



# SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

Sree Sainath Nagar, Tirupati – 517 102

## Department of Computer Science and System Engineering

### II B.Tech (CSSE) II-Semester

Subject Code	Subject	Periods per week			C	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
10BT50501	Design and Analysis of Algorithms	4	1	-	4	30	70	100
10BT4EC01	Optimization Techniques	4	1	-	4	30	70	100
10BT50502	Micro-Processors and Interfacing	4	1	-	4	30	70	100
10BT40502	Object Oriented Programming	4	1	-	4	30	70	100
10BT40511	Object Oriented Programming Lab	-	-	3	2	25	50	75
10BT50511	Micro-Processors and Interfacing Lab	-	-	3	2	25	50	75
	<b>TOTAL</b>	<b>24</b>	<b>6</b>	<b>6</b>	<b>28</b>	<b>230</b>	<b>520</b>	<b>750</b>

**UNIT – I: INTRODUCTION TO ENVIRONMENTAL SCIENCES**

Definition and concept of the term environment, Various components of environment, Abiotic and biotic, Atmosphere, Hydrosphere, Lithosphere, Biosphere, Interrelationships, 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*, 1<sup>st</sup> Edition, Universities Press, Hyderabad, 2010.
2. A. Kaushik and Kaushik, *Environmental Studies*, 3<sup>rd</sup> Edition, New Age International Publishers, 2011.

**REFERENCES**

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

**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: MICRO-PROGRAMMED 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-Pentium IV, RISC Architecture-PowerPC.

**TEXT BOOKS :**

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

**REFERENCE BOOKS:**

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

**UNIT I: INTRODUCTION**

Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big (o) notation, Omega notation, Theta notation and Little (o) notation, Recurrences, Probabilistic analysis.

**UNIT II: DISJOINT SETS AND GRAPHS (Algorithm and Analysis)**

Disjoint set operations, union and find algorithms, Graphs-Breadth First search and Traversal, Depth First Search and Traversal, spanning trees, connected components and biconnected components.

**UNIT III: DIVIDE AND CONQUER**

General method, Applications-Analysis of Binary search, Quick sort, Merge sort, Strassen's matrix multiplication, Finding the Maxima and Minima.

**UNIT IV : GREEDY METHOD**

General method, Applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem, Optimal storage on Tapes.

**UNIT V: DYNAMIC PROGRAMMING**

General method, Applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design, String Editing.

**UNIT VI: BACKTRACKING**

General method, applications-n-queen problem, sum of subsets problem, graph colouring, 0/1 knapsack problem, Hamiltonian cycles.

**UNIT VII: BRANCH AND BOUND**

General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

**UNIT VIII: NP-HARD AND NP-COMPLETE PROBLEMS**

Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem, NP-hard scheduling Problems.

**TEXT BOOK:**

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, *Fundamentals of Computer Algorithms*, 2 ed, Galgotia publications Pvt. Ltd.

**REFERENCE BOOKS:**

1. M.T.Goodrich and R. Tomassia, *Algorithm Design: Foundations, Analysis and Internet examples*, John Wiley and sons, 2002.
2. R.C.T.Lee, S.S. Tseng, R.C. Chang and T. Tsai, *Introduction to Design and Analysis of Algorithms A strategic approach*, McGraw Hill, 2006.
3. Allen Weiss, *Data structures and Algorithm Analysis in C++*, 2 ed, Pearson education.
4. Aho, Ullman and Hopcroft, *Design and Analysis of algorithms*, 2 ed, Pearson education.

**UNIT I: INTRODUCTION TO OPTIMIZATION TECHNIQUES**

Statement of an optimization problem, design vector, design constraints, constraint surface, objective function, objective function surfaces, classification of optimization problems.

**UNIT II: CLASSICAL OPTIMIZATION TECHNIQUES**

Single variable optimization, multi variable optimization without constraints, necessary and sufficient conditions for minimum/maximum, multivariable optimization with equality constraints, solution by method of lagrange multipliers, multivariable optimization with inequality constraints, Kuhn – Tucker conditions.

**UNIT III: INTRODUCTION TO LINEAR PROGRAMMING**

Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, big M-method, dual simplex algorithm.

**UNIT IV: TRANSPORTATION PROBLEM AND CONVEX PROGRAMMING**

Finding initial basic feasible solution by North–West corner rule, least cost method and Vogel's approximation method, Assignment problems, variants, Integer Programming, Branch and bound technique, Convex programming.

**UNIT V: UNCONSTRAINED NONLINEAR PROGRAMMING:**

One–dimensional minimization methods: Classification, Fibonacci method, Problems and Quadratic interpolation method, Problems.

**UNIT VI: UNCONSTRAINED OPTIMIZATION TECHNIQUES**

Univariate method, Problems, Powell's Method, Conjugate directions, Algorithms, Problems, Steepest Descent (Cauchy) Method, Problems.

**UNIT VII: CONSTRAINED NONLINEAR PROGRAMMING**

Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods.

**UNIT VIII: DYNAMIC PROGRAMMING**

Dynamic programming, multistage decision processes, types, concept of sub optimization and the principle of optimality, computational procedure in dynamic programming, examples illustrating the calculus method of solution, examples illustrating the tabular method of solution.

**TEXT BOOKS:**

1. S. S. Rao, *Engineering optimization: Theory and practice*, 3 ed, New Age International (P) Limited, 1998.
2. Dr. S.D. Sharma, *Operations Research*, Kedarnath Ram Nath and Co. Publications, Meerut, 2003.

**REFERENCE BOOKS:**

1. H.A. Taha, *Operations Research: An Introduction*, 6 ed, PHI Pvt. Ltd.
2. Kanthi Swaroop, Gupta and Mohan, *Introduction to Operations Research*, 2006.

**UNIT-I: INTRODUCTION**

An overview of 8085, Architecture of 8086 microprocessor, Register organization, 8086 flag register and functions of 8086 flags, Addressing modes of 8086, Instruction set of 8086, Assembler directives, Simple programs, Procedures and Macros.

**UNIT-II: ASSEMBLY LANGUAGE PROGRAMMING**

Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

**UNIT-III: ARCHITECTURE OF 8086 AND INTERFACING**

Pin configuration of 8086-Minimum mode and maximum mode of operation, Timing diagram, Memory interfacing to 8086 (static RAM and EPROM), Need of Direct Memory Access (DMA), DMA data transfer method, Interfacing with 8237/8257.

**UNIT-IV: PROGRAMMABLE INTERFACING DEVICES**

8255 PPI-various modes of operation and interfacing to 8086. Interfacing keyboard, displays, 8279, stepper motor and actuators. D/A and A/D converter interfacing.

**UNIT-V: INTERRUPTS AND PROGRAMMABLE INTERRUPT CONTROLLERS**

Interrupt structure of 8086, Interrupt Vector table, Interrupt service routines, Introduction to DOS and BIOS interrupts, 8259 PIC architecture and interfacing cascading of interrupt controller and its importance, Programming with 8259.

**UNIT-VI: SERIAL DATA TRANSFER SCHEMES**

Asynchronous and synchronous data transfer schemes, 8251 USART architecture and interfacing, TTL to RS232C and RS232C to TTL conversion, Sample programs for serial data transfer, Introduction to high-speed serial communications standards, USB.

**UNIT-VII: ADVANCED MICROPROCESSORS**

Introduction to 80286, Salient Features of 80386, Real and Protected Mode, Segmentation and Paging, Salient Features of Pentium, Branch Prediction, Overview of RISC Processors.

**UNIT-VIII: 8051 MICROCONTROLLER AND ITS PROGRAMMING**

Architecture of microcontroller - 8051 Microcontroller - internal and external memories -counters and timers - synchronous serial-cum asynchronous serial communication-interrupts. Addressing modes of 8051, Instruction set of 8051, Assembly Language Programming examples using 8051.

**TEXT BOOKS:**

1. A.K. Ray and K.M.Bhurchandi, *Advanced microprocessor and peripherals*, Tata Mc-Graw Hill Edition, 2<sup>nd</sup> Edition, 2000.
2. Kenneth J. Ayala, *The 8051 Microcontroller architecture, programming & applications*, Pearson, 2<sup>nd</sup> Edition.

**REFERENCE BOOKS:**

1. Douglas V.Hall, *Microprocessors Interfacing*, 2<sup>nd</sup> Edition, 2007.
2. Walter A. Triebel, Avtar Singh, *The 8088 and 8086 Microprocessors*, PHI, 4<sup>th</sup> Edition, 2003.
3. Liu and GA Gibson, *Micro computer system 8066/8088 family Architecture, programming and Design*, PHI, 2<sup>nd</sup> Edition.
4. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems*, PHI, 2000.
5. Deshmukh, *Microcontrollers*,Tata Mc-Graw Hill Edition, 2004.

**UNIT-I: INTRODUCTION TO OBJECT ORIENTED PROGRAMMING**

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 (new and delete).

**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, data types, 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**

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

**UNIT-VI: MULTITHREADING AND APPLETS**

Differences between multithreading 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 – scroll pane, dialogs, menu bar, 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, Waite Group's *Object-Oriented Programming in C++*, 3<sup>rd</sup> Edition, 2007.
2. Herbert schildt, *Java- the complete reference*, 7<sup>th</sup> editon, TMH, 5<sup>th</sup> Reprint 2008.

**REFERENCE BOOKS:**

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

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.

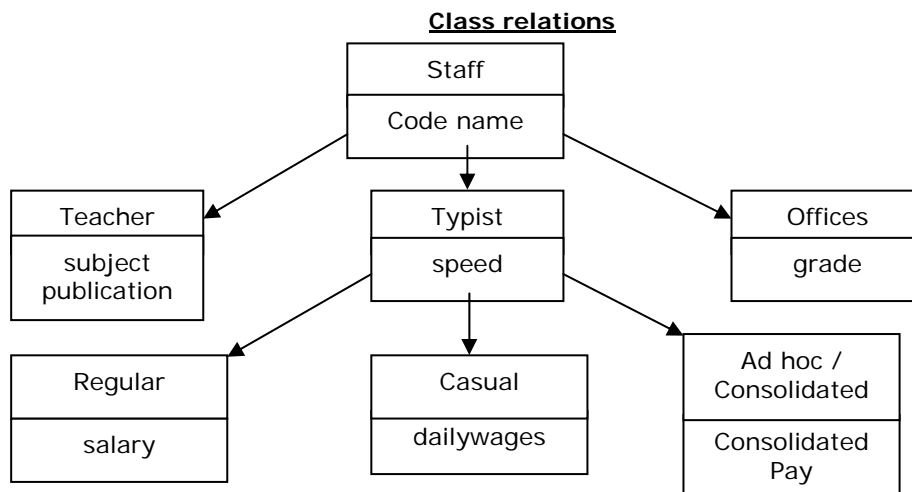
2.a) Write a program in C++ to perform the following using the function template concepts.

- a. To read a set of integers
- b. To read a set of floating point numbers
- c. 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.



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:

$$\text{Area of rectangle} = x * y$$

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

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 relation ship holds true.

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.

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).
- 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.
- 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.
- 9.a) Write a program that converts from 24-hour time to 12-hour time. Define an exception class Illegal Time Format, 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.
- 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.
- 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.
- 12.a) Write a Java program for handling Mouse Events.
- b) Write a Java program for handling Keyboard Events.
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.

**I. Microprocessor 8086:**

1. Introduction to MDS
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

**II. Interfacing:**

1. 8259 – Interrupt Controller: Generate an interrupt using 8259.
2. 8279 – Keyboard Display: Write a small program to display a string of characters.
3. 8255 – PPI: Interfacing DAC, Stepper Motor, ADC.
4. 8251 – USART: Write a program in ALP to establish Communication between two processors.

**III. Microcontroller 8051**

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.