



SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, A. Rangampet – 517 102

COURSE STRUCTURE (2010-2011)

DEPARTMENT OF INFORMATION TECHNOLOGY

II B.Tech I Semester

Code	Subject	Periods per week			Credits	Scheme of Examination Max. Marks		
		L	T	P		Internal	External	Total
10BT3BS01	Probability and Statistics	4	1	-	4	30	70	100
10BT30421	Electronic Devices and Circuits	4	1	-	4	30	70	100
10BT30221	Basic Electrical Engineering	4	1	-	4	30	70	100
10BT30422	Digital Logic Design	4	1	-	4	30	70	100
10BT30501	Discrete Mathematical Structures	4	1	-	4	30	70	100
10BT30502	Data Structures	4	1	-	4	30	70	100
10BT30431	Analog and Digital Electronics Lab	-	-	3	2	25	50	75
10BT30511	Data Structures Lab	-	-	3	2	25	50	75
TOTAL		24	6	6	28	230	520	750

II B.Tech II Semester

Code	Subject	Periods per week			Credits	Scheme of Examination Max. Marks		
		L	T	P		Internal	External	Total
10BT3BS02	Environmental Sciences	4	1	-	4	30	70	100
10BT40501	Computer Architecture and Organization	4	1	-	4	30	70	100
10BT40502	Object Oriented Programming	4	1	-	4	30	70	100
10BT50504	Operating Systems	4	1	-	4	30	70	100
10BT41201	Data Communications	4	1	-	4	30	70	100
10BT60501	Theory of Computation	4	1	-	4	30	70	100
10BT40521	Operating Systems Lab	-	-	3	2	25	50	75
10BT40511	Object Oriented Programming Lab	-	-	3	2	25	50	75
TOTAL		24	6	6	28	230	520	750

I B.Tech. I Semester

10BT3BS01: PROBABILITY AND STATISTICS

L	T	P	C
4	1	-	4

UNIT-I: PROBABILITY AND MATHEMATICAL EXPECTATIONS

Introduction to Probability: Definition of Random Experiment, Events and Sample space, Definition of probability, Addition and Multiplication theorems, Conditional probability, Baye's Theorem, Simple Problems on Baye's theorem.

Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density functions, Mathematical expectation, Properties of mathematical expectations, Mean and Variance.

UNIT-II: PROBABILITY DISTRIBUTIONS

Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and standard Deviations of Poisson distribution, Applications.

Continuous Probability Distributions: Uniform distribution, Exponential distribution, Normal distribution, Properties of Normal Distribution, Importance of Normal Distribution, Area properties of Normal curve.

UNIT-III: CORRELATION AND REGRESSION

Correlation: Definition, measures of correlation, Correlation for bivariate distribution, Rank correlation coefficients.

Regression: Simple linear regression, regression lines and properties.

UNIT-IV: SAMPLING DISTRIBUTIONS

Population and sample, parameter and statistic, Sampling distribution of statistic, Standard Error of statistic, Null and alternative hypotheses, Type I and II errors, Level of Significance, Critical region, Degrees of freedom.

UNIT-V: LARGE SAMPLE TESTS OF SIGNIFICANCE

Test of significance for single proportion, Test of significance for difference of proportions, Test of significance for a single mean, test of significance for difference of means and test of significance for difference of standard deviations.

UNIT-VI: SMALL SAMPLE TESTS OF SIGNIFICANCE

Student's t-test, F-test for equality of population variance, chi-square test for goodness of test, contingency table, chi-square test for independence of attributes.

UNIT-VII: STATISTICAL QUALITY CONTROL

Introduction, Advantages and limitations of statistical quality control, Control charts, Specification limits, R, np and c charts.

UNIT-VIII: QUEUING THEORY

Queuing Theory, Pure Birth and Death Process, M/M/1 Model, Problems.

TEXT BOOKS:

1. T.K.V. Iyengar, B. Krishna Gandhi and Others, *Probability and Statistics*, S. Chand and Company, 3rd edition, 2011.
2. Shahnaz Bathul, *A text book of Probability and Statistics*, Ridge Publications, 2nd edition.
3. Kandaswamy and Thilagavathy, *Probability Statistics and Queuing Theory*, S.Chand, New Delhi, Latest edition.

REFERENCE BOOKS:

1. Miller and John E. Freund's, *Probability and Statistics for Engineers*, Pearson Education, 2009.
2. Ronald E. Walpole, *Probability and Statistics for Engineers and Scientists*, Pearson Education India, 2002.
3. S.C.Gupta and V.K.Kapoor, *Fundamentals of Mathematical Statistics*, Sutan and Chand, New Delhi, 2004.
4. S.C.Gupta and V.K.Kapoor, *Fundamentals of Applied Statistics*, Sultan and Chand, New Delhi, 1998.

II B.Tech. I Semester

10BT30421: ELECTRONIC DEVICES AND CIRCUITS

L	T	P	C
4	1	-	4

UNIT-I: PN JUNCTION DIODE

PN Junction Diode Equation, Volt-Ampere (V-I) Characteristics, Temperature Dependence of V-I Characteristics, Ideal Versus Practical, Static and Dynamic Resistances, Diode Equivalent circuits, Break down Mechanisms in semiconductor Diodes, Zener Diode Characteristics.

UNIT-II: RECTIFIERS AND FILTERS

PN Junction as a Rectifier, Halfwave rectifier, ripple factor, Fullwave rectifier, Bridge Rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, pi-section filter, Use of Zener Diode as a Regulator.

UNIT-III: BIPOLAR JUNCTION TRANSISTOR (BJT)

Transistor construction, BJT Operation, BJT Symbol, Transistor as an Amplifier, Transistor currents and their relations, Input & Output Characteristics of a Transistor in CB, CE and CC Configurations, BJT specifications.

UNIT-IV: TRANSISTOR BIASING AND STABILIZATION

Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization against Variations in V_{BE} and β .

UNIT-V: BIPOLAR JUNCTION TRANSISTOR AMPLIFIERS

BJT Hybrid Modeling for CB, CE and CC Configurations, Determination of h-Parameters from Transistor Characteristics, Comparison of CB, CE and CC configurations, Simplified Hybrid Model.

UNIT-VI: FIELD EFFECT TRANSISTOR

Junction Field Effect Transistor (Construction, Principle of Operation, Symbol) - Pinch-Off Voltage - Volt-Ampere Characteristics, MOSFET Characteristics in Enhancement and Depletion Modes, Small Signal Model of JFET & MOSFET.

FET AMPLIFIERS: Common Source, and Common Drain Amplifiers using FET, Generalized FET Amplifier, Biasing of FET, Comparison between BJT and FET.

UNIT-VII: FEEDBACK AMPLIFIERS AND OSCILLATORS (Qualitative Treatment)

Feedback Concepts, Types of Feedback Circuits (block diagram representation), General characteristics of negative feedback amplifier, Effect of Feedback on Amplifier characteristics. Barkhausen criterion, Hartley & Colpitts oscillators, Phase Shift Oscillators and Crystal Oscillator.

UNIT-VIII: SPECIAL PURPOSE ELECTRONIC DEVICES

Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR) and applications.

TEXT BOOKS:

1. J. Millman, Christos C. Halkias, *Electronic Devices and Circuits*, 1991 edition, TMH, 2008.
2. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, 9th edition, PHI, 2006.
3. David A. Bell, *Electronic Devices and Circuits*, 5th edition, Oxford University press, 2008.

REFERENCE BOOKS:

1. J. Millman and Christos C. Halkias, *Integrated electronics*, 1st edition, TMH, 2004.
2. K. Lal Kishore, *Electronic Devices and Circuits*, 2nd edition, BSP, 2005.
3. Rober T. Paynter, *Introduction to Electronic Devices and Circuits*, Pearson Education.
4. S. Salivahana, N. Suresh Kumar, A. Vallavaraj, *Electronic Devices and Circuits*, 2nd edition, TMH, 2008.

II B.Tech. I Semester

10BT30221: **BASIC ELECTRICAL ENGINEERING**

L	T	P	C
4	1	-	4

UNIT-I: INTRODUCTION TO ELECTRICAL ENGINEERING

Essence of electricity - Basic circuit components - Basic definitions: Electric field - Electric Current - Potential and potential difference - EMF - electric power - Ohm's law - resistive networks - Inductive networks - capacitive networks - Kirchoff's laws - series parallel circuits - star delta and delta star transformations - fuses - earthing.

UNIT-II: NETWORK ANALYSIS

Basic Definitions: Node - Path - Loop - Branch - Nodal analysis- Mesh analysis- Source Transformation Technique -Problems.

Network Theorems: Superposition - Thevenin's - Maximum Power Transfer Theorems.

UNIT-III: ALTERNATING QUANTITIES

Principle of AC voltages - wave forms and basic definitions - RMS and average values of alternating currents and voltage - form factor and Peak factor - phasor representation of alternating quantities - the J operator and phasor algebra - analysis of AC circuits with single basic network element - single phase series and parallel RLC circuits - power factor.

UNIT-IV: THREE PHASE CIRCUITS

Introduction - polyphase systems - advantages - star and delta connection - voltages and currents in balanced star and delta connections - numerical problems - advantages of star and delta connections.

UNIT-V: DIRECT CURRENT MACHINES

Constructional details of a DC machine - principle of operation of a DC generator - types of DC generators - emf equation of a generator - Applications.

DC motors - Principle of operation - types of DC motors - Torque equation - losses and efficiency- Applications.

UNIT-VI: ALTERNATING CURRENT MACHINES

Transformers - principle of operation - constructional details - losses and efficiency - regulation of transformer - testing of Transformers: OC and SC test- Simple problems.

Three phase Induction motors: Constructional details- principle of operation - slip - rotor frequency.

UNIT-VII: SPECIAL MACHINES

Single phase induction motors - Principle of operation - Shaded pole motors - Capacitor motors - AC servomotor - AC tachometers - Synchros - Stepper Motors - Characteristics - voltage stabilizers, uninterruptible power supply (UPS).

UNIT-VIII: BASIC MEASURING INSTRUMENTS

Introduction - classification of instruments - operating principles - essential features of measuring instruments - Permanent Magnet Moving Coil (PMMC) and moving iron instruments (voltmeters and ammeters) - Digital multimeters.

TEXT BOOKS:

1. T.K. Nagasarkar and M.S. Sukhija, *Basic Electrical Engineering*, Oxford University press, 2009.
2. BL Theraja and AK Theraja, *A text book of electrical technology in SI units*, vol: 2, 2010.

REFERENCE BOOKS:

1. D.P. Kothari and I. J. Nagrath, *Theory and problems of Basic Electrical Engineering*, Prentice Hall of India, 2009.
2. V.K. Mehta, Rohit Mehta, *Principles of electrical engineering*, S. Chand and Company Ltd., 2006.
3. V.K. Mehta, Rohit Mehta, *Principles of power systems*, S. Chand and Company Ltd., 2006.
4. M.S. Naidu and S. Kamakshaiah, *Basic Electrical Engineering*, Tata McGraw Hill Publications Ltd, 2009.

II B.Tech. I Semester

10BT30422: DIGITAL LOGIC DESIGN

L	T	P	C
4	1	-	4

UNIT-I: BINARY SYSTEMS

Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

UNIT-II: BOOLEAN ALGEBRA AND LOGIC GATES

Basic Definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, other logic operations, Digital logic gates, integrated circuits.

UNIT-III: GATE – LEVEL MINIMIZATION

The k-map method - Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function, Hardware Description language (HDL).

UNIT-IV: COMBINATIONAL LOGIC

Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor , Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT-V: SYNCHRONOUS SEQUENTIAL LOGIC

Sequential circuits, latches, Flip-Flops, Analysis of clocked sequential circuits, HDL for sequential circuits, State Reduction and Assignment, Design Procedure.

UNIT-VI: Registers, shift Registers, Ripple counters, synchronous counters, other counters, HDL for Registers and counters.

UNIT-VII: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

UNIT-VIII: ASYNCHRONOUS SEQUENTIAL LOGIC

Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race- Free State Assignment Hazards, Design Example.

TEXT BOOKS:

1. M. Morris Mano, *Digital Design*, 3rd edition, Pearson Education/PHI, 1999.
2. Roth, *Fundamentals of Logic Design*, 5th edition, Thomson, 2004.

REFERENCE BOOKS:

1. Zvi. Kohavi, *Switching and Finite Automata Theory*, Tata McGraw Hill, 2004.
2. C.V.S. Rao, *Switching and Logic Design*, 3rd edition, Pearson Education, 2009.
3. Donald D.Givone, *Digital Principles and Design*, Tata McGraw Hill, 2002.
4. M. Rafiqzaman, *Fundamentals of Digital Logic and Micro Computer Design*, 5th edition, John Wiley, 2005.

II B.Tech. I Semester

10BT30501: DISCRETE MATHEMATICAL STRUCTURES

L	T	P	C
4	1	-	4

UNIT-I: MATHEMATICAL LOGIC

Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

UNIT-II: PREDICATES

Predicate Calculus, Free and Bound variables, Rules of inference, Consistency, Proof of contradiction and Automatic Theorem Proving.

UNIT-III: RELATIONS

Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications.

Functions: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT-IV: ALGEBRAIC STRUCTURES

Algebraic System-Examples and General Properties Semi Groups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT-V: MATHEMATICAL REASONING

Methods of Proof, Mathematical Induction.

Counting: Basics of counting, The Inclusion- Exclusion Principle, The Pigeon hole principle, Permutations and Combinations, Generalized Permutations and Combinations.

UNIT-VI: RECURRENCE RELATIONS

Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT-VII: GRAPHS

Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring, 4-color theorem, 5-color theorem.

UNIT-VIII: GRAPH THEORY AND ITS APPLICATIONS

Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees, Kruskal's Algorithm and Prim's Algorithm.

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*, Tata McGraw Hill, 1997.
2. Kenneth H. Rosen, *Discrete Mathematics and its Applications*, 6th edition, Tata McGraw Hill, 2007.

REFERENCE BOOKS:

1. Joe L.Mott and Abraham Kandel, *Discrete Mathematics for Computer Scientists and Mathematicians*, 2nd edition, Prentice Hall of India Private Limited, 2004.
2. C.L. Liu and D.P. Mohapatra, *Elements of Discrete Mathematics*, 3rd edition, McGraw Hill, 2008.
3. Ralph P. Grimaldi and B.V.Ramana, *Discrete and Combinatorial Mathematics- An Applied Introduction*, 5th edition, Pearson Education, 2006
4. D.S Mallik and M. K Sen, *Discrete Mathematical Structures: Theory and Applications*, Course Technology, 2004.

II B.Tech. I Semester

10BT30502: DATA STRUCTURES

L	T	P	C
4	1	-	4

UNIT-I: INTRODUCTION TO DATA STRUCTURES

Definition, Classification, The Abstract Data Type (ADT), model for ADT, ADT implementation, Generic code for ADTs.

Sorting: Sort concepts, Merge sort, Shell sort, Quick sort, Heap sort.

Searching: Sequential search, variations on sequential search, Binary search, Fibonacci search.

UNIT-II: GENERAL LINEAR LISTS

Singly linked list, Basic Operations, Implementation, List ADT, Circularly linked lists, Doubly linked lists, Multi linked lists.

UNIT-III: STACKS AND QUEUES

Basic stack operations, Stack linked list, implementation, Stack ADT, Applications: Reversing data, Convert Decimal to binary, Postponement.

Queues: Queue operations, Queue linked list design, Queue ADT, Applications: Categorizing data, Queue simulations.

UNIT-IV: NON LINEAR LISTS

Basic tree concepts, Binary trees: properties, traversals, expression trees, Binary search trees: Basic concepts, Operations, Binary Search Tree ADT, Threaded trees.

UNIT-V: AVL TREES

Basic Concepts, Balance Factor, implementation, ADT, Algorithms, And Applications: Count words.

Heaps: Basic Concepts, Implementation, ADT, Heap Application.

UNIT-VI: MULTIWAY TREES

M-way search trees, B-trees: Implementation- Insertion, Deletion, Balance, Combine, Traversal, Search, B-tree ADT, Simplified B-trees, lexical search trees.

UNIT-VII: GRAPHS

Basic Operation, Review of traversals- Breadth First Traversal, Depth First Traversal, Graph storage structures, Graph ADT, Networks: Minimum spanning trees, Shortest path algorithm.

UNIT-VIII: HASH TABLES

Introduction, Hash Table structure, Hash functions, Linear open Addressing, Chaining, Applications.

File Organizations: Introduction, Files, Keys, Basic File Operations, Heap Organization, Sequential File Organization, Indexed Sequential File Organization, Direct File Organization.

TEXT BOOKS:

1. Richard F.Gilberg, Behrouz A.Forouzan, *Data Structures- A pseudocode Approach with C*, 2nd edition, Cengage Learning, 2007.
2. G.A.V. Pai, *Data Structures and Algorithms*, Tata McGraw Hill, 2009.

REFERENCE BOOKS:

1. J. Tremblay, P. Sorensen, *An introduction to data structures with Applications*, 2nd edition, Tata McGraw-Hill, 1984.
2. M. Weiss, *Data Structures and Algorithm Analysis in C++*, 2nd edition, Pearson Education, 2002.
3. E. Horowitz, S. Sahni, D. Mehta, *Fundamentals of Data Structures in C++*, Galgotia Book Source, New Delhi, 1995.
4. Y. Langsam, M. Augenstin and A. Tannenbaum, *Data Structures using C and C++*, 2nd edition, Prentice Hall of India, 2002.
5. A. Drozdek, Thomson Brookes, *Data Structures in C++*, 2nd edition, COLE Books, 2002.

II B.Tech. I Semester

10BT30431: **ANALOG AND DIGITAL ELECTRONICS LAB**

L	T	P	C
-	-	3	2

PART A

ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B

ANALOG DEVICES AND CIRCUITS (Minimum seven experiments to be conducted)

1. PN Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Full wave or Half wave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of CE Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C

DIGITAL CIRCUITS

Realization of

1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of

5. VHDL Programme

II B.Tech. I Semester

10BT30511: DATA STRUCTURES LAB

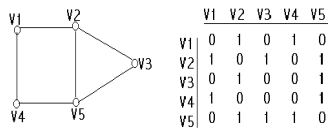
L T P C

- 3 2

1. a. Implement Quick sort algorithm on the list $L = \{67, 78, 34, 11, 99, 42, 56, 23\}$ and display the output list at the end of each pass.
b. Implement Merge sort algorithm on the lists $L1 = \{123, 678, 345, 225, 890, 650, 111\}$, $L2 = \{654, 789, 912, 144, 255, 666\}$
2. a. Implement Heap sort for the list $L = \{H, V, A, T, L, M, K, U\}$
b. Implement Heap sort for the list L of Week1 (a).
3. Implement binary search and Fibonacci search algorithms on an order list $L = \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$ Undertake search for the elements in the list $\{3, 18, 1, 25\}$. Compare the number of keys comparisons made during the searches.
4. Write a program to implement the following operations on singly linked list
 - i) Creation
 - ii) Insertion
 - iii) Deletion
 - iv) Display
5. Write a menu driven program which will maintain a list of car models, their price, name of the manufacturer, engine capacity etc., as a doubly linked list. The menu should make provisions for inserting information pertaining to new car models, delete obsolete models, update data such as price besides answering queries such as listing all car models with in a price range specified by the client and listing all details given a car model.
6. Write a C program to implement the following using an array.
 - i) Stack ADT
 - ii) Queue ADT
7. Write a C program to implement the following using a single linked list.
 - i) Stack ADT
 - ii) Queue ADT
8. Write a C program to perform the following operations:
 - i) Insert an element into a binary search tree.
 - ii) Delete an element from a binary search tree.
 - iii) Search for a key element in a binary search tree.
9. Write a C program that uses recursive functions to traverse the given binary tree in
 - i) Preorder
 - ii) Inorder
 - iii) Postorder (Non recursive)
10. Write a C program to perform the following operation.
 - i) Insertion into an AVL - tree
 - ii) Deletion from an AVL - tree
11. Write a C program to perform the following operations
 - i) Insertion into a B - tree
 - ii) Deletion from a B - tree
12. Write a C program for the implementation of BFS (Breadth First Search) and DFS (Depth First Search) for a given adjacency matrix.

Adjacency Matrix for a Simple Graph:

Example : Given a graph G as follows



From the chart above, the adjacency matrix for the graph G is:

0	1	0	1	0
1	0	1	0	1
0	1	0	0	1
1	0	0	0	1
0	1	1	1	0

13. a. Implement a hash table using an array data structure. Design functions to handle overflows using i) linear probing ii) quadratic probing iii) rehashing for a set of keys.
- b. Implement a hash table for a given set of keys using chaining method of handling overflows. Maintain the chains in the ascending order of keys. Design a menu driven front end to perform the insert, delete, and search operations on the hash table.

TEXT BOOKS:

1. Richard F. Gilberg, Behrouz A. Forouzan, *Data Structures- A pseudocode Approach with C*, 2nd edition, Cengage Learning, 2007.
2. G.A.V. Pai, *Data Structures and Algorithms*, Tata McGraw Hill, 2009.

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1. J. Tremblay, P. Sorensen, *An introduction to data structures with Applications*, 2nd edition, Tata McGraw-Hill, 1984.
2. M. Weiss, *Data Structures and Algorithm Analysis in C++*, 2nd edition, Pearson Education, 2002.
3. E. Horowitz, S. Sahni, D. Mehta, *Fundamentals of Data Structures in C++*, Galgotia Book Source, New Delhi, 1995.
4. Y. Langsam, M. Augenstein and A. Tannenbaum, *Data Structures using C and C++*, 2nd edition, Prentice Hall of India, 2002.
5. A. Drozdek, Thomson Brookes, *Data Structures in C++*, 2nd edition, COLE Books, 2002.

II B.Tech. II Semester

10BT3BS02: ENVIRONMENTAL SCIENCES

L	T	P	C
4	1	-	4

UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES Definition and concept of the term environment - Various components of environment - Abiotic and biotic - Atmosphere - Hydrosphere - Lithosphere - Biosphere - Inter relationships - Need for public awareness - Role of important national and international individuals and organizations in promoting environmentalism.

UNIT-II: NATURAL RESOURCES, CONSERVATION AND MANAGEMENT

Renewable and Non renewable resources and associated problems - Forests: Deforestation, Causes, effects and remedies - Effects of mining, dams and river valley projects - case studies; Water resources: Water use and over exploitation - Conflicts over water - Large dams - benefits and problems; Food resources : World food problems - Adverse effects of modern agriculture - Fertilizer and pesticide problems; Land resources: Land degradation - Land slides- Soil erosion - desertification- water logging - salinity - Causes, effects and remedies; Mineral resources: Mining - Adverse effects; Energy resources: Growing needs - Renewable and Non renewable resources - Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear energy, Hydrogen fuel and Solar energy - Impact on environment - Sustainable life styles.

UNIT-III: ECOLOGY AND ECOSYSTEMS

Definitions and concepts - Characteristics of ecosystem - Structural and functional features - Producers, consumers and decomposers and food webs - Types of ecosystems - Forests grassland, desert, crop land, pond, lake, river and marine ecosystems - Energy flow in the ecosystem - Ecological pyramids - Ecological successions.

UNIT-IV: BIO DIVERSITY, CONSERVATION AND MANAGEMENT

Introduction - Definition and concept of biodiversity - Value of biodiversity - Role of biodiversity in addressing new millennium challenges - Global, national biodiversity - Hot spots of biodiversity Threats to biodiversity - Man and wild life conflicts - Remedial measures - Endemic, endangered and extinct species - In-situ and ex-situ conservation of biodiversity.

UNIT-V: ENVIRONMENTAL POLLUTION AND CONTROL

Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution - Solid waste management - Causes, effects, control and disposal methods - Role of individuals in the prevention of pollution - Hazards and disaster management - Floods - Earthquakes - Tsunamis - Cyclones - Land slides - Case studies.

UNIT-VI: SOCIAL ISSUES AND THE ENVIRONMENT

Concept of sustainable development - Methods of rainwater harvesting - Watershed management - Waste land reclamation - Green cover - Green power - Green technology - Resettlement and rehabilitation of people and related problems - Case studies - Issues and possible solutions - Greenhouse effect and global warming - Carbon credits - Acid rains - Ozone layer depletion - Causes, effects and remedies - Consumerism and waste production - Environment protection acts - Air act - Water act - Forest conservation act - Wild life protection act - Issues involved in the enforcement.

UNIT-VII: HUMAN POPULATION AND ENVIRONMENT

Population growth and its impact on environment - Environmental ethics - Family welfare programmes - Human health: T.B., Cancer, HIV/AIDS - Causes, effects and remedies - Occupational health hazards - Human rights - Important international protocols and conventions on environment.

UNIT-VIII:

FIELD WORK/ENVIRONMENTALIST'S DIARY/ASSIGNMENTS/SEMINARS

TEXT BOOKS:

1. Erach Barucha, *Environmental Studies*, 1st edition, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies*, 3rd edition, New Age International Publishers, 2011.

REFERENCE BOOKS:

1. Desh wal, *Environmental Studies*, 2nd edition, Khanna Publications, New Delhi, 2010.
2. Rajagopalan, *Environmental Studies*, 1st edition, Oxford University Press, 2009.
3. Joseph Benny, *Environmental Studies*, 2nd edition, Tata McGraw-Hill, New Delhi, 2010.

II B.Tech. II Semester

10BT40501: COMPUTER ARCHITECTURE AND ORGANIZATION

L	T	P	C
4	1	-	4

UNIT-I: STRUCTURE OF COMPUTERS

Computer Types, Functional Units, Basic Operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputers.

Computer Arithmetic: Review of Representation of Information, Addition and Subtraction, Multiplication and Division Algorithms, Floating-Point Arithmetic Operation, Decimal Arithmetic Unit, Decimal Arithmetic operations.

UNIT-II: REGISTER TRANSFER AND MICRO-OPERATIONS Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic logic shift unit, Instruction Codes, Computer Registers, Computer Instructions, Instruction Cycle, Timing and Control, Memory-Reference Instructions, Input-Output and Interrupt.

Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC). Comparison of RISC and CISC.

UNIT-III: MICROPROGRAMMED CONTROL

Control Memory, Address Sequencing, Micro-program Example, Design of Control Unit, Hardwired Control, Micro-programmed Control, Nanoprogramming.

UNIT-IV: PIPELINE AND VECTOR PROCESSING

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path & Control Consideration, Superscalar Operations, Vector Processing, Array Processors.

UNIT-V: THE MEMORY SYSTEM

Basic Concepts, Semiconductor RAM Types of Read - only Memory (ROM), Cache Memory, Performance Considerations, Virtual Memory, Secondary Storage, and Introduction to Redundant Array of Inexpensive Disks (RAID).

Input - Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).

UNIT-VI: INPUT-OUTPUT ORGANIZATION (ADVANCED)

Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols Like RS232, USB, and IEEE1394.

UNIT-VII: MULTIPROCESSORS

Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

UNIT-VIII: CASE STUDIES

CISC Architecture - PentiumIV, RISC Architecture - PowerPC.

TEXT BOOKS:

1. M. Moris Mano, *Computer System Architecture*, 3rd edition, Pearson/PHI, 2008.
2. William Stallings, *Computer Organization and Architecture*, 6th edition, Pearson/PHI.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, *Computer Organization*, 5th edition, McGraw Hill, 2002.
2. Andrew S. Tanenbaum, *Structured Computer Organization*, 4th edition, PHI/Pearson
3. Sivarama P. Dandamudi, *Fundamentals of Computer Organization and Design*, Springer Int. Edition, 2003.
4. John P. Hayes, *Computer Architecture and Organization*, 3rd edition, Tata McGraw Hill, 1998.

II B.Tech. II Semester

10BT40502: OBJECT ORIENTED PROGRAMMING

L	T	P	C
4	1	-	4

UNIT-I: OBJECT ORIENTED THINKING

Need for OOP paradigm, OOP concepts, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions. C++ class overview-class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation.

UNIT-II: POLYMORPHISM AND INHERITANCE

Function overloading, operator overloading, generic programming-function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, abstract classes, Streams.

UNIT-III: BASICS OF JAVA

History of Java, Java buzzwords, datatypes, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects - concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-IV: INHERITANCE AND INTERFACES

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V: EXCEPTION HANDLING

Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

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

UNIT-VI: MULTITHREADING

Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads.

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

UNIT-VII: EVENT HANDLING

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.

UNIT-VIII: SWINGS

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing - JApplet, JFrame and JComponent, Icons and labels, text fields, The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed panes, Scroll Panes, Trees and Tables.

TEXT BOOKS:

1. Robert Lafore, *Object-Oriented Programming in C++*, 3rd edition, Waite Group.
2. Herbert schildt, *Java the complete reference*, 7th editon, TMH.

REFERENCE BOOKS:

1. Y. Daniel Liang, *Introduction to Java programming*, 6th edition, Pearson Education.
2. Core Java 2, Vol 1, *Fundamentals*, Cay.S.Horstmann and Gary Cornell, 7th edition, Pearson Education.
3. S.B.Lippman, *C++ primer*, 3rd edition, Pearson Education Ltd.
4. W.Savitch, *Problem solving with C++*, The OOP, 4th edition, Pearson Education.
5. B. Stroustrup, *The C++ Programming Language*, 3rd edition, Pearson Education.

II B.Tech. II Semester

10BT50504: OPERATING SYSTEMS

L	T	P	C
4	1	-	4

UNIT-I: OPERATING SYSTEMS OVERVIEW

Introduction, Operating system operations, Process management, Memory management, Storage management, Protection and Security, Distributed Systems, Special purpose systems. Operating systems structures: Operating system services and Systems calls, System programs, Operating system structure, Operating systems generations.

UNIT-II: PROCESS MANAGEMENT

Process concepts, Process state, Process control block, Scheduling queues, Process scheduling, Multithreaded programming, threads in UNIX, Comparison of UNIX and Windows.

UNIT-III: CONCURRENCY AND SYNCHRONIZATION

Process synchronization, Critical-section problem, Peterson's Solution, Synchronization Hardware, semaphores, Classic problems of synchronization, Readers and Writers problem, Dining-philosophers problem, Monitors, Synchronization examples(Solaris), atomic transactions. Comparison of UNIX and Windows.

UNIT-IV: DEADLOCKS

System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock- bankers algorithm.

UNIT-V: MEMORY MANAGEMENT

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, Allocation of frames, Thrashing, case study- UNIX.

UNIT-VI: FILE SYSTEM

Concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection.

File System implementation: File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, comparison of UNIX and Windows

UNIT-VII: I/O SYSTEM

Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling algorithms, swap-space management, stable-storage implementation, Tertiary storage structure,

I/O: Hardware, application I/O interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

UNIT-VIII: PROTECTION AND SECURITY

Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights. Security: The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, fire walling to protect systems.

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Principles*, 7th edition, John Wiley.

REFERENCE BOOKS:

1. Stallings, *Operating Systems, Internals and Design Principles*, 5th edition, Pearson Education, 2006.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd edition, PHI, 2007.
3. Deitel & Deitel, *Operating systems*, 3rd edition, Pearson Education, 2008.
4. Crowley, *Operating systems Oriented Approach*, TMH, 1998.
5. Dhamdhere, *Operating systems*, 2nd edition, TMH, 2008.

II B.Tech. II Semester

10BT41201: DATA COMMUNICATIONS

L	T	P	C
4	1	-	4

UNIT-I: FUNDAMENTALS OF DATA COMMUNICATION

Data communication Network Architecture, Protocols and Standards, Standards Organizations for Data Communications, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks.

Signals, Noise, Modulation and Demodulation: Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud and M-ary Encoding, Digital Modulation.

UNIT-II: METALLIC CABLE TRANSMISSION MEDIA

Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Equivalent Circuit, Metallic Transmission Line Losses.

Optical Fiber Transmission Media: Advantages and Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, The Physics of Light, Velocity of Propagation, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables.

UNIT-III: DIGITAL TRANSMISSION

Pulse Modulation, Pulse Code Modulation (PCM), Dynamic Range, Signal Voltage -to-Quantization Noise Voltage Ratio, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed.

Multiplexing and T Carriers: Time- Division Multiplexing, T1 Digital Carrier System, Digital Line Encoding, T Carrier systems, Statistical Time - Division Multiplexing, Frame Synchronization, Frequency- Division Multiplexing, Wavelength- Division Multiplexing.

UNIT-IV: WIRELESS COMMUNICATIONS SYSTEMS

Electromagnetic Polarization, Rays and Wave fronts, Electromagnetic Radiation, Spherical Wave front and the Inverse Square Law, wave Attenuation and Absorption, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Basics of Microwave Communications Systems and Satellite Communications Systems.

UNIT-V: TELEPHONE INSTRUMENTS AND SIGNALS

The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

The Telephone Circuit: The Local Subscriber Loop, Telephone Message- Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Crosstalk.

UNIT-VI: CELLULAR TELEPHONE CONCEPTS AND SYSTEMS

Mobile Telephone Service, Cellular Telephone, Interference, Cell Splitting, Sectoring, Segmentation, Dualization, Topology, Roaming and handoff, Network Components, First-Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems.

UNIT-VII: DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

UNIT-VIII: DATA COMMUNICATIONS EQUIPMENT

Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems- Compatible Voice- Band Modems, Voice- Band Modern Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, ITU-T Voice- Band Modem Specifications, 56K Modems, Probability of Error and Bit Error Rate.

TEXT BOOK:

1. Wayne Tomasi, *Introduction to Data Communications and Networking*, 1st edition, Pearson Education, 2005.

REFERENCE BOOKS:

1. Behrouz A Forouzan, *Data Communications and Networking*, 4th edition, TMH, 2006.
2. Fred Halsall, *Data Communications, Computer Networks and Open Systems*, 4th edition, Pearson Education, 1996.

II B.Tech. II Semester

10BT60501: THEORY OF COMPUTATION

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4	1	-	4

UNIT-I: INTRODUCTION TO THEORY OF AUTOMATA

Strings, Alphabets, Language, Operations on sets, Definition of an automaton, Description of a Finite Automaton (FA), Transition systems, Properties of transition functions, Acceptability of a string by a finite automaton.

UNIT-II: FINITE AUTOMATA

Deterministic finite automata(DFA), Nondeterministic finite automata(NFA), The language of a DFA, The Language of an NFA,

NFA to DFA conversion, Equivalence between two finite state machines, Finite automata with output-Mealy and Moore machines, Minimization of finite automata.

UNIT-III: REGULAR EXPRESSIONS

Regular expressions, Regular sets, Identity rules, Constructing finite automata for a given regular expressions, Conversion of finite automata to regular expressions, Pumping lemma for regular sets, Applications of pumping lemma, Closure properties of regular sets.

UNIT-IV: FORMAL LANGUAGES

Basic definitions and examples, Chomsky classification of languages, Languages and their relation, Languages and automata, Regular grammars- Right linear and Left linear grammars, Equivalence between regular linear grammar and FA.

Context Free Grammars: Definition of context free grammars(CFG), Leftmost and rightmost derivations, The language of a grammar, Sentential forms, Constructing parse trees, The yield of a parse tree, Ambiguous grammars, Removing ambiguity from grammars.

UNIT-V: CONTEXT FREE LANGUAGES

Simplification of CFG, Eliminating useless symbols, Elimination of NULL productions, Elimination of unit productions, Chomsky Normal Form (CNF), Greibach Normal Form(GNF), Pumping lemma for context free languages(CFL).

UNIT-VI: PUSHDOWN AUTOMATA

Definition of pushdown automaton(PDA), The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic pushdown automaton.

UNIT-VII: TURING MACHINES AND LINEAR BOUNDED AUTOMATA

Turing Machine model, Representation of Turing Machines(TM), Languages acceptability by Turing Machines, Design of Turing Machines, Computable functions, Recursively enumerable languages, Church's hypothesis, Counter machine, Types of Turing Machines, The model of linear bounded automaton(LBA), Turing Machines and type 0 grammar, Linear bounded automata and Languages.

UNIT-VIII: COMPUTABILITY THEORY

LR(k) grammar, Universal Turing Machines, Undecidable problems about Turing Machines, Post's Correspondence Problem, The Classes P and NP, An NP-Complete and NP-Hard Problems.

TEXT BOOK:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, *Introduction to Automata Theory Languages and Computation*, 2nd edition, Pearson Education, 2005.

REFERENCE BOOKS:

1. K.L.P Mishra and N. Chandrashekar, *Theory of Computer Science-Automata Languages and Computation*, 2nd edition, PHI, 2003.
2. John C Martin, *Introduction to Languages and the Theory of Computation*, 3rd edition, Tata McGraw Hill, 2003.
3. Daniel I.A. Cohen, *Introduction to Computer Theory*, 2nd edition, John Wiley, 2007.

II B.Tech. II Semester

10BT40521: OPERATING SYSTEMS LAB

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1. Simulate the following CPU Scheduling algorithms and calculate waiting time, turnaround time.
 - a. First Come First Served (FCFS)
 - b. Shortest Job First (SJF)
2. Simulate the following CPU Scheduling algorithms and calculate waiting time, turnaround time.
 - a. Round Robin
 - b. Priority
3. Simulate the following Page Replacement algorithms and calculate the page faults.
 - a. First in First Out (FIFO)
 - b. Optimal
4. Simulate the following Page Replacement algorithms and calculate the page faults.
 - a. Least Frequently Used (LFU)
 - b. Least Recently Used (LRU)
5. Simulate the following Disk Scheduling algorithms and calculate total head movements
 - a. First Come First Served (FCFS)
 - b. Shortest Seek Time First (SSTF)
6. Simulate the following Disk Scheduling algorithms and calculate total head movements.
 - a. SCAN
 - b. Circular SCAN (CSCAN)
7. Simulate the following Disk Scheduling algorithms and calculate total head movements.
 - a. LOOK
 - b. Circular LOOK (CLOOK)
8. Implement Bankers Algorithm for Deadlock Avoidance.
9. Implement Bankers Algorithm for Deadlock Prevention
10. Implement the Bounded Buffer Producer - Consumer problem using Semaphores.
11. Implement the Infinite Buffer Producer - Consumer problem using Binary Semaphores.
12. Implement the Bounded Buffer Producer - Consumer problem using Monitors.
13. Implement the Dining Philosopher problem using Semaphores.
14. Simulate the following Disk Scheduling algorithms and calculate total head movements.
 - a. Multiprogramming with a fixed number of tasks (MFT)
 - b. Multiprogramming with a variable number of tasks (MVT)

II B.Tech. II Semester

10BT40511: OBJECT ORIENTED PROGRAMMING LAB

L T P C
- - 3 2

1. a. Write a C++ program that prints Student Name, Roll No., Branch, Marks and display the Total and Division in the following format after reading the necessary input (Use \n \t etc..).

```
Name : *****
Roll No : *****
Branch : *****
Marks : *****
Total : *****
Division : *****
```

b. Write a C++ program to perform complex operations addition, Subtraction, Multiplication and Division using friend function.

2. a. Write a program in C++ to perform the following using the function template concepts.

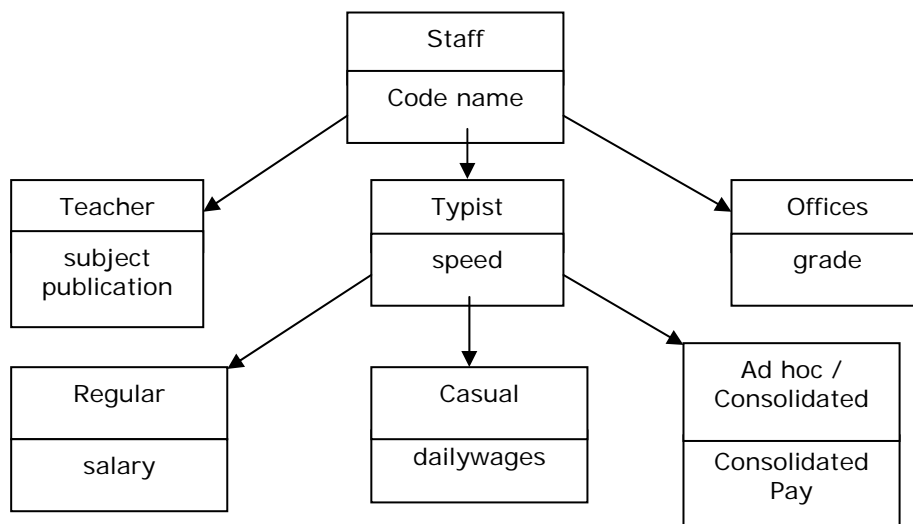
- i. To read a set of integers
- ii. To read a set of floating point numbers
- iii. To read a set of double numbers

Write function for finding average of non-negative numbers and also calculate the deviation of the numbers.

b. Write a class Fraction that defines methods addition, subtraction, multiplication and division of fractions by overloading basic arithmetic operators.

3. a. Write a C++ program to implement the given hierarchy, using the appropriate methods.

Class Relations



Salary – DA, HRA, PF, Dailywages – 200/- per day, Consolidated pay – Fixed Amount

b) Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get data() to initialize base class data members and another member function display area() to compute and display the area of figures. Make display area() as a virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively, and display the area.

Remember the two values given as input will be treated as length of two sides in the case of rectangles, and as base and height in the case of triangles, and used as follows:

Area of rectangle = $x * y$

Area of triangle = $\frac{1}{2} * x * y$

WEEK 4:

a) Create a class called Date that includes three pieces of information as instance variables-a month (type int), a day (type int). Your class should have a constructor that initializes the three values provided are correct.

Provide set and get method for each instance variable. Provide a method display date that displays the month, day, year separated by forward slashes (/).

Write a test application named DateTest that demonstrates Class Date's capabilities.

b) Create a class huge Integer which uses a 40-element array of digits to store integers as large as 40 digits each. Provide Methods: isEqualTo, isNotEqualTo, isGreaterThan, isLessThan, isGreaterThanOrEqual and isLessThanOrEqual.

Each method returns a boolean value if the relationship holds true.

WEEK 5:

a) Write a program that reads a line of integers (maximum limit 6 digits), and then displays each integers and sum of all the integers.

(Hint: Use StringTokenizer class)

b) Write a program to do the following

- a) To print a question "Who is inventor of Java"?
- b) To accept the answer
- c) To print out "Good" and then stop, if the answer is correct.
- d) To output the message "try again", if the answer is wrong.
- e) To display the correct answer when the answer is wrong even at the third attempt and stop.

WEEK 6:

a) Assume that a bank maintains two kinds of account for its customers, one called saving account and the other current account.

The savings account provides compound interest and with drawl facilities but no chequebook facility. The current account provides chequebook facility but no interest.

Current account holders should also maintain a minimum balance and if the balance falls below this level a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes Curr_Acct and Sav_Acct to make them more specific to their requirements.

Include the necessary methods in order to achieve the following tasks:

- a) Accept deposit from a customer and update the balance
- b) Display the balance.
- c) Compute and deposit interest.
- d) Permit with drawl and update the balance.
- e) Check for the minimum balance, impose penalty, if necessary and update the balance.

b) Write an inheritance hierarchy for classes Quadrilateral, Trapezoid, Parallelogram, Rectangle and Square. Use Quadrilateral as the super class of the hierarchy. Make the hierarchy as deep as possible. Specify the instance variables and methods for each class. The private instance variables of Quadrilateral. Write a program that instantiates objects of your classes and outputs the object's area (except Quadrilateral).

WEEK 7:

a) Write a program to illustrate an inner class by creating an anonymous object in the main class.
b) Design an interface 'Moveable Shape' that can be used as a generic mechanism for animating a shape. A movable shape must have two methods: move and draw. Write a 'Animation Panel' class that paints and moves any 'Moveable Shape' supply movable rectangle and car shapes.

WEEK 8:

a) Write a package called Math that implements class exactly java.lang.math, with a distinguished set of mathematical functions and also Date manipulation functions.

b) Implement Stack ADT using Packages.

WEEK 9:

a) Write a program that converts from 24-hour time to 12-hour time. Define an exception class IllegalTimeFormat, if the user enters an illegal time like 11:65 or even gibberish like &&* 68, throw and catch the exception.

b) Write a program that calls a method that throws an exception of type Arithmetic Exception at a random iteration in a for loop. Catch the Exception in the method and pass the iteration count when the exception occurred to the calling method by using an object of an exception class you define.

Add a finally block to the method to output the iteration count when the method exists.

WEEK 10:

a) Write a program that correctly implements producer consumer problem using the concept of inter thread communication.

b) Write a program that demonstrates time slicing among equal priority threads, show that a lower priority thread's execution is deferred by the time slicing of higher-priority threads.

WEEK 11:

a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named "Compute" is clicked.

WEEK 12:

a) Write a Java program for handling Mouse Events.

b) Write a Java program for handling Keyboard Events.

WEEK 13:

Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result.

TEXT BOOKS:

1. W.Savitch, *Problem solving with C++*, *The OOP*, 4th edition, Pearson Education.
2. H.M.Dietel and P.J.Dietel, *Java How to Program*, 6th edition, Pearson Education/PHI.
3. Y.Daniel Liang, *Introduction to Java Programming*, 6th edition, Pearson Education.
4. Cay Horstmann, *Big Java*, 2nd edition, Wiley Student Edition, Wiley India Private Limited.