**computer organization**

**UNIT I**

**Basic Computer Organization:** Functions of CPU,I/O Units,Memory.**Instrcution**: Instruction formats- One address, Two addresses, Zero addresses and three addresses and comparison. Addressing modes with numeric examples. Program control-Status bit conditions, conditional branch instructions, program Interrupts: Types of Interrupts.

**UNIT II**

**INPUT-OUTPUT ORGANIZATION:** Input-Output Interface, I/O Bus and Interface modules: I/O Vs memory Bus, Isolated Vs Memory-Mapped I/O.Asynchronous data transfer-Strobe Control, Hand Shaking: Asynchronous. Serial transfer-Asynchronous Communications interface, Modes of transfer.

Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA Transfer, IOP-CPU-IOP Communication, Intel 8089 IOP

**UNIT-III**

**Memory Organizations**

Memory hierarchy, Main Memory, RAM,ROM Chips, Memory Address Map, Memory Connection to CPU,associate memory, Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time, associative, set associative ,mapping, waiting into cache, Introduction to virtual memory.

**UNIT-IV**

**8086 CPU Pin Diagram-** Special functions of general purpose registers, Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

**UNIT-V**

**8086-Instruction formats:** assembly Language Programs involving branch & Call instructions, sorting ,evaluation of arithmetic expressions.

**TEXT BOOKS:**

**T1: *’Computer System Architecture’*** – M.Morris Mano.(UNIT-1,2,3)

**T2:** **Advance d Micro Processor and Peripherals**-Hall/A K Ray(UNIT-4,5)

**REFERENCE BOOKS:**

**R1:** Stallings William, ***‘ComputerOrganization & Architecture’*** - VI Edition.PHI/Pearson

**R2:** Tanenbaum Andrew S, ***’Structured computer Organization’*** -IV Edition.PHI/Pearson

**R3:** Sivaraama Dandamudi Springer, ***’Fundamentals of Computer Organization and Design’*** -Int.Edition.

**R4:** John L. Hennessy and David A. Patterson, ***‘Computer Architecture a quantitative Approach’*** -4th Edition Elsevier

 **Design and Analysis of Algorithms**

 **UNIT – I**

**Introduction:** Algorithm, pseudo code for expressing algorithms, performance analysis, space complexity, time complexity, asymptotic notation, big oh notation, omega notation, theta notation, and little oh notation, probabilistic analysis, amortized analysis.

**Divide and conquer**: general method, applications, binary search, quick sort, merge sort, strassen’s matrix multiplication

**UNIT-II**

**Searching and Traversal Techniques:**  Efficient non-recursive binary tree traversal algorithms, Disjoint set operations, union and find algorithms, spanning trees, graph traversals- breadth first search and depth first search, AND/OR graphs, game trees, connected components, biconnected components.

**UNIT – III**

**Greedy method:** general method, applications - job sequencing with deadlines, 0/1 knapsack problem, minimum cost spanning trees, single source shortest path problem.

**Dynamic programming**: general method, applications - multi stage graphs, optimal binary search trees, 0/1 knapsack problem, all pairs shortest path problem, travelling sales person problem, reliability design.**UNIT – IV**

**Backtracking:** general method, applications - n-queen problem, sum of subsets problem, graph colouring, Hamiltonian cycles.

**Branch and Bound**: general method, applications - travelling sales person problem, 0/1 knapsackproblem. LC branch and bound solution, FIFO branch and bound solution.

**UNIT – V**

**NP-hard and NP-complete problems**: basic concepts, non deterministic algorithms, NP-hard and NP-complete classes, NP-hard problems, Cook’s theorem.

**SUGGESTED BOOKS**

**TEXT BOOKS:**

T1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of ComputerAlgorithms, Galgotia publishers

T2. ParagHimanshu Dave, HimanshuBhalchandraDave, Design and Analysis algorithmsPearson Publication

T3. M.T. Goodrich, Robert Tamassia, Algorithm design: Foundations, Analysis and Internetexamples, Wiley student Edn, John Wiley & sons

**REFERENCE BOOKS:**

R1. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 2nd Edn,Pearson Education

R2. R C T Lee, Hang and TT Sai, Introduction to Design and Analysis of Algorithms, Astrategic approach, TMH

R3. Allen Weiss, Data structures and Algorithm Analysis in C++, 2nd Edn, PearsonEducation

R4. Aho, Ullman and Hopcroft, Design and Analysis of Algorithms, Pearson Education

R5. Richard Johnson Baugh, and Marcus Schaefer, Algorithms, Pearson Education

**Data Base Management Systems**

**UNIT I**

Introduction-Data base System Applications, Purpose of Data base System , View of Data – Data Abstraction ,Instances and Schemas ,Data Models , Database Languages – DDL , DML ,Database Access from Applications Programs, Transaction Management ,Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design and ER diagrams ,Beyond ER Design, Entities, Attributes and Entity sets ,Relationships and Relationship sets , Additional features of ER Model , Conceptual Design for Large enterprises. Relational Model :Introduction to Relational Model, Integrity Constraint Over relations ,Enforcing Integrity constraints , Querying relational data , Logical data base Design ,Introduction to Views – Destroying /altering Tables and Views.

**UNIT II**

**Relational Algebra and Calculus:** Selection and projection, Set operations ,Renaming ,Joins ,Division ,Examples of Algebra overviews , Relational calculus , Tuple relational Calculus ,Domain relational calculus , Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries , Introduction to Nested Queries ,Correlated Nested Queries , Set – Comparison Operators , Aggregative Operators , NULL values ,Comparison using Null values , Logical connectives, AND, OR and NOT – Impact on SQL Constructs ,Outer Joins ,Disallowing NULL values ,Complex Integrity Constraints in SQL Triggers and Active Data bases.

**UNIT III**

Introduction to Schema Refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition , Functional Dependencies – FIRST, SECOND, THIRD Normal forms – BCNF – Properties of Decomposition-Lossless join Decomposition , Dependency preserving Decomposition ,Schema refinement in Data base Design , Multi valued Dependencies – FORTH Normal Form, Join Dependencies, FIFTH Normal Form, Inclusion Dependencies.

**UNIT IV**

Transaction Management: Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for Serializability.

Concurrency Control: Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

Recovery System: Failure Classification-Storage Structure Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

**UNIT V**

**Overview of Storage and Indexing:** Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations .

Tree Structured Indexing: Intrusions for Tree Indexes, Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable Hashing, Linear Hashing, Extendable vs Linear Hashing.

**TEXT BOOKS:**

1. “***Data base Management Systems”***, Raghu RamaKrishnan, Johannes Gehrke, TATA

 McGrawHill 3rd Edition, 2003.

2. ***“Data base System Concepts” ,*** *A****.***Silberschatz, Korth, S.Sudarshan McGraw hill, VI edition, 2006.

**REFERENCE BOOKS:**

1***.”Database Systems”***,6th edition, Ramez Elmasri, Shamkant B,Navathe ,Pearson Education, 2013.

2. **”*Database Principles, Programming and Performance”***, P.O.Neil, E.O.Neil, 2nd Edition, ELSEVIER.

3. ***“Data base Systems Concepts”,*** Peter Rob & Carlos Coronel, Cengage Learning, 2008.

 7th Edition

4.***”Database Systems”***, A Practical approaches to Design Implementation and management fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.

5. ***“Fundamentals of Relational Database Management systems”***, S.Sumathi, S.Esakkiarajan, Springer.

6. ***“Database Management System Oracle SQL and PL/SQL”,*** P.K.Das Guptha, PHI.

7. ***“Introduction to Database Management “***, M.L.Gillenson and others, Wiley Student Edition.

8. ***“Database Development and Management”,*** Lee Chao, Auerbach publications, Taylor & Francis Group.

9. ***“Introduction to Database Systems”***, C.J.Date, Pearson Education.

10. ***“Database Management System”,*** G.K.Guptha, TMH.

**Formal Languages and Automata Theories**

**UNIT I :**

**Fundamentals :**Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

**Finite Automata :** NFA with Î transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without Î transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM’s, Finite Automata with output- Moore and Melay machines.

**UNIT II :**

**Regular Languages :** Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required).

**Grammar Formalism :** Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

**UNIT III :**

**Context Free Grammars :** Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

**Push Down Automata :** Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

**UNIT IV :**

**Turing Machine :** Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church’s hypothesis, counter machine, types of Turing machines (proofs not required). linear bounded automata and context sensitive language.

**UNIT V :**

**Computability Theory :** Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

**TEXT BOOKS :**

1. “Introduction to Automata Theory Languages and Computation”. Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation – Sipser 2nd edition Thomson

**REFERENCES BOOKS:**

1. Introduction to Forml languages Automata Theory and Computation Kamala Krithivasan Rama R.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory Of Computation: A Problem - Solving Approach, Kavi Mahesh, Wiley India Pvt. Ltd.
4. “Elements of Theory of Computation”, Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.

**Java Programming**

**UNIT-I**

**OOP concepts -** Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms.

**Java programming -** History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT-II**

**Inheritance -** Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

**Polymorphism -** dynamic binding, method overriding, abstract classes and methods.

**Interfaces -** Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interfaces.

**Inner classes -** uses of inner classses, local inner classes, anonymous inner classes, static inner classes, examples.

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

**UNIT-III**

**Exception handling -** Dealing with errors, benefits of execution handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

**Multithreading -** Difference between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, procedure consumer pattern.

**UNIT-IV**

**Collection Framework in Java -** Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calender and Properties

**Files -** streams - byte streams, character streams, text input/output, binary input/output, random access file operations, File managament using File class.

**Connecting to Database -** JDBC Type 1 to 4 drives, connecting to a database, querying a database and processing the results, updating data with JDBC.

**UNIT-V**

**GUI Programming with Java -** The AWT class hierarchy, Introduction to Swing, Swing vs, AWT, Hierarchy for Swing components, Containers - JFrame, JApplet, JDialog, JPanel, Overview of some swing components Jbutton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types - border, grid and flow

**Event handling -** Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listerners, Delegation event model, Examples: handling a buttong click, handling mouse events, Adapter classes.

**Applets -** Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

**TEXT BOOKS:**

1. Java Fundamentals - A comprehensive Introduction, Herbet Schidt and Dale Srien, TMH.

**REFERENCES BOOKS:**

1. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education (OR) Java: How to Program P.J. Deitel and H.M. Deitel, PHI.
2. Object Orientd Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson  Education
4. Programming in Java, Bruce Eckel, Pearson Education
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.