THEORY OF COMPUTAION

UNIT- I Finite Automata

- Basic Mathematical Notation and techniques
- Finite State systems
- Basic Definitions
- Finite Automaton
- DFA and NDFA
- Finite Automaton with €- moves
- Regular Languages
- Regular Expression
- Equivalence of NFA and DFA
- Equivalence of NDFA's with and without €-moves
- Equivalence of finite Automaton and regular expressions
- Minimization of DFA
- Pumping Lemma for Regular sets
- Problems based on Pumping Lemma

PART- A

- What does N represent in the Grammer G = (N, T, P, S)?
- Find out the values of Rϵ = ϵR = ?
- Which is used to find all the states which can be reached from the present state on one or more epsilon transition
- Fin out the value of R^+ U {ϵ} = ?

❖ Define Grammer
❖ State any one difference between NFA and DFA
❖ Write the language form (expanded form) for the corresponding regular expression (r)= 0*1
❖ Which is used to fund all the states which can be reached from the present state on one or more epsilon transitions?
❖ Define DFA
❖ Find out the value of R* - {ϵ} =?

PART- B

- Show NFA for b(a|b)*a
- Explain left linear regular grammar for generating any binary numbers
- Show minimal DFA directly from regular expression (r) = (a|b)*ab

- Interpret whether the languages L= $\{O^n1^n2^n \mid n>=1\}$ is a regular language or not using pumping lemma.

❖ What is regular expression? Explain its properties
❖ Find whether the language L= $\{a^nb^m \mid n, m>=1\}$ is regular set or not. Justify your answer.
❖ Find whether the language L= $\{0^{2n} \mid n>=1\}$ is regular set or not. Justify your answer.
❖ Show that case-I (k=0) and case-II (k>0) equations for converting from finite automata to regular expression.
❖ Interpret whether the language L= $\{a^nb^{2n} \mid n>=1\}$ is a regular language or not using Pumping Lemma, Justify your answer.

PART- C

- Show the language form(expanded form) for following regular expressions:
  - b | a
  - ba
  - b*a*
  - (b|a)*
- Construct NFA, DFA and Minimal DFA for the regular expression r = (a|b)

❖ Construct NFA, DFA and minimal DFA for the regular expression (r) = aab*
❖ Discuss the equivalence of finite automaton and regular expressions with an example for each
❖ Construct NFA, DFA and minimal DFA for the regular expression (r) = ab*a
❖ Convert the Regular expression (0|1)*(00|11)(0|1)* to NFA

UNIT- II Grammers

- Grammar Introduction
- Types of Grammar
- Context Free Grammars and Languages
- Derivations and Languages
- Ambiguity
- Relationship between derivation and derivation trees
- Simplification of CFO
- Elimination of Useless symbols
- Unit productions
- Null productions
- Greibach Normal form
- Chomsky normal form
- Problems related to CNF and GNF

PART- A

- Ambiguous grammer
- Structure of Parse Tree
- General structure of CNF
- LMD vs RMD

❖ Which of various/symbol is the root of the parse tree?
❖ Name the production whose form is A->B, where A and B are non-terminals
❖ Which of the grammar with more than one parse tree
❖ Name the grammar is having the following format: α -> β, where α and β can be anything.
❖ State any one difference between ambiguous grammar and unambiguous Grammer.

PART- B

- Translate the following given grammar into Chomsky Normal Form (CNF)
  - S -> bA | aB
  - A -> bAA | aS | a
  - B -> aBB | bS | b
- Greibach Normal Form (GNF) with example
- Ambiguous vs Unambiguous grammer
- Leftmost derivation and rightmost derivation for a sentence (a+b)*c for the given grammar
  - P -> P+ Q | Q
  - Q -> Q * R | R
  - R -> (P) |a|b|c

- Write the steps for eliminating useless symbols in CFG.
- Eliminate null(ϵ) productions for the following CFG grammar.
  - S -> AaB | aaB
  - A -> ϵ
  - B -> bbA | ϵ
- Eliminate the unit projections for the following context free grammar(CFG)
  - S -> AB
  - A -> a
  - B -> C|b
  - C -> D
  - D -> E
  - E -> a

- Write the steps for eliminating Null(ϵ) productions in CFG
- Translate the following grammar into Chomsky Normal Form(CNF) and show the answer
  - S -> AB
  - A -> aAb | aA | a
  - B -> aBb | bB | b
- Show the elimination of null (ϵ) productions for the following CFG grammar? Show your answers
  - S -> AB
  - A -> aAA | ϵ
  - B -> bBB | ϵ

PART- C

- Leftmost derivation, Rightmost derivation and parse tree for sentence c*c-d*d for the grammer E -> E – E | E * E | c | d
- Leftmost derivation, Rightmost derivation and parse tree for sentence a^a+b^b for the grammer S -> S+S | S^S | a | b

- Build the Leftmost Derivation, Rightmost Derivation and parse tree for a sentence (a*a) + (b/b) for the given grammer
  E -> E + E | E - E | E * E | E / E | (E) | a | b
- Construct GNF for the following the context free grammar using Lemma1 and Lemma2
  - A1 -> A2A1 | a
  - A2 -> A1A2 | b
- Consider the grammar
  - S -> aB | bA
  - A -> a | aS | bAA

- B -> b | bS | aBB

For the string ‘aaabbabbba’ find a leftmost, rightmost derivation and parse tree

- Construct GNF for the following the context free grammar using Lemma1 and Lemma2
  - A1 -> A2A3
  - A2 -> A3A1 | b
  - A3 -> A1A2 | a

UNIT- III Pushdown Automata

- Moves
- Instantaneous descriptions
- Deterministic pushdown automata
- Equivalence of Pushdown automata and CFL
- Pumping lemma for CFL
- Problems based on pumping Lemma.

PART- A

- PDA
- Which data structure used in PDA
- When PDA said to be deterministic

❖ when a string will be accepted by a PDA?
❖ What are elements of Instantaneous Description of PDA?

PART- B

- Show the general push and pop rules for construction of PDA for context free grammer
- Draw the transition diagram of PDA L = $\{0^n1^m \mid n, m >= 1\}$
- Show that L= $\{a^nb^mc^mc^n \mid n, m>=1\}$ is context free language or not using pumping lemma
- Components of PDA briefly

❖ Find whether the language L = $\{0^n1^n2^n \mid n>=1\}$ is context free or not. Justify your answer.
❖ Discuss the operations of Deterministic PDA
❖ Discuss the operations of non-deterministic PDA
❖ What are the components of PDA
❖ Find the transition diagram for L=$\{a^nb^m \mid n,m >= 1\}$

PART- C

- Apply push and pop rules to construct PDA for the CFL L = $\{wcw^R \mid w\epsilon(a \mid b)^*\}$ with transition diagram. Test whether the string 'abbcbba' is in L
- Apply push pop rules to construct a PDA for the CFL with transition function (ID). Test whether the string '(a+b)*(c-d)' is in CFG using stack
  - E -> E + F | E – F | F
  - F -> F * G | F / G | G
  - G -> (E) |a | b | c | d

- Construct PDA for CFL L = {ww^R | w ϵ (0 | 1)*} with transition function and transition diagram. Test whether the string '110011' is in L
- Design a PDA for following CFG with transition function. Test whether the string 'id-id/id' is in CFG
  - S -> S – Y | Y
  - Y -> Y / Z | Z
  - Z -> (S) | id
- Construct PDA for CFL L = {wcw^R | w ϵ (0 | 1)*} with transition function and transition diagram. Test whether the string '110c011' is in L
- Design a PDA for following CFG with transition function. Test whether the string 'id+id*id' is in CFG
  - A -> A + B | B
  - B -> B * C | C
  - C -> (A) | id
- Apply push and pop rules to construct a PDA for the following CFG with transition function (ID). Test whether the string 'aabaaa' is in CFG
  - S -> aAA
  - A -> aS | bS | a

UNIT- IV Turing Machines

- Definitions of Turing machines
- Models
- Computable languages and functions
- Techniques for Turing machine construction
- Multi head and Multi tape Turing Machines
- The Halting problem
- Partial Solvability
- Problems about Turing machine
- Chomsky hierarchy of languages

PART- A

- Various field of transition function / table of Turing Machine
- Operation of turing machine
- Use of subroutine in multiplication of two numbers

❖ State any one difference between multi head and multi tape Turing machines
❖ ~~Define Chomsky hierarchy~~
❖ State any one difference between PCP and modified PCP
❖ Give any two examples for undecidable problems
❖ Define multi tape Turing machine

PART- B

- Show the multiple tracks to find whether the given number 5 is prime or not
- Explain the post correspondence problem

❖ Explain halting problem with example
❖ Show the uses of subroutine in Turing machine
❖ Classify the components of Turing machine

PART- C

- Construct a Turing Machine for multiplication (m * n) of two numbers with transition table and transition diagram
- Construct a Turing Machine for proper subtraction of two numbers with transition table and transition diagram

❖ Construct the Turing machine with multi head and multi tape with their structures and operations

- Apply the different techniques for construction of Turing machine with their structures and operations

UNIT- V Unsolvable Problems and Computable Functions

- Primitive recursive functions
- Recursive and recursively enumerable languages Universal Turing machine
- Measuring and Classifying Complexity
- Tractable and lnTractable problems
- Tractable and possibly intractable problems
- P and NP completeness
- Polynomial time reductions.

PART- A

- Which machine can be used to simulate any Turing Machine
- What is recursively enumerable language

- ❖ If both a language L and its complement L' are recursively enumerable, then what is L?
- ❖ Show that the union of two recursive language is recursive
- ❖ When we say a problem is decidable?
- ❖ Mention the different between P and NP problems

PART- B

- Show that is a language L and its complement of L are both recursively enumerable, then L is recursive
- Show that the union of two recursive languages is recursive

- ❖ Compare tractable and intractable problems
- ❖ Show that the both language L and it's complement L' are recursively enumerable, and union of two recursively enumerable language is recursively enumerable
- ❖ What is recursively enumerable language?
- ❖ State primitive recursive function. Give an example.

PART- C

- ❖ Construct a universal Turing machine with its structure and operations
- ❖ Design a deterministic Turing machine to solve a polynomial time problem with an example
- ❖ Design a deterministic Turing machine to solve a polynomial time problem with an example
- ❖ Design a Turing machine to solve following problems
  - The complement of a recursive language is recursive
  - The union of two recursive language is recursive
  - If a language L and its complement of L are both recursively enumerable, the L is recursive

COMPUTER GRAPHICS AND MULTIMEDIA

UNIT- I Introduction

- Overview of Graphics System
- Coordinate Representation
- Graphics Output Primitives
- Attributes of Graphics Primitives
- Implementation Algorithms for Graphics Primitive
- Introduction to OpenGL- OpenGL functions for Graphics Primitives.

PART- A

- Types of output devices used in CG
- Expand GUI
- What is interactive CG
- Types of line drawing algorithm
- Which is used to compose the vector graphics?
- Aspect ratio
- File format used to represent an image
- Which is used to represents the quality of an image in CG

❖ What are the attributes of line?
❖ List the disadvantages of DDA algorithm
❖ Recall the types of computer graphics
❖ Define computer graphics
❖ What do you mean by emissive and non-emissive display

PART- B

- Pixel and resolution
- Applications of CG
- Vector vs Raster graphics
- Hardware devices used for CG
- Output primitives
- Points and lines in the CG system
- 8-way symmetry of circle
- Window and viewport

❖ Differentiate simple DDA and symmetrical DDA
❖ Differentiate Emissive and non-emissive display

- Compare bresenham's and DDA algorithm
- Explain opengl command format briefly

PART- C

- DDA algorithm to rasterize the line from (0, 0) to (4, 6)
- Bresenham's algorithm to rasterize the line from (5, 5) to (13, 9)

- Explain in detail about Midpoint Circle Drawing Algorithm with suitable example
- Illustrate the working principle of CRT with neat diagram
- Identify the various attributes of Line and Circle primitives
- Explain DDA line drawing algorithm in detail
- Explain the attributes of output primitives in detail
- Explain shadow mask and Beam penetration technique

UNIT- II 2D Concepts

- 2D Transformations
- 2D Viewing
- Window Viewport Transformation
- Line, Polygon, Curve and Text Clipping Algorithms
- OpenGL Functions for 20 Transformations and 2D Viewing

PART- A

- Define text clipping
- What is meant by viewing
- Define translation
- List the use of clipping
- Define clipping
- What is reflection?

PART- B

- What are the types of parallel projection
- What are the various Text Clipping Method
- Infer translation, rotation and scaling
- Explain concept of vanishing points
- What is reflection and shearing
- How will you clip a point? Point out.

PART- C

- Construct a triangle ABC whose coordinates are A(1,1), B(5,2), C(4,3)
  - Reflect the given triangle about x and y axis
  - Reflect the triangle about Y=X and X=Y axis

  In each case find the coordinates of reflected triangle
- Build a Sutherland Hodgeman polygon clipping algorithm with suitable example
- Explain the various text clipping
- Demonstrate to translate the polygon with co-ordinates A(2,5), B(7,10), C(10,2) by 3 units in x direction and 4 units in y direction
- Solve that the multiplication of transformation matrices for each of the following sequences is commutative:
  - Two successive rotations
  - Two successive translations
- Discuss window to viewport transformation

UNIT- III 3D Concepts

- 3D Transformations
- 3D Viewing
- 3D Object Representations
- Spline Representation
- Visible Surface Detection Methods
- Color Models
- OpenGL Functions for 3D Transformations and 3D Viewing

PART- A

- Properties of Beizer curve
- Projection
- Surface path

❖ How do you represent sphere in 3D?
❖ What is Blobby object?
❖ Name the important properties of Bezier curve
❖ Define projection
❖ Define primary colors
❖ Define B-spline curve

PART- B

- Use of projection reference point
- Advantages of B-spine over Bezier curve
- Color look up table
- YIQ color model

❖ Define XYZ color model
❖ What are the steps involved in 3D transformation
❖ Illustrate the use of projection reference point
❖ Summarize the color lookup table
❖ Compare orthographic projection and oblique parallel projection
❖ Explain scaling and translation in 3D transformations.

PART- C

❖ Explain about additive and subtractive color models in detail
❖ Explain 3D transformation with suitable example
❖ Explain in detail about conversion between HSV and RGB color models
❖ Explain any two visible surface algorithms in detail

- Explain about parallel projection
- Describe RGB and CMY color models

UNIT- IV Multimedia Systems Design

- Multimedia Basics
- Multimedia Applications
- Multimedia System Architecture
- Evolving Technologies for Multimedia
- Defining Objects for Multimedia Systems
- Multimedia Dam Interface Standards
- Multimedia Databases.

PART- A

- Data objects used in multimedia systems
- Challenges in multimedia databases
- Component of multimedia databases

❖ Show the basic objects of multimedia
❖ Various elements of multimedia
❖ Applications of multimedia
❖ Define hypertext

PART- B

- Basic objects of multimedia

❖ Multimedia system architecture
❖ Data object used in multimedia
❖ Multimedia databases and its characteristics
❖ Optical character recognition
❖ File formats for multimedia systems

PART- C

- Evolving technologies for multimedia systems
- Digital audio and voice in multimedia I/O technologies

❖ Multimedia applications
❖ Multimedia system architecture of as multimedia workstation environment
❖ Elements of multimedia
❖ Explain the defining objects for multimedia systems

UNIT- V Multimedia File Handling and Hypermedia

- Compression and Decompression
- Data and File Format Standards
- Multimedia I/O Technologies
- Digital Voice and Audio
- Video image and Animation
- Full Motion Video
- Storage and Retrieval Technologies
- Multimedia Authoring and User interface
- Hypem1edia Messaging

PART- A

- Need for compression
- Types of file formats standards for data

❖ Lossless compression
❖ Multimedia I/O devices
❖ Types of file formats for data
❖ MPEG-2
❖ TIFF and RIFF
❖ Compression

PART- B

- Lossy and lossless compression technique
- Requirements of Full-Motion video controller
- Advantages of Hypermedia messaging

❖ Types of multimedia authoring systems
❖ How a file is compressed and decompressed
❖ Pros and cons of linking and embedding multimedia objects
❖ Show briefly about playback issues for image, audio and video objects
❖ Difference between GIF and JPEG
❖ Define animation tool

PART- C

- Full motion video authorizing system
- Hypermedia linking and embedding

- Examine a TIFF file creating by a graphics package and identify the tags in it. Does these packets follow the TIFF5 or TIFF6 standards
- Design TWAIN architecture with neat diagram. Mention the specification, objectives and benefits of TWAIN architecture.
- Discuss about Hypermedia message components
- Discuss video image and animation technique

COMPUTER NETWORKS

UNIT- I Data Communication Components

- Representation of data and its flow Networks
- Various Connection Topology, Protocols and Standards
- OSI model
- Transmission Media
- LAN
  - Wired LAN
  - Wireless LANs
  - Connecting LAN
  - Virtual LAN
- Techniques for Bandwidth utilization:
  - Multiplexing
  - Frequency division
  - Time division
  - Wave division
- Concepts on spread spectrum

PART- A

- Advantages of star topology
- Citeria necessary for efficient network
- Different physical media
- Characteristics of radio waves

❖ Routing operates at the which layer of the OSI model?
❖ Convert 95 decimal to octal
❖ If 10 devices are arranged in a mesh topology, how many cables and ports are needed for each device?
❖ Why are protocol needed?
❖ Name the topology requires central controller or hub
❖ Which topology requires multiport connection?

PART- B

- OSI vs TCP/IP
- Key elements of protocols
- Fiber optic cable
- Usage and advantages of Spread Spectrum

- Define router, switch and hub
- Write about unguided communication method
- Difference between Wire LAN and Wireless LAN
- Define spread spectrum and its goal
- Explain about ring topology
- Virtual LAN

PART- C

- Unguided media
- Time division Multiplexing

- Explain how frequency division multiplexing help in improving bandwidth utilization
- Compare and contrast protocols and standards
- Discuss about Guide media in transmission line
- Explain the concept of synchronous time division multiplexing
- Illustrate LAN with its types
- Explain various techniques for bandwidth utilization

UNIT- II Data Link Layer and Medium Access Sob Layer

- Error Detection and Error Correction
- Block coding
- Hamming Distance
- CRC: Flow Control and Error control protocols
- Stop and Wait
- Go back- N ARQ
- Selective Repent ARQ
- Sliding Window
- Piggybacking
- Random Access
- Multiple access protocols
- Pure ALOHA
- Slotted ALOHA
- CSMAICD
- CDMA/CA

PART- A

- Responsibilities of data link layer
- Use of two-dimensional parity in error detection
- Purpose of hamming code
- Propagation delay

❖ Define burst error
❖ Minimum hamming code distance
❖ Define piggybacking and its usefulness
❖ ARQ

PART- B

- Principle of Error Detection and Correction
- Hamming distance with example
- Piggybacking and its advantages and disadvantages
- Flow control vs Error control

❖ Drawback of simplex protocol
❖ Pure aloha vs slotted aloha
❖ CRC with simple example
❖ Block coding

- Functions of Stop and Wait protocol

PART- C

- Hamming code
- Sliding windows flow control with example

- Outline the different methods of framing in data link layer
- Summarize the aspects of CSMA with collision detection protocol
- Discuss about sliding windows using Go Back N
- Apply Selective Repeat protocol, suppose frames through 0 to 4 have been transmitted. Now, imagine that 0 times out, 5 (a new frame) is transmitted, 1 time out, 2 times out and 6 (another new frame) is transmitted. At this point, what will be the outstanding packets in sender's window?
- Explain the concept of CSMA/CA
- Applying CSMA/CD, suppose nodes A and B are on same 10 Mbps Ethernet segment and the propagation delay between two nodes is 225 bit times. Suppose A and B send frames at t=0, the frames collide then at what time, they finish transmitting a jam signal. Assume a 48 bit jam signal.
- Explicate the hamming distance
- Enumerate the Flow control and Error control protocol

UNIT- III Network Layer

- Switching
- Logical addressing
- IPV4, IPV6
- Address mapping - ARP. RARP, BOOTP and DHCP-Delivery
- Forwarding and Unicast Routing protocols

PART- A

- In a block of addresses, we know the IP address of one host 25.34.12.5/16. What are the first (network address) and the last address in this block?
- Direct vs Indirect delivery
- Purpose of BGP

- How many bits are used for an IP address in IPV6?
- What is ARP protocol used for?
- Show the different between connectionless and connection-oriented services
- Recall the switching technique used in Traditional Telephone System
- Which level is the network layer in OSI model

PART- B

- Classful Addressing vs Classless Addressing
- Salient features of IPV6
- Autonomous system
- Distance vector routing vs Link state routing

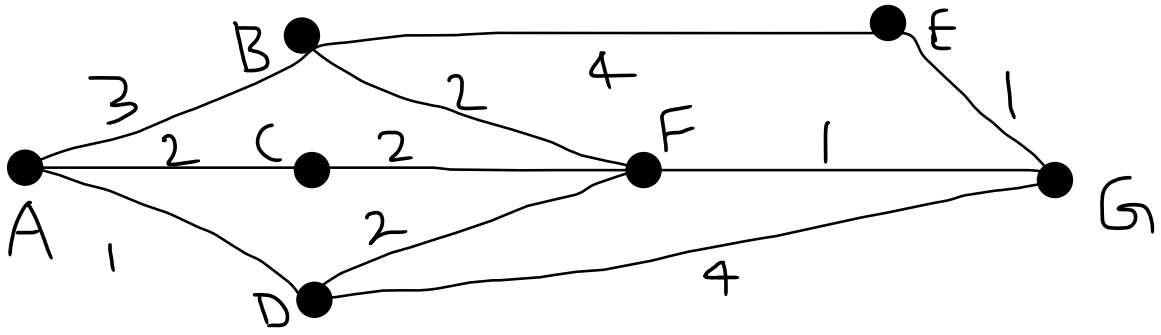
- Check whether 100.1.2.32 and 100.1.2.49 is a valid IP address block or not
- An organization requires 8 subnet each having at least 63 hosts. If the allotted IP address is 193.1.1.0 determine the class of IP address, default mask, subnet mask, number of subnet id bits and the broadcast address of the subnets.
- What is the mask in IPV4 addressing? What is the default mask in it?
- IP address depletion
- Types of Address mapping

PART- C

- Choose the subnet masks 255.255.254.0. for each subnet mask, find
  - Number of hosts per subnet
  - Number of subnets if subnet mask belongs to class A
  - Number of subnets if subnet mask belongs to class B

- Number of subnets if subnet mask belongs to class C
- Number of subnets if total 10 bits are used for the global network ID

- A router with IPV4 address 125.45.23.13 and Ethernet physical address 23:45:AB:4F:67:CD has received a packet for a destination with IP address 125.11.78.10. Show the entries in the ARP request packet sent by the router. Assume no subnetting
- The network uses a Link State Routing protocol. Construct a Shortest Path Tree for node A, using Dijkstra's algorithm



- ❖ Evaluate the merits of DHCP over BOOTP in dynamically assigning an IP address and other network configuration parameters to a host in a network
- ❖ Show how intra and inter-domain routing differs and explain distance vector routing in detail
- ❖ discuss briefly about Address Resolution protocol
- ❖ What is IPV4? explain.

UNIT- IV Transport Layer and Application Layer

- Process to Process Communication
- User Datagram Protocol (UDP)
- Transmission Control Protocol (TCP)
- SCTP Congestion Control
  - Quality of service
  - QoS improving techniques: Leaky Bucket and Token Bucket algorithm.
- Application Layer
  - Domain Name Space (DNS), DONS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls
  - Basic concepts of Cryptography

PART- A

- Reliable and Unreliable service
- UDP is a Message Oriented Protocol. TCP is Byte Oriented Protocol. If an Application needs to protect the Boundaries of it message, which Protocol should used, UDP or TCP
- General techniques to improve Quality of services

❖ Advantages of using UDP over TCP
❖ Round Trip Time
❖ How is cognition control and QoS related?
❖ Why was there a need for DDNS?
❖ Define cognition control
❖ What is meant by concatenation

PART- B

- SMTP
- Leaky and Token bucket

❖ What is SCTP protocol
❖ How traffic shaping helps to improve QoS
❖ Compare TCP header and UDP header
❖ Discuss about firewalls
❖ Distinguish between UDP and TCP
❖ What is DNS?

PART- C

- Leaky bucket algorithm and how it’s used for traffic shaping

- Working of electronic mail. How SMTP used in e-mail applications

- ❖ Illustrate the relevance of various fields present in the TCP header
- ❖ Token bucket algorithm
- ❖ QoS improving techniques
- ❖ Infer file transfer protocol

UNIT- V Services Mechanism

- Attacks
- The OSI security architecture
- Network security model
- Classical Encryption techniques (Symmetric cipher model. substitution techniques, transposition techniques, steganography)
- Finite Fields and Number Theory: Groups, Rings, Fields-Modular arithmetic
- Euclid's algorithm
- Finite fields
- Polynomial Arithmetic
- Prime numbers
- Fermat's and Euler's theorem
- Testing for primality
- The Chinese remainder theorem
- Discrete logarithms

PART- A

- Abelian group
- Example for Ring

❖ Classify the category of passive and active security attacks
❖ Illustrate the two basic functions used in encryption algorithm
❖ What is decryption?
❖ What is proxy firewall?

PART- B

- Illustrate that the GCD of two co-prime numbers is equal to one using Euclid's algorithm.
- Find $\theta(165)$ using Euler's Totient function

❖ Describe about network security model
❖ Illustrate using Fermat's theorem to find a number x between 0 and 37 with x^{73} congruent to 4 modulo 37
❖ Describe symmetric cipher model
❖ Write short notes on Steganography

PART- C

❖ Summarize the different types of Active and Passive attacks

- Demonstrate how substitution techniques and transposition techniques are used as a network security mechanism
- Explain any 5 concepts of substitution technique. Give example for each
- Discuss about finite fields and polynomial arithmetic with example
- Briefly explain the classical encryption techniques
- Explain about Euclid's Algorithm

MICROPROCESSORS

UNIT- I Introduction to 8086

- Microprocessor architecture
- Addressing modes
- Instruction set and assembler directives
- Assembly language programming
- Modular Programming
- Linking and Relocation
- Stacks
- Procedures
- Macros
- Interrupts and Interrupt service routines
- Byte and String Manipulation

PART- A

- Segment registers of 8086 microprocessor
- Role of BUI
- Register addressing mode
- FAR and NEAR assembler directives

❖ Significance of lock signal in 8086
❖ What is modular programming?
❖ Role of assembler
❖ Define immediate addressing

PART- B

- Purpose of various flags in the flag register of 8086 microprocessor
- Assembly language program to add two numbers of 16-bit data
- Steps involved in the execution of CALL and RET instructions
- Procedure vs Macro

❖ How the 20-bit effective address is calculated in 8086 processor?
❖ Disadvantage of modular programming
❖ Write an assembly language program to multiply two 16-bit data

PART- C

- Addressing mode of 8086 microprocessor
- Internal architecture of 8086 microprocessor

- Summarize the assembler directives in 8086
- Explain the ALP development tools and modular programming in detail
- Explain linking and relocation
- Write an ALP to multiply 2 16-bit data

UNIT- II 8086 Processor

- 8086 Architecture
- Basic Configuration
- 8086 Minimum and Maximum mode configurations
- Addressing modes
- Basic Instructions
- System bus timing
- System design using 8086
- IO programming
- Introduction to Multiprogramming
- System Bus Structure
- 8086 Interrupts
- Assembly levels programming
- Introduction to 80186 - 80286 - 80386 - 80486 and Pentium processors

PART- A

- Two-byte manipulation instruction
- Single-step interrupt
- Role of NMI pin in 8086
- Uses of Timing Diagram

❖ What is Interrupt service routine
❖ Define software interrupt
❖ What is the drawback in memory mapped I/O
❖ Define fetch and execute cycle
❖ Specify the purpose of stack
❖ How multiprogramming supported by 8086?

PART- B

- Use of HOLD and HOLDA pin in minimum mode 8086
- Programmed IO data transfer scheme
- Timing diagram of memory read cycle in 8086
- The purpose of READY and RESET pin of 8086

❖ Compare byte or word I/O transfer with block I/O transfer
❖ Outline the feature of 80286 advanced microprocessor
❖ What is use of latch signal on AD0-AD15 bus in an 8086 system?
❖ Outline the features of 80386 advances microprocessor

❖ Timing diagram of memory write cycle in 8086

PART- C

- Maximum mode 8086 microprocessor system
- Minimum mode 8086 microprocessor system

❖ Draw and explain block diagram of 80186.

❖ Draw and explain the timing diagram for 8086 maximum mode input and out transfer

UNIT- III Interfacing

- Memory Interfacing and I/O interfacing
- Parallel communication interface
- Serial communication interface
- D/A and A/D Interface
- Timer
- Keyboard/display controller
- Interrupt controller
- DMA controller
- Programming and applications Case studies:
  - Traffic Light control, LED display, LCD display, Keyboard display Interface and Alarm Controller

PART- A

- Serial and parallel data transfer
- Function of mode-0 in 8255 IC
- Role of 8257
- Need of 8279

❖ What is synchronous data transfer?
❖ Use of 8251 chip
❖ Purpose of 8255 IC

PART- B

- Interfacing of memory with 8086 microprocessors
- Memory mapping and IO mapping of IO device
- Purpose of INTEL 8259A
- Timing diagram of mode-3 of INTEL 8254

❖ Write about simplex, duplex and half duplex in 8251
❖ Different types of input modes used in 8279
❖ Describe the memory interfacing with memory mapping
❖ Explain the timer-8254 with the functional block diagram

PART- C

- Programming 8254

❖ Design an ALP to interface a 7 LED display interface with 8051

- Develop ALP to keyboard and display interfacing using 8279 microprocessor
- Design an ALP to simulate the function of four ways using traffic light controller
- Develop an ALP to convert an analog signal to digital signal interfacing in 8086 microprocessor
- Demonstrate the interface of 8255 with 8086
- Explain the programmable serial communication interface – 8251A

UNIT- IV Microcontroller

- Architecture of 8031/8051
- Special Function Registers (SFRs)
- I/O Pins Potts and Circuits
- Instruction set
- Addressing modes
- Assembly language programming
- Introduction to 16-bit Microcontroller

PART- A

- Need of DMA controller
- Role of 8051 IC

❖ What is SJMP
❖ Why we need microcontrollers
❖ Write about the JUMP statement in 8051
❖ How DMA is initiated
❖ What is the need for an interrupt controller

PART- B

- Addressing modes in INTEL 8051A
- 8051 program on 8 bit addition
- SFRs in 8051

❖ Explain the 16-bit microcontroller
❖ Feature of 8051 microcontroller
❖ Write a program to swap two numbers in 8051

PART- C

- Architecture of 8051

❖ Draw the I/O pins, ports and circuits of 8051 and explain
❖ Describe the different instruction sets and addressing modes of 8051
❖ Explain the 16-bit registers DPTR and SP of 8051
❖ Write an ALP using 8051 to find smallest number in an array

UNIT- V Advanced Topics

- Programming 8051 Timers
- Serial Port Programming
- Interrupts Programming
- LCD & Keyboard Interfacing
- ADC, DAC & Sensor Interfacing
- External Memory Interface
- Stepper Motor
- Waveform generation

PART- A

- Software vs Hardware interrupts
- Role of PSEN pin of 8051

❖ What is meant by serial interrupts
❖ Mention the use of timer mode (TMOD) SFR
❖ Mention any two application that used ADC and DAC
❖ What are the pins used for serial data communication
❖ Define ADC
❖ Define stepper motor

PART- B

- Find the initial count and TMOD content for square wave generation of 1 KHz using Timer-0 of 8051. Consider the oscillator frequency is 12 MHz

❖ Describe the serial communication in 8051
❖ Explain the interrupt program in detail
❖ What are the methods to double the baud rate?
❖ Write the format of IE register
❖ Illustrate the steps involved in initialize a timer of 8051 microcontroller
❖ Explain the interrupt priority register of 8051 microprocessor

PART- C

- Programming 8051 Timers
- Serial port programming of 8051

❖ Describe the external memory interface with microcontroller
❖ Draw the diagram to Digital to Analog converter with 8051 microcontroller and explain

- Explain how ADC is interface with 8051
- Explain how internal and external memory is handled by 8051
- Summarize the concept of interrupt programming
- Explain the programming 8051 timer mode of operations

WEB TECHNOLOGY

UNIT- I XHTML

- Evolution of HTML and XHTML
- Standard XHTML Document Structure
- Basic Text Markup
- Images
- Hypertext Links-Lists
- Tables
- Forms
- Frames
- Cascading Style Sheet
- Levels of Style Sheets
- Style Specification Formats
- Selector Forms
- Property Value Forms
- Font Properties
- List Properties
- Color
- Alignment of Text
- Background Images
- Span and Div Tags

PART- A

- HTML
- Common lists that are used when designing a page
- CSS
- SPAN and DIV elements

❖ What is XHTML
❖ Which elements are used to create table
❖ Which year XHTML was introduced
❖ List some table tags in XHTML

PART- B

- Different types of headings in HTML
- Create Hyperlink in HTML
- Which HTML tags are used to display the data in the tabular form

- How do you add buttons in HTML

- ❖ Compare XHTML with HTML
- ❖ Construct XHTML program to list some fruit name using list tags
- ❖ Discuss XHTML program for frame tag
- ❖ Demonstrate the usage of Span and Div tags with example

PART- C

- Structure of HTML webpage with an example
- Form tag, design a resignation page by using all form controls

- ❖ Construct a simple XHTML program and explain the document structure
- ❖ Design a webpage using different level of stylesheets
- ❖ Develop a XHTML program to display any fruit name using UL and OL tags
- ❖ Develop a XHTML program to use all the font properties in the CSS sile

UNIT- II Introduction to SGML

- Features of XML
- XML as a subset of SGML
- XML Vs HTML
- Views of an XML document
- Syntax of XM
- XML Document Structure
- Namespaces
- XML Schemas
- simple XML document
- Different forms of markup that can occur in XML documents
- Document Type declarations
- Creating XML DTDs
- Displaying XML Data in HTML browser
- Convening XML to HTML with XSL minimalist XSL style sheets
- XML applications.

PART- A

- Uses of XML
- XML vs HTML
- DTD
- Various Logical structure of an XML document

❖ Name any four entity references
❖ What is XMLNS?
❖ Tell the syntax of XML declaration
❖ Name the two types of DTDs

PART- B

- Advantages of XML
- Namespaces
- XSL
- Basic rules while writing XML

❖ Show the rules to create elements in XML
❖ List XML application
❖ Illustrate comments in XML
❖ Explain how to solve the name conflict in XML

PART- C

- Procedure for validating the XML documents
- Importance of XML in web application

❖ Construct a simple XML document and explain the document structure

❖ Illustrate the different types of DTDs with suitable example

UNIT- III Overview of Perl

- Origin and Use of Perl
- Scalars and their Operations
- Assignment Statements and Simple Input and Output
- Control Statements
- Fundamentals of Arrays
- Hashes References
- Functions
- Pattern Matching
- File Input and Output
- Simple programs in Perl
- Using Perl for CGI Programming

PART- A

- Operators in Perl
- Different string manipulation in Perl
- Single vs double quote string

❖ Which datatype stores associative arrays?
❖ How arrays are declared in perl
❖ Uses of perl

PART- B

- Perl program to find the factorial of a number
- For and Foreach loops with example
- Continue statement in Perl with example

❖ Illustrate different control statement in perl with example
❖ Show how files are handled in perl
❖ Describe about hashes in perl
❖ Outline the input and output operations in perl

PART- C

- Control statement in PERL
- Features of Perl programming

❖ Apply function concepts in developing simple PERL program

- Apply perl scripts for CGI programming
- Illustrate different datatypes of perl with example

UNIT- IV Overview of PHP

- Origin and Use of PHP
- General Syntactic Characteristics Operations and Expressions
- Control Statements
- Arrays
- Functions
- Pattern Matching-
- Form
- Handling
- Files
- Cookies-Session Tracking
- Database Connectivity
- Simple programs in PHP and MySQL

PART- A

- Declare array in PHP
- Use of $ sign in PHP
- Syntax for creating cookie

❖ Tell the output statement in PHP
❖ List the string handling functions in PHP
❖ Tell the syntax of expression in PHP
❖ List the types of arrays in PHP

PART- B

- Characteristics of PHP
- PHP program to print reverse of any number

❖ Label the PHP datatypes with example
❖ Define cookies in PHP
❖ Various string function in PHP

PART- C

- How files are uploaded to server using PHP script
- Develop a PHP that determines and display whether the given number is Prime number or not

❖ Explain function concepts with suitable program in PHP

- Develop simple program in PHP and mySQL
- Different types of control statement in PHP
- File handling with example

UNIT- V Rails

- Overview of Rails
- Document Requests
- Processing Forms
- Rails Application with Databases
- Layouts
- Overview of Ajax
- Basics of Ajax
- Rails with Ajax

PART- A

- Major advantages in AJAX
- Components of Rail

❖ What are the technologies used by AJAX
❖ Name the web application development framework written in the ruby language
❖ Find the Rails application framework
❖ Name the full form of AJAX

PART- B

- GET and POST methods in Rails
- Data types supported in Ruby language

❖ Describe how the model files for the tables of mySQL database are created
❖ Demonstrate the process of synchronous request in AJAX
❖ Illustrate how a simple application can be build using rails
❖ Explain the goal of AJAX in web application

PART- C

❖ Explain in detail about layout subdirectory
❖ Explain how a web application can be developed using AJAX
❖ Explain how dynamic documents can be created using Rails

MOBILE APP DEVELOPMENT

UNIT- I Android

- An Open Platform for Mobile Development
- Native Android Applications
- Android SDK features
- Understanding the Android Software Stack
- The Dalvik Virtual Machine
- Android Application Architecture
- Android Libraries
- Creating the Android Application
- Types of Android Applications
- Android Development Tools
- Externalizing the Resources
- The Android Application Lifecycle

PART- A

- Android
- Features of DVM
- Native android applications
- Android emulator

❖ Name the graphical analysis tools for viewing the trace logs from your android application
❖ What is the use of Android API
❖ List three types of animations supported by android
❖ What is open source software
❖ Expand SDK

PART- B

- UI, CDD and CTS
- Six android development tools
- Features of android SDK
- How android an open platform for mobile development

❖ Recall the components of android debug bridge
❖ List out the various folders that are available in each android project
❖ Brief about application framework of the android software stack
❖ Explain about Dalvik virtual machine

PART- C

- How to create a new android project

- ❖ Outline various android development tools
- ❖ Illustrate importance of externalizing resources
- ❖ Outline android application architecture
- ❖ Determine how to create resources for different languages and hardwares

UNIT- II Building User Interface

- Fundamental Android UI design
- Android User Interface fundamentals
- Layouts
  - Linear
  - Relative
  - Grid Layouts
- Fragments
- Creating new fragments
- The Fragments Lifecycle
- Introducing the Fragment Manager
- Adding Fragments to Activities
- Interfacing between Fragments and Activities

PART- A

- Activity
- Where is manifest file located in android
- Fragment
- View group

❖ List the fundamental android UI design
❖ Recall the onPause() method
❖ List down the three screen orientation in app development
❖ What is the unit of screen pixel density
❖ State the use of setContentView method

PART- B

- Relative layout
- Vies vs view group
- Features of fragment
- How to add, remove and replace fragment

❖ Uses of fragments
❖ Linear layout
❖ Relate among active, visible and full lifetimes od activity states
❖ How to attach and detach fragment from the parent activity

PART- C

- An application’s priority and it’s process state
- Types of layouts with example
- Fragment life cycle with example

❖ Organize the steps required to create a new android application from the scratch
❖ Construct the fragment lifecycle

UNIT- III Intents and Broadcasts Receivers

- Introducing Intents
- Using intents to launch Activities
- Introducing Linkify
- Using Intents to Broadcast Events
- Introducing the Local Broadcast Manager
- Introducing pending intents
- Using Intent filters to service implicit Intents - Using
- Intent Filters for Plugins and extensibility
- Listening for Native Broadcast Intents
- Monitoring Device State Changes Using Broadcast Intents

PART- A

- Broadcast Intents are needed
- Types of intends
- Intend resolution

❖ How do you determine the docking status and type of dock of android devices
❖ State the use of sticky intends
❖ State the use of Linkify
❖ How implicit intent differ from explicit intent?
❖ Write skeleton code for creating an Intent for menu-action resolution

PART- B

- Use of Linkify
- How you start explicitly start new activities
- List dome of the native action available as static string constants in the intent class
- Importance of local broadcast manager

❖ State the broadcast event with intent
❖ What is intent resolution
❖ Explain the launching of sub-activity
❖ List the uses of transform filter
❖ How do you monitor changes in the battery level or charging status within an activity?

PART- C

- How android resolves Intent Filters
- How intent filters are used for plug-ins and extensibility

- Explain creation of intend filter and broadcast receiver
- Discuss how the intent filters are used for plug-ins and extensibility
- Discuss the use of intents to broadcast intents
- Explain about pending intents
- Interpret how to monitor device changes using Broadcast intents
- Elaborate the use of intent filters to service implicit intents

UNIT- IV

- Saving Simple Application Data
- Creating and Saving Shared Preferences
- Retrieving Shared Preferences
- Introducing the Preference Framework and the Preference Activity
- Working with the File System
- Introducing Android Databases
- Introducing SQLite
- Content Values and Cursors
- Working with SQLite Databases
- Creating Content Providers
- Using Content Providers

PART- A

- Shared preferences
- Why content values are used
- Methods for cleaning up temporary files
- Content provider

❖ Which is called data-persistence techniques in Android?
❖ Where SQLite databases are used in android
❖ Which method is used to access content resolver instance included in each application?

PART- B

- Preference screen layout in XML
- SQLite
- How to retrieve shared preferences
- How to extract value from a curser

❖ What is the uses of shared preference class?
❖ Label the four parts of preference framework
❖ Explain about persisting of application instance state
❖ Describe preference activity
❖ Name the use of content values and cursors

PART- C

- Construct simple shared preference screen
- Explain the process of querying content providers

- Identify the importance of file system when working with multimedia files in Android
- Utilize insert, delete and update method in SQLite database class to add, remove and update rows in database table
- Describe the procedure for creating content providers
- Discuss about native preference control
- Apply the intents to import system preferences into preference screens
- Explain how to store files in a content provider

UNIT- V Advanced Topics

- Alarms
- Creating and using alarms
- Using Location Based Services
- Using the Emulator with Location
- Based Services
- Finding the Current Location
- Using the Geocoder
- Creating Map-Based Activities

PART- A

- What are the four types of alarm available
- How to enable continuous location updates on the emulator, allowing you to use DDMS
- What is need for emulator
- Expand IRNSS

PART- B

- Illustrate the technologies used for finding device current locations
- Explain how can you find the last known location
- When will you use map controller
- Describe about Geocoder
- Why do you set repeating alarms
- discuss the various class used to support android maps

PART- C

- Construct the repeating alarms to replace the timer currently used to schedule earthquake network refreshes
- Built the concept of creating and using overlays with example
- Create an app to alarm when a particular place is reached
- Create an app to find distance between two locations in map
- Develop a project to transform map functionality into a map activity
- Explain how do you add and remove overlays