JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
I YEAR I SEMESTER M.C.A

MCA I YEAR I SEMESTER STRUCTURE

Code Theory	Subject	T	P
	ENGLISH LANGUAGE COMMUNICATION SKILLS	2	-
	C PROGRAMMING AND DATA STRUCTURES	4	-
	DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION	4	
	DISCRETE STRUCTURES AND GRAPH THEORY	4	
	PROBABILITY AND STATISTICAL APPLICATIONS	4	
	ACCOUNTING AND FINANCIAL MANAGEMENT	4	
Code Practical's	**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**	-	2
	C PROGRAMMING AND DATA STRUCTURES LAB	-	4
	DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION LAB	-	4

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ENGLISH LANGUAGE COMMUNICATION SKILLS

UNIT I:
Features of Indian English - Correction of sentences - Structures - Tenses - ambiguity - idiomatic distortions.

UNIT II:
Informal conversation Vs Formal expression Verbal and non-verbal communication, barriers to effective communication – kinesics

UNIT III:
Types of Communication - - Oral, aural, Writing and reading - Word-Power - Vocabulary- Jargon - rate of speech, pitch, tone - Clarity of voice

UNIT IV:
Technical presentations - types of presentation –video conferencing-- participation in meetings - chairing sessions.

UNIT V:
Formal and informal interviews – ambiance and polemics - interviewing in different settings and for different purposes e.g., eliciting and giving information, recruiting, performance appraisal.

UNIT VI:
Written communication - differences between spoken and written communication - features of effective writing such "as clarity, brevity, appropriate tone clarity, balance etc.- GRE. TOEFL models

UNIT VII:
Letter-writing - business letters – pro forma culture - format - style – effectiveness, promptness - Analysis of sample letters collected from industry - email, fax.

UNIT VIII:
Technical Report writing - Business and Technical Reports – Types of reports - progress reports, routine reports - Annual reports - format - Analysis of sample reports from industry - Synopsis and thesis writing

REFERENCE BOOKS:
1. Essentials of Business Communication, Rajendra Pal, J S KorlahaHi , Sultan Chand & Sons,
2. Basic Communication Skills for Technology, Andrea J. Rutherford, Pearson Education Asia,
3. Advanced Communication Skills, V. Prasad, Atma Ram Publications.
4. Business Communication, Theory & Application .Raymond . Lesikav, John D. Pettit Jr. All India Traveller Bookseller
5. Business Communication, RK Madhukar, Vikas Publishing House Pvt Ltd
6. English. for Technical Communication – vols I & 2.,K R Lakshminarayana. SCITECH Publications
7. Edmond H Weiss: Writing Remedies: Practical Exercises for Technical Writing, Universities Press
8. Cliffs Test Prep for GRE and TOEFL, Computer Based Test, IDG Books.
9. GRE and TOEFL, Kaplan and Baron's
10. English in Mind, Herbert Puchta and Jeff Stranks, Cambridge

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C PROGRAMMING AND DATA STRUCTURES

UNIT I
Introduction to Computers, Some novice HW and SW concepts, Algorithm / pseudo code, flowchart, program development steps, Introduction to various IDE's and their use in C program development, structure of   C program, A Simple C program, identifiers, basic data types and sizes,   Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, goto , labels, and switch statements.

UNIT II
Loops- while, do-while and for statements, break, continue, programming examples.
Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1-D arrays other than strings, 2-D character arrays – 2-D arrays other than character arrays – Multidimensional arrays – Practical examples to expose Engineering problems.

UNIT III
Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C pre-processor, example c programs. Passing 1-D arrays, 2-D arrays , and functions.

UNIT IV
Pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address –dangling memory, dangling memory, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions,   command line arguments, C program examples.

UNIT V
Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations, C program examples.

UNIT VI
Introduction to Data Structures – Time Complexity – Space Complexity – Pattern matching – naive method – Robin Karp Algorithm - Searching – Linear and binary search methods, sorting – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

UNIT VII
Introduction to data structures, single linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Adding two large integers using linked lists.

UNIT VIII
Trees- Binary tress, terminology, representation, traversals, Graphs - terminology, representation, graph traversals (dfs & bfs) – Warshalls – Dijkstra – Kruskal – Prims Algorithms. Only Algorithms

TEXT BOOKS:
1. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B. Venkateswarlu & E.V. Prasad, S Chand & Co, 2009.
2. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

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REFERENCES:
1. Fundamentals of Data Structures in C , Horowitz, Sahni, Anderson-Freed, 2nd ed, Universities Press,2008.
2. Classic Data Structures, Samanta,2nd ed, PHI, 2009.
3. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie,   PHI/ Pearson.
4. C Programming with problem solving, J.A. Jones & K. Harrow,   Dreamtech Press
5 DataStructures Using C , A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/ Pearson.
6. Programming in C , Stephen G. Kochan, III Edition, Pearson .
7. Data Structures and Program Design in C, R.Kruse,, Tondo, Leung, Shashi M, 2nd Edition, Pearson.
8. Data Structures and Algorithms, Aho, Hopcroft, Ullman, Pearson ,2006
9. C and Data Structures, Ashok N.Kamthane, Pearson.
10. C Programming and Data Structures, E Balaguruswamy, TMH, 2008.

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DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION

UNIT I
Digital Components and Data Representation: Learning Goals, Introduction, Numbering Systems, Decimal to Binary Conversion, Binary Coded Decimal Numbers, Weighted Codes, Self-Complementing Codesm, Cyclic Codes, Error Detecting Codes, Error Correcting Codes, Hamming Code for Error Correction, Alphanumeric Codes, ASCII Code, Indian Script Code for Information Interchange (ISCII), Representation of Multimedia Data, Representation of Pictures, Representation of Video, Representation of Audio
Boolean Algebra and Logic Gates: Learning Goals, Introduction, Postulates of Boolean Algebra, Basic Theorems of Boolean Algebra, Duality Principle, Theorems, Precedence of operators, Venn Diagram , Boolean Functions and Truth Tables, Canonical Forms for Boolean Functions, Binary Operators and Logic Gates, Simplifying Boolean Expressions, Veitch-Karnaugh Map Method, Four Variable Karnaugh Map, Incompletely Specified Function, Quine-McCluskey Procedure

UNIT II
Digital logic circuits: Combinatorial Switching Circuits,: Introduction, Combinatorial Circuit Design Procedure, Integrated NAND-NOR Gates, CMOS Transistor Gates, NAND-NOR Gates with CMOS Transistors, Open Drain and Tri-state Gates, Wired AND Gate, Driving a Bus from Many Sources, Tri-state Gates, Realization of Boolean Expressions Using NAND/NOR Gates, Combinatorial Circuits Commonly Used in Digital Systems, Design of Combinatorial Circuits with Multiplexers, Programmable Logic Devices, Realization with FPLAs, Realization with PALs
Sequential Switching Circuits: Types, Flip-Flops, Counters, Modelling Sequential Circuits – FSM. Synthesis of synchronous, Binary counters.

UNIT III
Arithmetic and Logic Unit: Learning Goals, Introduction, Binary Addition, Binary Subtraction, Complement Representation of Numbers, Addition/Subtraction of Numbers in 1's Complement Notation, addition/Subtraction of Numbers in Two's Complement Notation, Binary Multiplication, Multiplication of signed Numbers, Binary division, Integer Representation, Floating Point Representation of Numbers, Binary Floating Point Numbers, IEEE Standard Floating Point Representation, Floating Point addition/Subtraction, Floating Point Multiplication, Floating Point Division, Floating Point Arithmetic Operations, Logic Circuits for Addition/Subtraction, Half- and Full-Adder Using Gates, A Four-bit Adder, MSI arithmetic Logic Unit, A Combinatorial Circuit for Multiplication

UNIT IV
Central Processing Unit: Learning Goals, Introduction, Operation Code Encoding and Decoding, Instruction Set and Instruction Formats, Instruction set, Instruction Format, Addressing Modes, Base Addressing, Segment Addressing, PC Relative Addressing, Indirect addressing, How to Encode Various Addressing Modes, Register Sets, Clocks and Timing, CPU Buses, Dataflow, Data Paths and Microprogramming, Control Flow, Summary of CPU Organization.

UNIT V
Micro programmed Control: Control Memory, Address Sequencing, Conditional Branching, Mapping of Instruction, Subroutines, Micro program Example, Computer Configuration, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Micro program, Binary Micro program , Design of Control Unit, Micro program Sequencer

UNIT VI
Memory Organization: Learning Goals, Introduction, Memory Parameters, Semiconductor Memory Cell, Dynamic Memory Cell, Static Memory Cell, Static Memory Cell, Writing data In Memory Cell, Reading the Contents of Cell, IC Chips for Organization of RAMs , 2D Organization of Semiconductor Memory, 2.5D Organization of Memory Systems, Dynamic Random Access Memory, Error Detection and Correction in Memories, Read Only Memory, Dual-Ported RAM, Enhancing Speed and Capacity of Memories, Program Behaviour and Locality Principle, A Two-Level Hierarchy of Memories, Cache in Memory Organization, Design and Performance of Cache Memory System, Virtual Memory-Another Level in Hierarchy, address Translation, Page Replacement, Page Fetching, Page size, fast address Translation , Page Tables.

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UNIT VII
Input-Output Organization: Learning Goals, Introduction, device Interfacing, Overview of I/O Methods, Program Controlled Data Transfer, Interrupt Structures, Single level Interrupt Processing, Handling Multiple Interrupts, Interrupt Controlled data Transfer, Software Polling, Bus Arbitration, Daisy Chaining, Vectored Interrupts, Multiple Interrupt Lines, VLSI Chip Interrupt Controller, Programmable Peripheral Interface Unit, DMA Based Data Transfer, Input/output (I/O) Processors, Bus Structure, Structure of a Bus Types of Bus, Bus Transaction Type , Timings of Bus Transactions, Bus Arbitration, some Standard Buses, Serial Data Communication, Asynchronous Serial data communication, Asynchronous Communication Interface Adapter (ACIA), Digital Modems, Local area Networks, Ethernet Local area Network-Bus Topology, Ethernet Using star Topology, Wireless LAN, Client-Server Computing Using LAN.

UNIT VIII
Pipeline and Vector Processing: Parallel Processing, Pipelining-General Considerations, Arithmetic Pipeline, Instruction Pipeline, Ex: Four-Segment Instruction Pipeline, Data Dependency, Handling of Branch Instructions, RISC Pipeline, Ex: Three-Segment Instruction Pipeline, Delayed load, Delayed Branch, Vector Processing, Vector Operations, Matrix Multiplication Memory Interleaving Supercomputers, Array Processors, Attached Array Processor, SIMD Array Processor

TEXT BOOKS:
   1.   Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006
   2.   Computer System Architecture, 3rd ed ., M. Morris Mano, PHI, 1994

REFERENCE BOOKS:
   1.   Computer Organization, 5th ed., Hamacher, Vranesic and Zaky, TMH ,2002
   2.   Computer System Organization & Architecture, John D. Carpinelli, Pearson, 2008
   3.   Computer System Organization, Naresh Jotwani, TMH, 2009
   4.   Computer Organization & Architecture: Designing for Performance, 7th ed., William Stallings, PHI, 2006

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DISCRETE STRUCTURES AND GRAPH THEORY

UNIT I
Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus

UNIT II
Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving
Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

UNIT III
Set theory & Relations:Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram.
Functions: composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.

UNIT IV
Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

UNIT V
Elementary Combinatorics: Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

UNIT VI
Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT VII
Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs

UNIT VIII
Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

TEXT BOOKS:
1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians " J.L. Molt, A.Kandel ,T.P.Baker, PHI

REFERENCE TEXTBOOKS:
1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra,TMH
2. Discrete Mathematics, Schaum's Outlines,Lipschutz,Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009
4. Discrete Mathematics, Johnsonbaugh, 6th ed., Pearson, 2005
5. Discrete Mathematics, Malik, Sen, 6th ed., Cengage Learning, 2004
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005
7. Discrete Mathematics and Combinatorics, Sengadir, Pearson, 2009
8. Discrete and Combinatorial Mathematics, Grimaldi, Ramana, 5th ed., Pearson. 2006
9. Mathematical Foundations of Computer Science, Rajendra Prasad, Rama Rao et al., USP, 2009
10. Discrete Mathematics, J K Sharma, 2nd ed., Macmillan, 2005

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11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
12. Applied Discrete Structures For Computer Science, Alan Doerr, Levassure, GP, 2005
13. Discrete Mathematics with Applications, Koshy, Elsevier,2006.
14. Discrete Mathematics and its Applications, Rosen, 5th ed, T M Graw-Hill ed, 2006.
15. Discrete Mathematics for Computer Science, Gary Haggard, John Schlipf, Sue Whitesides, Cengage.,2006.
16. Discrete Mathematical, Kevin Ferland, Cengage,2008.
17. Discrete Mathematical Structures, Jayant Ganguly, Sanguine, 2007.

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PROBABILITY AND STATISTICAL APPLICATIONS

UNIT I
Probability Theory: Sample spaces Events & Probability; Discrete Probability; Union , intersection and compliments of events; Conditional probability ;Baye's theorem.

UNIT II
Random variables and distribution: Random variables Discrete Probability Distributions,. Continuous probability distribution, Binomial, Poisson, uniform, Exponential, Normal.

UNIT III
Expectations and higher order moments – Moment Generating Function, Characteristic functions – Laws on large numbers – Weak Laws and strong laws of large numbers. Central limit theorem and other limit theorems.

UNIT IV
Sampling distribution: Populations and samples - Sampling distributions of mean (σ known and unknown) proportions, sums and differences. Statistics based on Normal, Student's t and F distributions.

UNIT V
Tests of significance –Z-test, t-test, F-test, χ^2 test. Factor Analysis ANOVA, Application to medicine, psychology, agriculture etc

UNIT VI
Linear correlation coefficient Linear regression ; Non Linear regression Least square fit ; polynomial and Curve fittings

UNIT VII:
Time series and Forecasting : Moving averages , Smoothening of curves Forecasting models and methods , Statistical Quality Control Methods-bar charts p-charts etc.

UNIT VIII
Queuing theory – Markov Chains – Introduction to Queuing systems – Elements of a queuing model – Exponential distribution – Pure birth and death models. Generalized Poisson Queueing model – Specialized Poisson Queues.

TEXT BOOKS:
1. Probability, Statistics and Random Processes Dr.K.Murugesan & P.Gurusamy by   Anuradha Agencies, Deepti Publications.
2. Probability, Statistics and Random Processes , T.Veerarajan, TMH, India

REFERENCE BOOKS:
1. Probability and Statistics for Engineers: Miller and Freund, PHI.
2. Probability, Statistics and Queuing Theory Applications, 2nd ed, Trivedi, John Wiley and Sons.

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ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I:
Accounting: Generally Accepted Accounting Principles(GAAP) & Accounting standards, Characteristics and limitations of single entry system, double entry system of accounting, introduction of basic books of accounts ledgers..

UNIT II:
Preparation of trial balance - Final accounts - company final accounts. Users of Accounting Information, Role of Accountant in modern Organization

UNIT III:
Financial Management - meaning and scope, role, objectives of time value of money - over vitalization - under capitalization - profit maximization - wealth maximization - EPS maximization.

UNIT IV:
Ratio Analysis - advantages - limitations - Fund flow analysis - meaning, importance, preparation and interpretation of Funds flow and cash flow statements-statement of changes in working capital.

UNIT V:
 Costing - nature and importance and basic principles. Elements of cost ,Absorption costing vs. marginal costing - Financial accounting vs. cost accounting vs. management accounting.

UNIT VI:
Marginal costing and Break-even Analysis: nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis, Short run decisions.

UNIT VII:
Standard costing and budgeting: nature, scope and computation and analysis - materials variance, labor variance and sales variance -cash budget, sales budget - flexible Budgets, master budgets.

UNIT VIII:
Introduction to computerized accounting system: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Outputs obtained.

REFERENCES:
1. Accounting for Management, T. Vijay Kumar, TMH.
2. Financial Accounting,S.N. Maheswari and S.K. Maheswari, Vikas
3. Financial Accounting, A. Mukherjee and M. Haneef, TMH
4. Basic Financial Accounting for Management, Ambaresh Gupta, Pearson
5. Accounts and Finance for Non Accounts, Chatterjee. D.K, Himalaya
6. Financial Analysis and Accounting, P. Premchand Babu and M.Madan Mohan, Himalaya.
7. Essential of Financial Accounting, Ashish. K and Ballacharya, PHI.
8. Guide to Financial Management, John Tannent, Viva.

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Objectives: The language lab focuses computer-aided multi-media instruction and language acquisition to achieve the following targets:

1. To expose the students to a veriety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format- making etc.
    However, depending upon the available of infrastructure and budget, the above targets can also be achieved by procuring the minimum required equipment suggested for the establishment of Conventional Lab the details of which are given below. The lab should cater to the needs of the students to build up their confidence to help them develop leadership qualities through through their communicative competence.

ENGLISH LANGUAGE LABORATORY PRACTICE

1. Introduction to Phonetics.   2. Introduction to Vowels and Consonants and associated Phonetic symbols.
3. Introduction to Accent, Intonation and Rhythm. 4. Situational Dialogues/Role Play. 5. Debate
6. Public Speaking. 7. Group Discussions 8. Facing Interviews 9. Resume preparation 10. e- correspondence

MODULE	TOPICS/SUB-TOPICS	LAB SESSIONS
1.	INTRODUCTION TOPHONETICS -Vowels, -Consonants, -Diphthongs	2
2.	INTRODUCTION TO STRESS & INTONATION -Articulation, -Respiration, -Phonation	1
3	SITUATIONAL/DIALOGUE/ ROLE PLAY	1
4	PUBLIC SPEAKING	1
5	DEBATE	1
6	GROUP DISCUSSIONS	2
7	FACING INTERVIEWS	2
8	RESUME PREPARATION	1
9	e-CORRESPONDENCE	1
10	GRE,TOEFL,GMAT MODELS	2

Suggested Software for Lab classes:

- **Cambridge Advanced Learners' Dictionary with exercises**
- **The Rosetta Stone English Library**
- **Clarity Pronunciation Power**
- **Mastering English in Vocabulary, Grammar, Spellings, Composition**
- **Dorling Kindersley series of Grammar, Punctuation, Composition etc.**
- **Oxford Advanced Learner's Compass, 7th Edition**
- **Language in Use, Foundation Books Pvt Ltd**
- **Learning to Speak English - 4 CDs**
- **Microsoft Encarta**
- **Murphy's English Grammar, Cambridge**
- **Time series of IQ Test, Brain-teasers, Aptitude Test etc.**
- **English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**

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COMPUTER PROGRAMMING DATA STRUCTURES LAB

Objectives:
- To learn/strengthen a programming language like C, To learn problem solving techniques
- To Introduce the student to simple linear and non linear data structures such as lists, stacks, queues, etc.,

Recommended Systems/Software Requirements:
- Intel based desktop PC,   ANSI C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C

Exercise l.
a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
d) Write a program which checks a given integer is Fibonacci number or not.

Exercise 2.
a) Write a C program to calculate the following Sum:
$$Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program to implement Newton Raphson method for a quadratic equation
d) Write a C program to implement Newton Raphson method for a general purpose algebriac equation

Exercise 3
a) Write C programs that use both recursive and non-recursive functions
 i) To find the factorial of a given integer. ii) To find the GCD (greatest common divisor) of two given integers.
iii) To solve Towers of Hanoi problem.   iv) Write program to calculate probability of head/tail by generating random numbers using random() function.

Exercise 4
a) The total distance travelled by vehicle in 't' seconds is given by distance $= ut + 1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 5
a) Write a C program to find both the larges and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
      i) Addition of Two Matrices   ii) Multiplication of Two Matrices
      iii) Checking symmetricity of a square matrix.   iv) Calculating transpose of a matrix in-place manner.

Exercise 6
a) Write a C program that uses functions to perform the following operations:
      i) To insert a sub-string in to given main string from a given position.
      ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not

Exercise 7
a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text.

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Exercise 8
a) Write a C program to generate Pascal's triangle.   **b)** Write a C program to construct a pyramid of numbers.

Exercise 9
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
$1+x+x^2+x^3+…………+x^n$
For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0.
Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Exercise 10
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11
Write a C program that uses functions to perform the following operations using Structure:
i) Reading a complex number   ii) Writing a complex number
iii) Addition of two complex numbers   iv) Multiplication of two complex numbers

Exercise 12
a) Write a C program which copies one file to another. **b)** Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Exercise 13
a) Write a C program that uses functions to perform the following operations on singly linked list.:
          i) Creation ii) Insertion   iii) Deletion   iv) Traversal
b) Adding two large integers which are represented in linked list fashion.

Exercise 14
Write a C program that uses functions to perform the following operations on doubly linked list.:
          i) Creation ii) Insertion   iii) Deletion   iv) Traversal in both ways

Exercise 15
a.) Write C programs that implement stack (its operations) using
          i) Arrays   ii) Pointers iii) linked list.

Exercise 16
a. Write C programs that implement Queue (its operations) using
          i) Arrays   ii) Pointers   iii) linked lists.

Exercise 17
Write a C program that uses Stack operations to perform the following:
          i) Converting infix expression into postfix expression ii) Evaluating the postfix expression

Exercise 18
a. Write a C program that uses functions to perform the following:
          i) Creating a Binary Tree of integers ii) Traversing the above binary tree in preorder, inorder
             and postorder.
b. Program to check balance property of a tree. c. Program to check for its strictness.

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Exercise 19
Write C programs that use both recursive and non recursive functions to perform the following searching operations
for a Key value in a given list of integers : i) Linear search   ii) Binary search

Exercise 20
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
        i) Bubble sort   ii) Quick sort

Exercise 21
a. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
        i) Insertion sort   ii) Bubble sort
b. Recursive implementation of sorting algorithms.

Exercise 22
Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Exercise 23
a. Program to calculate mean and standard deviation of a population.
b. Write C programs to implement the linear regression and polynomial regression algorithms.

Exercise 24
    a. Write C programs to implement Trapezoidal and Simpson methods. and b) Program for Calculating pi
        value.

Reference Books:
    1. Digital Fundamentals, Floyd, Jain, 8th ed , Pearson
    2. Digital Logic and Computer Organization, Rajaraman, Radhakrishnan, PHI, 2006

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DIGITAL LOGIC AND COMPUTER SYSTEMS ORGANIZATION (DLCSO) LAB

Exercise 1
Boolean Algebra: Theorems and logical guides, verification of truth tables

Exercise 2
Realization of Boolean expressions ; Using (i) AND – OR-NOT Gates (ii) NAND Gates (iii) NOR Gates

Exercise 3
Latches Flip – Flops : RS, JK,T,D, Master –Slave FF, Edge – Triggered Flip – Flops

Exercise 4
Counters: Binary Counter, Synchronous/Asynchronous Binary Counter, Ripple Counter, Decade Counter, Up/Down Counter

Exercise 5
Modulo Counter: Modulo - 5, Modulo – 10

Exercise 6
Adders / Sub tractors: Half Adder, Full Adder, 1 's and 2's complement addition

Exercise 7
Multiplexers/ Data Selector : 2- input and 8- input, Demultiplexers , Logic Function Generator

Exercise 8
Decoders and Encoders

Exercise 9
BCD adders and Comparators

Exercise 10
Registers: Basic Shift Register (SR), SI/SO SR, SI/PO SR, PI/SO SR, PI/PO SR

Exercise 11
Johnson Counter, Sequence Generator, Parity Generators/ Checkers

Exercise 12
Code Converters : Decimal –to-Binary, Binary – to – Decimal, Decimal – to- Hexa Decimal,
BCD- to –Decimal, Binary – to- gray, gray- to -Binary

Exercise 13
Buffers / Derivers : Open ; collector Buffers

Exercise 14
Gates : CMOS / NMOS/TTL – Basic Operational Characteristics and parameters

Exercise 15
RAM, ROM, PROM, EPROM – Testing Memory Chips

REFERENCE BOOKS

1. Digital Fundamentals, Floyd & Jain , Pearson , 2005.
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