabular data control, sorting data, dynamic sorting, filtering

XML: Introduction, HTML vs. XML, syntax of XML document, XML attributes: use of elements vs. use of attributes, XML validation: "well formed" XML documents, "valid" XML documents, XML DTD: internal DTD, external DTD, the building blocks of XML documents, DTD elements: declaring an element, empty elements, elements with data, elements with children, wrapping, declaring only one occurrence of the same elements, declaring minimum one occurrence of the same element, defining zero or one occurrence of the same element, declaring mixed content, DTD attributes: declaring attributes, default attribute value, implied attribute, required attribute, fixed attribute value, enumerated attribute values, DTD entities, DTD validation, XSL, XSL transformation, XML namespaces, XML schema

Common Gateway Interface (CGI): Introduction, server - browser interaction, CGI script structure - the CGI .pm module, perl variables, CGI environment variables - processing forms - sending mail - validating the form data - handling check boxes - SSI - CGI server side and client side applets, CGI security issues

Unit - IV

Servlets : Introduction, advantages of servlets over CGI, installing servlets, the servlets life cycle, servlets API, a simple servlet, handling HTTP "Get" requests, handling HTTP "Post" requests, cookies, session tracking, multi tier applications using database connectivity, servlets chaining

Java Server Pages (JSP): Introduction, advantages of JSP, developing first JSP, components of JSP, reading request information, Retrieving the data posted from a HTML file to a JSP file, JSP sessions, cookies, disabling sessions

Active Server Pages (ASP): Introduction, advantages of ASP, first Asp script, processing ASP scripts with forms, variables and constructs, subroutines, Include/Virtual, ASP cookies, Asp objects, connecting to data with ASP

Prescribed Book:

N.P Gopalan, J.Akilandeswari, "Web Technology - A Developer's Perspective", PHI (2008)

Chapters : 1 through 12

Reference Books :

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).

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).

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)

MCA 405.2: CRYPTOGRAPHY 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)

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:

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

MCA 406 : WEB TECHNOLOGIES LAB
(Lab Cycle)

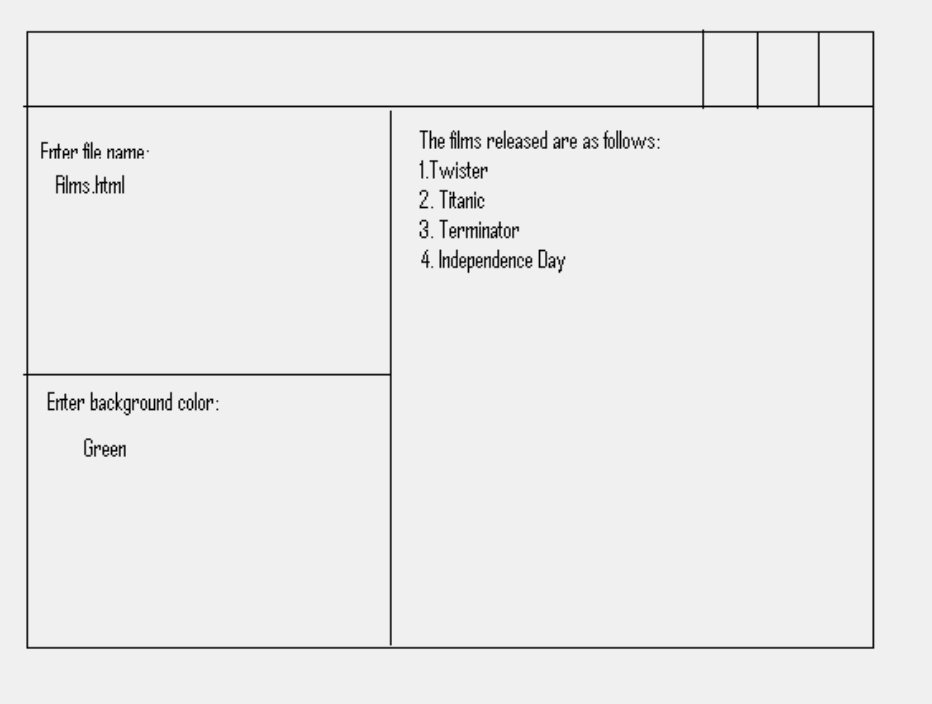
1. Write HTML code to provide intra document linking.
2. Insert the "Calendar" object in a web page.
3. Create a form with the following specifications:

a) Our form uses frames, one to hold the links bar at the op 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. Simulate the "notepad" help file in HTML.
5. Write a Java script to differentiate between write() and writeln() methods. Also, depict how <H1> tag in a Java script influence the output, while a <pre> tag is also attached to the script.
6. Find the difference in hours between local time and Greenwich Mean Time using the 'Date' object in Java Script.
7. Create a bank entry form using appropriate form elements. The account number must not be visible on the screen. The name and address must be stored in one place. There must be a text box showing the opening balance of the customer. The user should be able to make a choice of either a deposit (or) withdrawal transaction. Accordingly, when the user deposits (or) withdraws money, the opening balance must be updated using CREDIT/DEBIT button. The user should not be able to make any entries in the opening balance text box.
8. Write a Java Script to update the information into the array, in the "onClick" event of the button "Update".
9. Create forms for the objects "stu_info","College" and "Experience". Place textboxes for all the fields in the form "stu_info". Create two tables for storing data for the "college" and "experience" forms and place textboxes for all the fields in a three row format. Place two buttons "update" and "retrieve" in the form "execute".
10. Create a web page for a shopping mall that allows the user to tick off his purchases and obtain the bill with the total being added up simultaneously.
11. Use the suitable date functions to prompt the user for an integer between 1-31 and return the day of the week it represents.
12. Write a script to find the duplicate elements of an array.
13. Write validation functions for checking the alphabetic and number fields.
14. Using the concept of "Nested Frames", obtain the output as follows:



The right hand frame must display the output of the file, that is entered in the top-left frame. The bottom left-hand frame displays the selected background color.

15. Create a home page for "Cyber book stores" that will display the various books available, the authors and prices pf the books. Include a list box that contains various subjects and a "submit" button, that displays information about the books on the subject required by the user.
16. Create a HTML form that interacts with the user. Collect first name, last name and date of birth and display that information back to the user.
17. Write a script which generates a different greeting each time the script is executed.
18. Write a script that takes input from user and displays the same in upper case.
19. Illustrate different types of filters on a sample text.
20. Create an inline style sheet.
21. Illustrate the use of an embedded style sheet.

22. Create an external style sheet to illustrate the "Font" elements.

23. Create a file with HTML code and insert two anchors to point to a specific area in the code.

24. Illustrate the creation of clickable images in HTML.

25. With a suitable example, depict how we can align text and images using "table" tag.

26. Simulate the "Clip Art" gallery of M.S.Word in HTML, using suitable tags.

27. Using functions, write a Java Script code that accepts user name and password from user. Check their correctness and display appropriate alert messages. Restrict the user to try only for a maximum of three times.

28. Modify the above program that suits the following requirements:

    a) After a lapse of 15 seconds, the password should be generated automatically.

    b) For impatient users, place a button that displays the passwords immediately without waiting for 15 seconds.

29. Write a script to open a new window, after clicking a button named "New". After displaying the new window, the original window should be closed automatically.

30. Write an application to create a "customer interaction form", that accepts the name, age and salary of a customer who approaches the bank to obtain education loan for their children. He should furnish details about his marital status and children. Accept this information in textboxes and two check boxes. Display whether the customer is eligible for the loan (or) not, based on the furnished information.

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).

MCA 501 : DATA WAREHOUSING AND DATA MINING

Unit - I

Warehouse: What is it, Who Need It, and Why?, Things to Consider, Managing the Data Warehouse, Data Warehouse Design Methodology, Data Marts and Start Schema Design, Fundamentals of ETL Architecture, Partitioning Data, Indexing Data.

Unit - II

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

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

Unit - III

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

Unit - IV

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.

Prescribed Books :

1. Michael Corey, Michael Abbey, Ian Abramson, Ben Taub, "Oracle 8i Data Warehousing", TMH (For Unit-I).
2. Jiawei Han Micheline Kamber, "Data mining & Techniques", Morgan Kaufmann Publishers (Unit-II to IV).

Reference Books :

1 S.N.Sivanandam, S.Sumathi, "Data Mining - Concepts, Tasks and Techniques", Thomson (2006).
2 Ralph Kimball, "The Data Warehousing Toolkit", Wiley.
3 Margaret H. Dunham, "Data mining - Introductory and advanced topics",Pearson Education.
4 D.Hand, H. Mannila and P.Smyth, "Principles of Data mining", PHI (2001).

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).

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 deterministic 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)

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).

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).

MCA 504.3 Cloud Computing

UNIT I-

Understanding Cloud Computing : Beyond the Desktop : An Introduction to Cloud Computing ,Are you ready for Computing in the Cloud ?,Developing Cloud Services.

UNIT - II

Cloud Computing for Everyone : Cloud Computing for the Family, Cloud Computing for the Community,Cloud Computing for the Corporation.

UNIT - III

Using Cloud Services : Collaborating on calendars, Schedules and task management, Collaborating on event management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Collaborating on Spreadsheets.Collaborating on Databases, Collaborating on Presentations, Storing and Sharing Files and Other Online Content, Sharing Digital Photographs, Controlling it all with Web-Based desktops.

UNIT - IV

Outside the Cloud : Other ways to Collaborate Online, Collaborating via Web-Based Communication Tools,Collaborating Social Networks and Groupware,Collaborating via Blogs and Wikis.

Prescribed book :

Michael Miller, " Cloud Computing", Pearson Education, New Delhi.

All the four parts into which the Textbook is divided.

REFERENCES:

1. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in theCloud with SLAs, Emereo Pty Limited, July 2008.
2. Cloud Application Architectures, George Reese, ISBN: 8184047142,Shroff/O' Reilly, 2009.

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 Books :

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.

Reference Books :

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

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

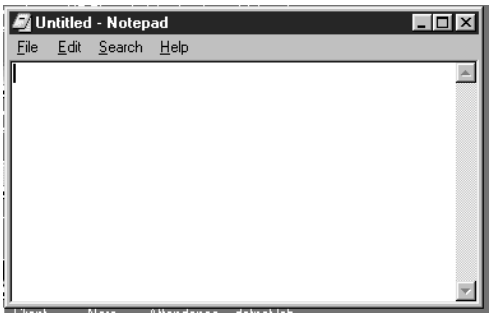
Prescribed Book :

Roger S Pressman, David Lowe, "Web Engineering A Practitioner's Approach", TMH (2008)

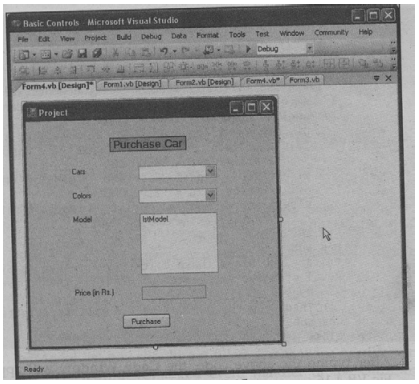
Chapters: 1 to 5, 7 to 12, 14, 15.

MCA 506 : . NET PROGRAMMING LAB
(Lab Cycle)
VB .NET

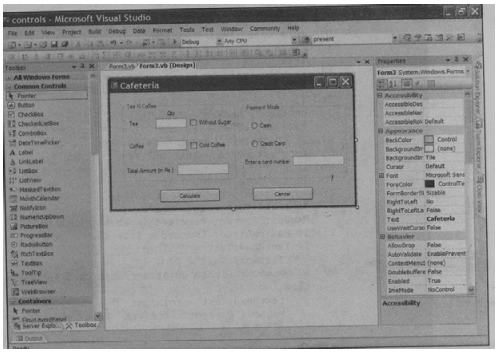
1) Develop an application which is similar to "Notepad" using menus.



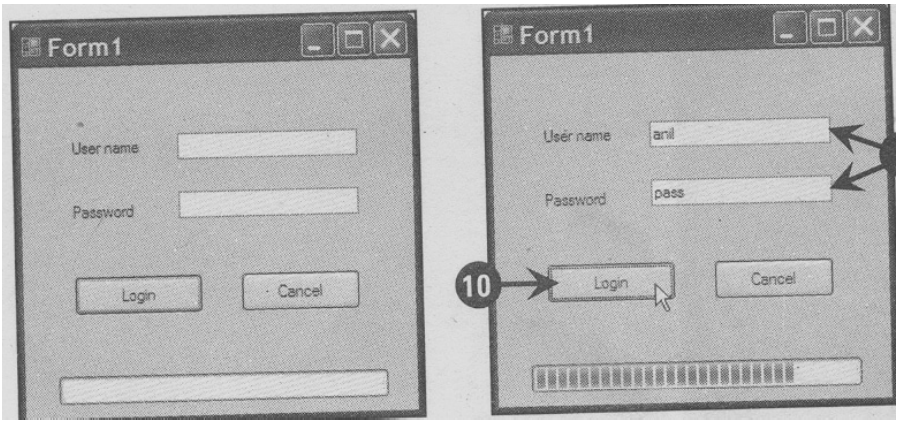
2) (a) Develop an application for facilitating purchasing order which will look like as shown below :



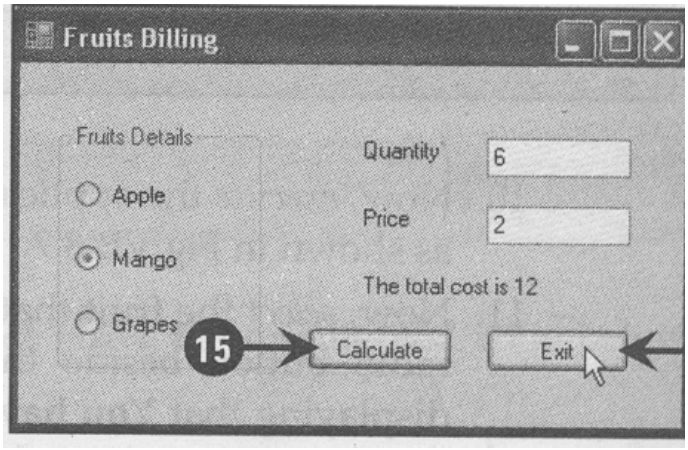
b) Develop an application for billing system in coffee shops which will look like as shown below :



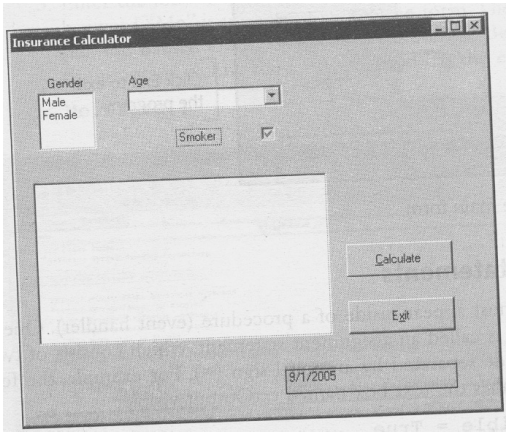
3 a) Develop an application which is similar to login form including the progress bar controls.



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

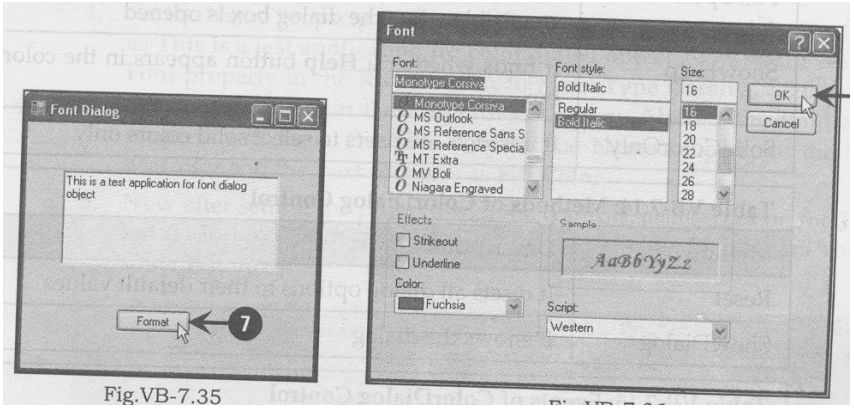


Fig.VB-7.35

b) Develop an application using color dialog control

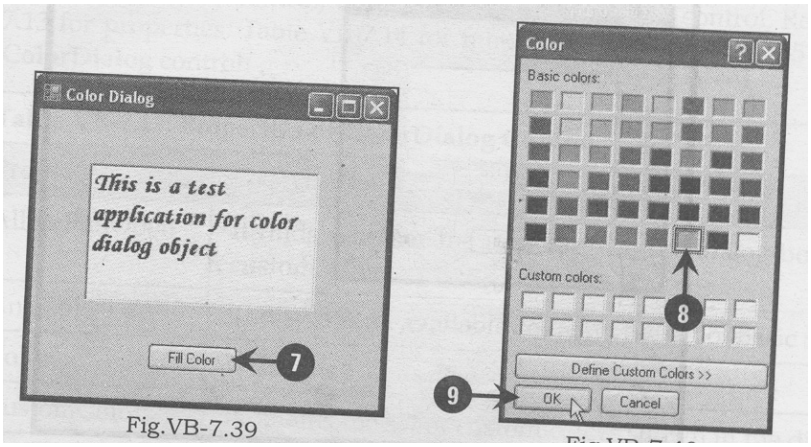


Fig.VB-7.39

6 Develop an application to display the file selected by the user in a web browser control.

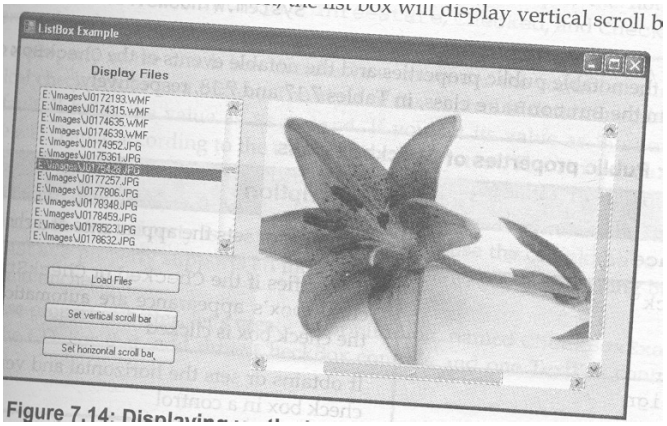
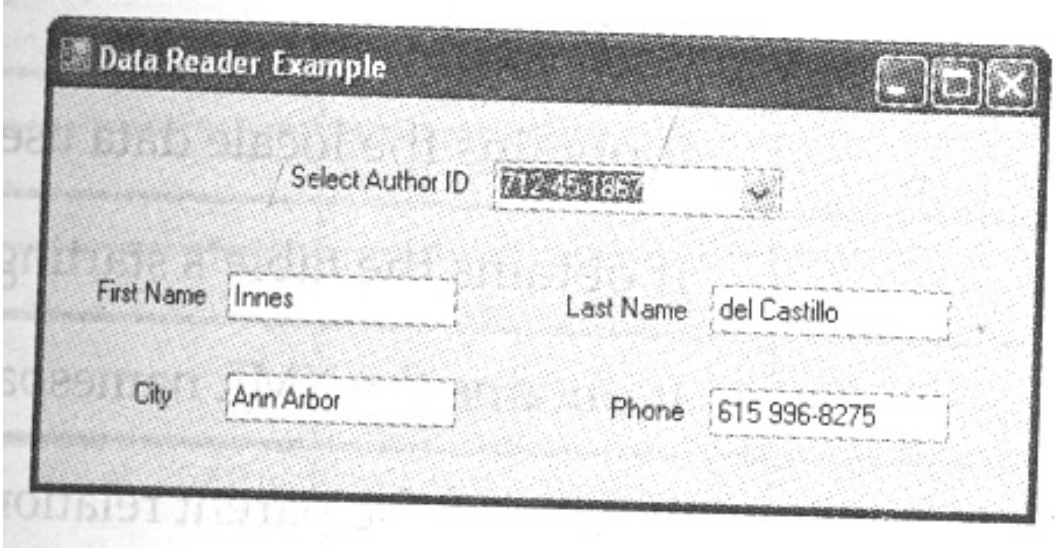


Figure 7.14: Displaying

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.

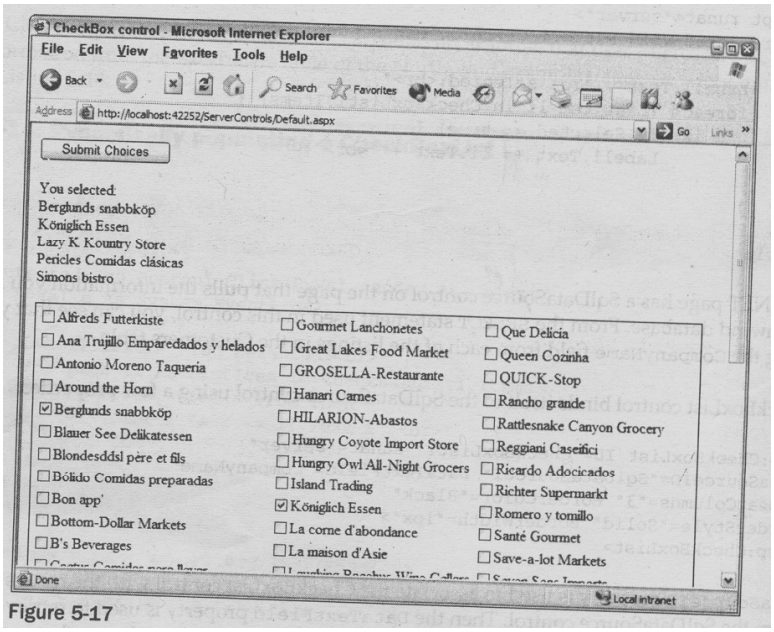


Figure 5-17

9 Develop an application for selecting a single day in the calendar control.

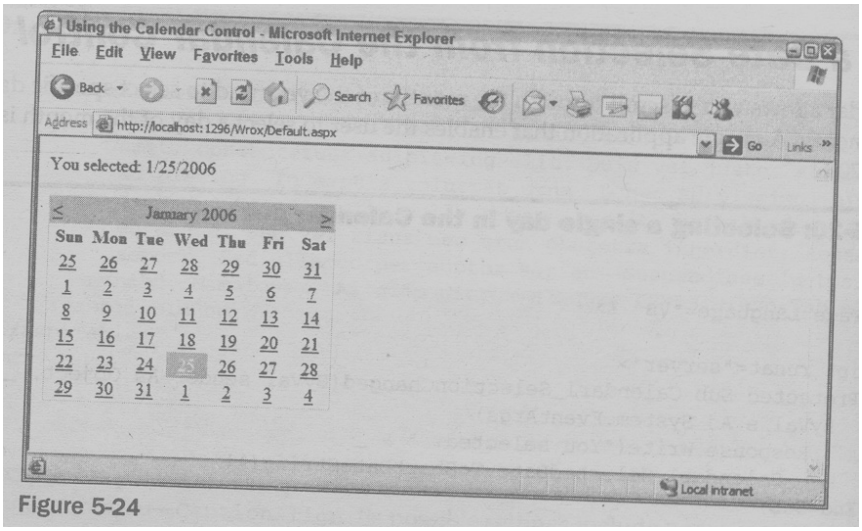
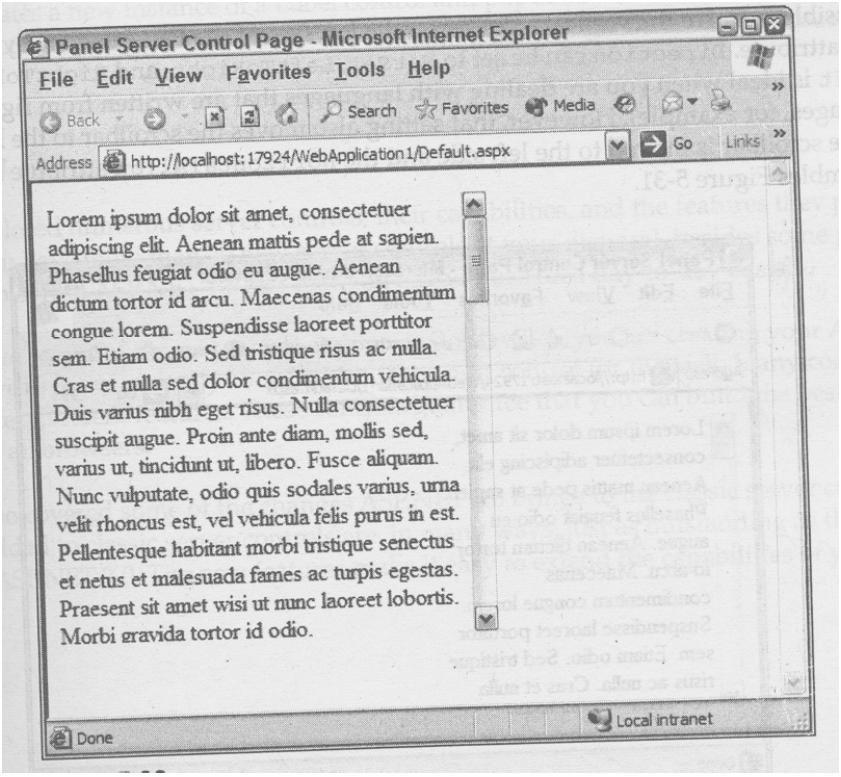


Figure 5-24

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.

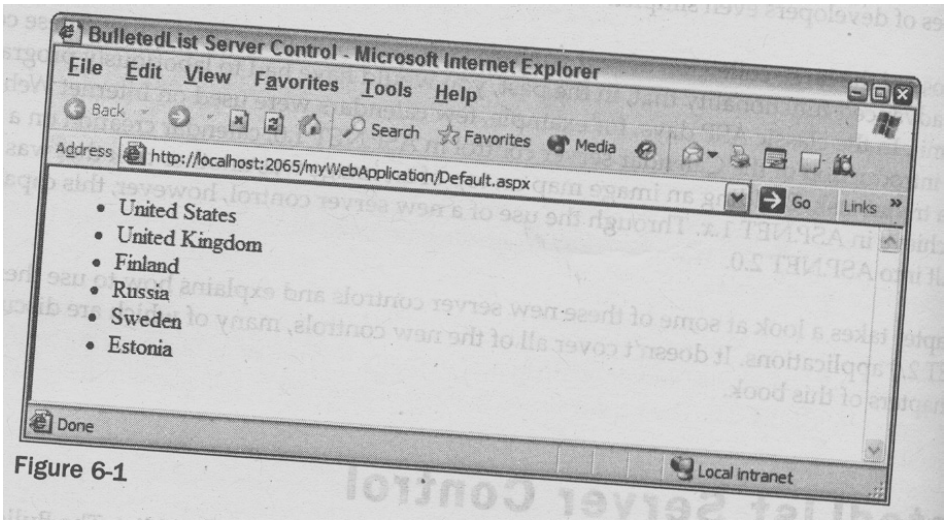
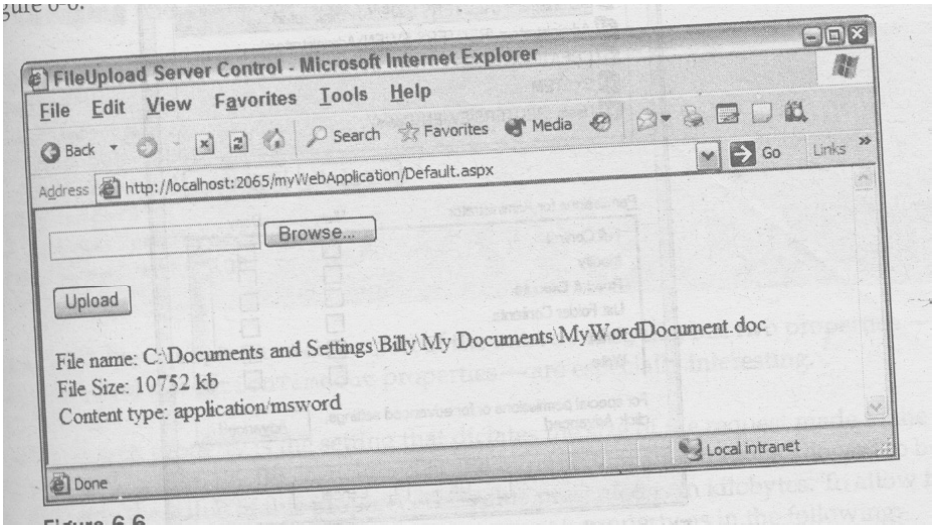
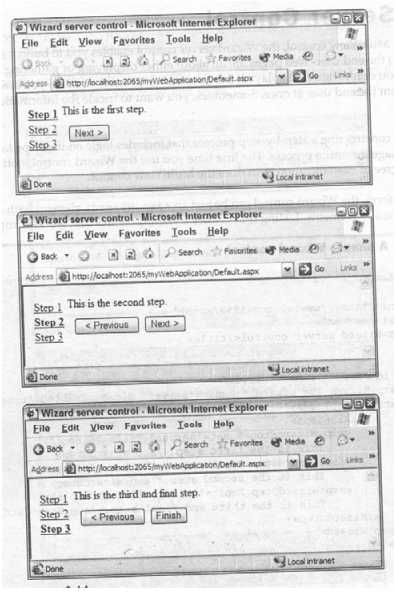


Figure 6-1

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

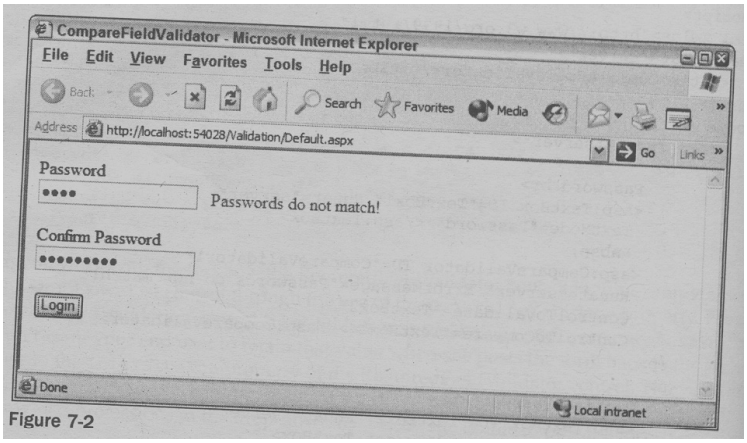


Figure 7-2

15.Design an application using the images, sounds for error notifications.

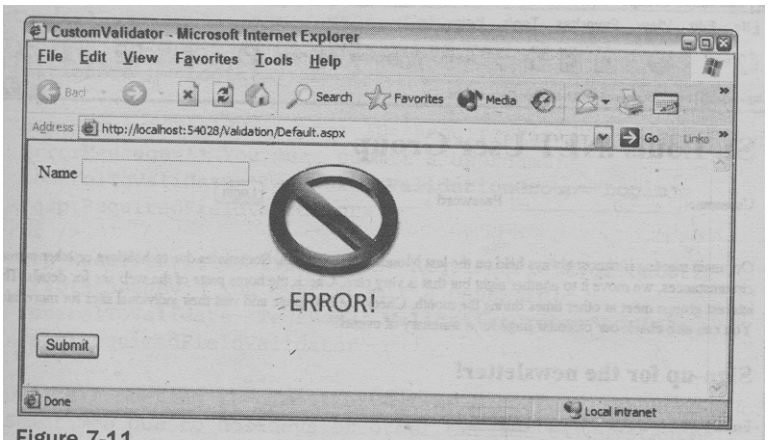
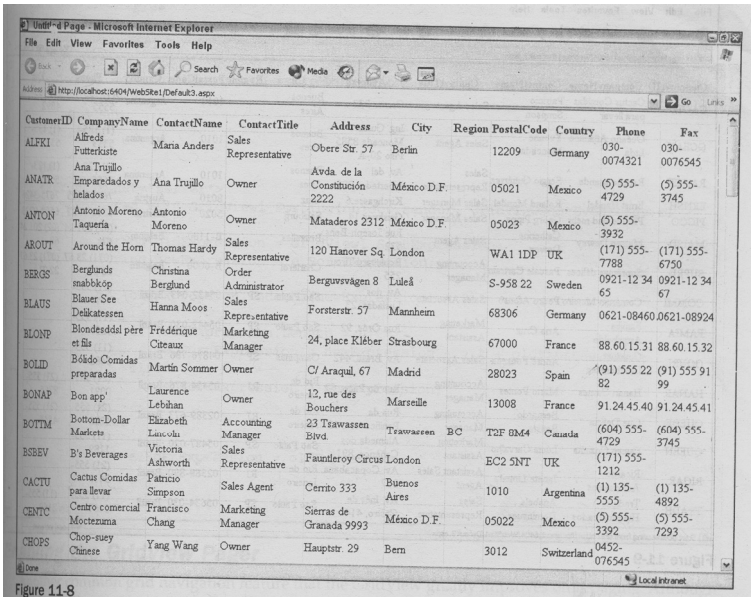


Figure 7.11

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.

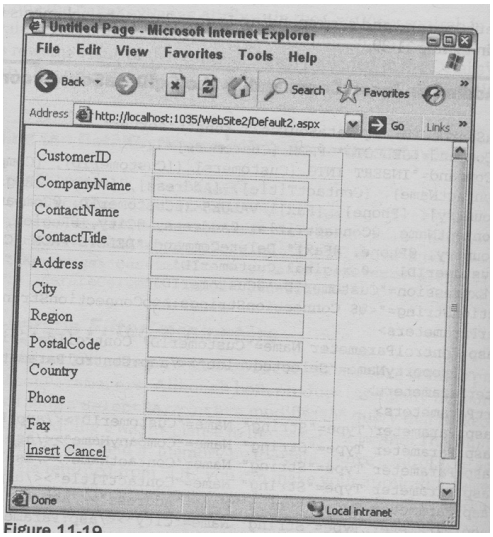


Figure 11-19

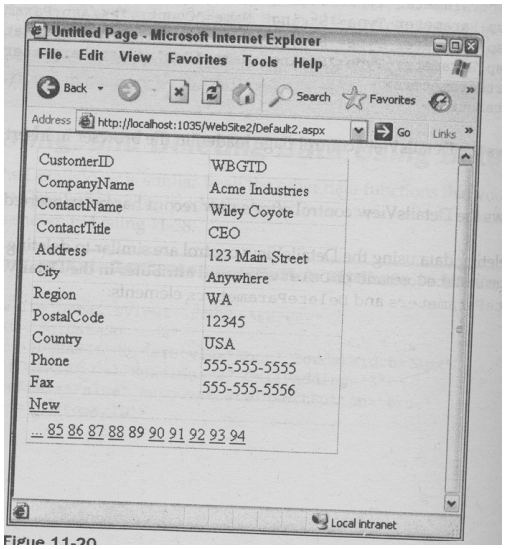
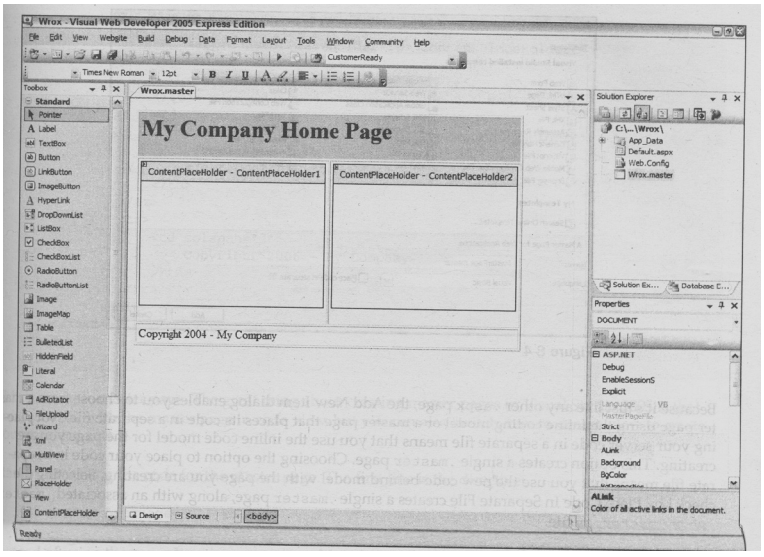


Figure 11-20

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 : ADVANCED JAVA LAB

(Lab Cycle)

1 a) Write a program to download a web page.

b) Write a program to download a web page using a URL Connection.

2 a) Write a program to print the socket information.

b) Write a program to print the information in the Datagram

3. Develop a Client, Server Application to satisfy the requests from multiple clients.

4. Write a program to implement a server that will simply echo back whatever is typed by the client a) TCP b) UDP

5. Write a program to have chat application a) TCP b) UDP

6. Write a program to add Cookie and get Cookie.

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

8. Develop Multithreaded Message Application Using Java Sockets

9. Develop Multicast Communication using Java Multicast class

10. Develop Distributed Programming using Java RMI

11. Develop Database Programming using JDBC and Java swings

12. Develop Web Programming using JSP and EJB.

13. Create a JavaBean class called Prompter that displays a prompting message and provides an entry field where users can enter their response to the prompt. This bean should also include an OK button so users can indicate that they are finished entering their response.

14. Write a program to retrieve values from database and print them in a text file.

15. Write a program to create a frame with a label, text field and a submit button. The Text field should not an empty value.

16. Write a program to create a frame with menu bar. The menu bar contains two menus. The first menu contains menu items like square, cube, square root and absolute value. The second menu contains two menu items namely clear and exit.

17. Write a simple program to get the result of stored procedure in the servlet by JDBC through the Oracle Database.

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