

3rd Semester

MCA – 601 ALGORITHM ANALYSES AND DESIGN

UNIT – I

Introduction: Analyzing algorithm, growth of functions, asymptotic notation, standard notation and common functions. Divide and Conquer approach: Performance analysis of binary search, quick sort, merge sort, heap sort.

UNIT – II

Recurrences: Substitution method, iteration method, master method, proof of master theorem. Red-Black Trees: Properties of red-black trees, Rotations, insertion, deletion. Augmenting Data Structures: Dynamic order statistics, How to augment a data structure.

UNIT – III

Dynamic Programming: Elements of Dynamic Programming, Matrix –chain multiplication, optimal binary search tree. Greedy Algorithm: Elements of the greedy strategy, Huffman codes, A task scheduling problem Amortized Analysis: Aggregate method, accounting method, potential method.

UNIT – IV

Introduction: Graph and Minimum Spanning Trees, Kruskal's and prim's algorithm. Single-Source Shortest Paths: The Bellman-Ford algorithm, Single-Source Shortest Paths in directed acyclic graphs, Dijkstra's algorithm. All-Pairs Shortest Paths: Shortest paths and matrix representation, The Floyd-Warshall algorithm. Maximum Flow : Flow networks, The Ford-Fulkerson method, Max-flow- min-cut theorem. Push –relabel algorithm.

UNIT – V

Sorting Networks: A bitonic sorting network, merging network, sorting network. Matrix Operations: Properties of matrices, Strassen's algorithm for matrix multiplication. Linear Programming: Standard and slack forms, Formulating problems as linear programs, The Simplex algorithm. Introduction to NP-Completeness. Number-Theoretic algorithms: The Chinese remainder theorem, The RSA public-key cryptosystem.

Text & Reference Books

- 1) Fundamentals of Computer Algorithms Ellis Horowitz, Sartaj sehani galgotia publications.
- 2) Introduction to Algorithms Cormen, Leiserson, Rivets, PHI.

EEG - 602 MICROPROCESSOR & ASSEMBLY LANGUAGE

UNIT I

MICROPROCESSOR ARCHITECTURE

Evolution and overview of Microprocessor, micro computer organization, Microprocessor architecture - introduction to 8085 and pin diagram of 8085, ALU timing and control unit, registers, data and address bus, timing and control signals, fetch and execute operations, instruction and data flow, system timing diagram, minimum system configuration for 8085.

UNIT II

ASSEMBLY LANGUAGE PROGRAMMING

Instruction type classification of instructions addressing modes, instruction format, assembler directives, over view of instruction set, writing assembly language programs with and without subroutines, concepts of stack, interrupts, interrupt service subroutine.

UNIT III

MEMORIES AND PERIPHERALS

Memory types, memory organization, static RAM interfacing memory, use of RAMs and EPROMs, RAM-6116, 6164, EPROM-2716, 2732, 2764, programmable peripherals interface (8255). Programmable interval timer 8253. Basic concepts in serial I/o and data transfer schemes and their classification.

UNIT IV

INTERFACING

Types of A/D & D/A converters, Interfacing & programming of ADC-0808/0809 and DAC-0800. Multiplexers and demultiplexer, 8085 based data acquisition system, stepper motor control, DC motor control, temperature control, traffic control.

UNIT V

ADVANCE MICROPROCESSORS

Advanced processor 8086 microprocessor family, 8086 internal architecture, instruction set. Introduction to programming of 8086, 8086 interrupts, multiuser, multitasking, Introduction to 80286, 80386, 80486, microprocessor family. Comparison of microprocessors

Text & Reference Books

- 1) Fundamentals of Microprocessors and Microcomputers by B.Ram
- 2) Microprocessors and programmed logic by Kenneth B.Short
- 3) Introduction to Microcomputer by Albert Paul Malvino
- 4) Microprocessors Architecture Programming and Applications- Ramesh S.Gaonkar.
- 5) Assembly language programming by Lance P. Levanthal
- 6) Microprocessors and Interfacing Programming and Hardware - Douglas V.Hall

MCA - 603 COMPUTER NETWORKS

UNIT - I

Use of computer networks; Type of networks; Network software: protocol hierarchies. Design; issues for the layers, interface and services, types of services, services primitives; Reference models: The OSI reference model, TCP/IP reference model, Example networks: The Internet, Novel Netware, Window NT.

UNIT – II

Physical layer: Transmission media: magnetic media, Twisted pair, Base band / broadband coaxial cable, fiber optics; Analog, digital, wireless transmission; Transmission and switching; ISDN system architecture, Satellite versus fiber; Terminal handling. The Data link layer

Design issues: services provided, framing, Error control, flow control; Error detection and correction; Error correcting codes, Error detecting codes; Elementary data link protocols: Unrestricted simplex, simplex stop and wait, simplex protocol for noisy channels; sliding window protocols: one bit, go back n, selective repeat; DLL in the Internet.

UNIT – III

Medium access sub layer: Static/dynamic channel allocation in LANs and MANs; multiple access protocols: ALOHA, carrier sense, collision free, limited contention, wireless LAN; IEEE standard 802 for LANs and MANs: Ethernet; token bus, token ring, comparison of 802.3, 802.4, 802.5; Bridges: bridges from 802.x and 802.y, Transparent bridges, High speed LANs.

UNIT – IV

Network Layer: Design issues, Internet organization of network layer; Routing algorithms: optimality principle, shortest path, flooding, Flow - based, hierarchical, multicast, broadcast; congestion control algorithms: General principle, prevention, Traffic shaping, choke packets, load shading etc.; Internetworking: How network differ, connectionless internetworking, Tunneling, internetworking, fragmentation, firewalls; Network layer in the Internet: IP protocol, IP address, subnets, OSPF, BGP, FTP, telnet, email. etc.

UNIT – V

Network Programming: Basically Sockets : Overview, Unix Domain Protocols, Overview, Unix Domain Protocols, socket-address, socket-system calls, reserved ports, passing file descriptions, I/O asynchronous & multiplexing, socket implementations.

Text & Reference Books

- 1) Computer Networks by Leon & Garcia
- 2) Local Area Networks by Keiser Windows Network Programming by R. Davis, Add Wesley
- 3) Unix Network Programming by S. Davis, PHI
- 4) Computer Networks by A.S. Tanenbaum

MCA – 604 STATISTICAL COMPUTING

UNIT – I

Probability Theory- Sample spaces, events and probability, some rules of probability, conditional probability, independent events and baye's theorem. Non-linear regression, multiple correlation and regression.

UNIT – II

Random Numbers: Algorithms for generation of random numbers, discrete random variables, acceptance and rejection techniques. Random Variables and Distributions- Random variables, continuous random variables, probability density functions.

UNIT-III

The discrete uniform distributions, Binomial, Poisson, Hyper geometric distributions. Continuous probability distributions, uniform, exponential and Normal distributions.

UNIT-IV

Hypothesis Testing-Testing of statistical hypothesis, Null hypothesis, tests of hypothesis and significance, one failed proportions, Chi-square, t, z and F tests, Losses and risks.

UNIT-V

Analysis of Variance- One way and two-way analysis Programming - Students must be encouraged to develop programs in C for correlation and regression, standard deviation, testing of hypothesis etc. Using standard package like SPSS.

Text Book

Mathematical Statistics by J.E. Freund and R.E. Walpole

Reference Books:

- 1) Probability and Statistics with reliability queuing and Computer Science Applications by K.S. Trivedi.
- 2) Introduction to Mathematical Statistics by F. Kreyzic
- 3) Statistical Analysis: Computer Oriented Approach by A.A. Affi
- 4) Statistics- Schaum's Series - By M.R. Spiegel

MCA - 605 DATA BASE MANAGEMENT SYSTEM

UNIT-I

Introduction to database: Data Abstraction, Data Models, Basic concepts of database: Data Independence DML, DCL, DDL and structure of Data Base Management System. Entity relationship diagram : Basic and Advance concepts Application of ER diagram in designing database system. Relational Algebra, Tuple Relational Calculus

UNIT-II

SQL, QUEL, Domain relational calculus, Integrity, Referential, Domain constraints, functional dependency, Assertions, Triggers, Query processing and Query optimization and Embedded and Dynamic SQL

UNIT-III

Database design issues, Normalization 1NF, 2NF, 3NF, 4NF, BCNF and 5NF, live database design problem. Security and Integrity: Use of SQL for specifying Security and integrity. Authorization, view, Encryption. Storage structure indexing and hashing. Different type of file organization.

UNIT-IV

Transaction & concurrency control, Schedules, testing, serializability, Lock based Protocol, Time stamp protocol, validation technique, Multiple granularity, Multi-version scheme Insert and delete operation, Crash recovery, Log based recovery, buffer management checkpoints, shadow paging. Object oriented databases

UNIT-V

Distributed database structure, Design transparency and Autonomy, Distributed Query processing Recovery, commit protocol Deadlock handling, Multidatabase system, Parallel database concept and related issues, Web interface to database, Database System Architecture.

TEXT BOOK:

Database System Concept By Henry F. Korth Abraham Silber Schatz

REFERENCE BOOK:

- 1) Database System Concept By C.J. Date.
- 2) Database System By Aho. Ullman.
- 3) Database Systems By Rob, Coronel.

EEG 641 MICROPROCESSOR AND ASSEMBLY LANGUAGE

LIST OF EXPERIMENTS

- 1) STUDY & FAMILIARIZATION OF MICROPROCESSOR 8085 KIT (VMC-8503).
- 2) WRITE A PROGRAM FOR ADDITION AND SUBTRACTION OF TWO 8 BIT HEXADECIMAL NUMBERS.
- 3) WRITE A PROGRAM FOR ADDITION OF TWO 16 BIT HEXADECIMAL NUMBERS.
- 4) WRITE A PROGRAM FOR MULTIPLICATION OF TWO 16 BIT HEXADECIMAL NUMBERS USING REGISTER SHIFTING METHOD.
- 5) WRITE A PROGRAM FOR DIVISION OF TWO 16 BIT HEXADECIMAL NUMBERS USING REGISTER SHIFTING METHOD.
- 6) TO STUDY AND TO GENERATE SQUARE WAVE USING 8255 PPI PROGRAMMABLE PERIPHERAL INTERFACE.
- 7) TO STUDY AND TO GENERATE SQUARE WAVE USING 8253 PPI PROGRAMMABLE PERIPHERAL INTERFACE.
- 8) STUDY & FAMILIARIZATION OF MICROPROCESSOR 8086 INSTRUCTION SET.

BEGINNERS PRACTICE PROBLEMS

- 1) Write a program to add the contents of the registers c and d & save the result in register b.
- 2) Write a program to add the contents of 2040h memory location to the contents of register c
& store the result in 2050h memory location.
- 3) Write a program to subtract 07h from 0dh & save the result in register c.
- 4) Write a program for adding the contents of specified memory location and subtracting the contents of another specified memory location from the sum; then save the result to a specified register and also display at a specified output port.
- 5) Write a program for loading two numbers 8c and 9a in register b and c respectively and add them if carry is generator display the carry at port 02 and if no carry display sum itself at port 02.

MCA 642 COMPUTER NETWORK & N/W PROGRAMMING

Viva-Voce shall be conducted on Computer Network & N/w programming. Assignment related to Computer Network shall be given. Case Study of different Operating Systems having Network Features shall be studied. Assignment shall include Network Programming

MCA 643 PROGRAMMING LAB IN RDBMS & FRONT END TOOLS

Student is required to develop a small real life database oriented project .