

MAHAKAUSHAL University



**Computer Science Syllabus and
Prescribed Books**

Subject-M.SC Computer Science Semester

Examination 2022-2023

I, II,III& IV Semester

ज्ञानं महाकरालम्

MSC Computer Science 1st Semester
MMCS0101-T Discrete Mathematics Structures

Unit No.	Topics
Unit 1	Computer Organization: Digital and Analog computers, Major components of a digital computer, Memory addressing capability of a CPU, Word length of a computer, Processing speed of a CPU, Definitions of Hardware, Software and Firmware, Smart and Intelligent terminals. Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers. Binary Codes: BCD code, Gray Code, ASCII code, Excess 3 Code, Error detecting Code. Computer Arithmetic: Binary representation of Negative Integers using 2's complement and Signed magnitude representation, Fixed point Arithmetic operations on Positive and Signed (Negative) Integers like addition, subtraction, multiplication, Booth algorithm for multiplication, and bit pair (fast) multiplication, Division of positive and negative binary numbers.
Unit 2	Boolean Algebra and Logic Gates: Basic Definitions, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and standard forms, Other Logic operations, Digital Logic gates, Integrated Circuits. Gate-Level Minimization: The K-Map Method, 3 and 4 variable K-Map, Product of sums simplification, Sum of Products simplification, Don't care conditions, NAND and NOR implementations, Exclusive-OR function.
Unit 3	Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary half adder, binary full adder, binary full subtractor, binary parallel adder, carry propagation delay and Propagation delay calculation of various digital circuits, Fast adder, Decimal Adder, Binary multiplier, magnitude comparator, Parity generator, seven segment display, BCD to excess three code converter, Decoders, Encoders, Multiplexes, and Demultiplexers. Synchronous Sequential logic: Sequential circuits, Latches, Flip Flops: SR, D, JK, T, Master Slave JK Flip flop, Characteristic equations and Excitation tables of flip-flops, Analysis of clocked sequential circuits: State diagrams, State equations for D, JK and T Flip flops, State reduction methods using all Flip Flops, Mealy and Moore Models.
Unit 4	Shift Registers: Serial in Serial out, Serial in Parallel out, Parallel in Serial out and Parallel in Parallel out. Designing of Asynchronous (Ripple) Counters, Design of Synchronous Counters. Signal characteristics: frequency, phase and amplitude, Types of communication with and among computers, Characteristics of communication channels, allocation of channel, signal power, amplitude and frequency modulation, space division multiplexing, frequency division multiplexing, Time division multiplexing.
Unit 5	Physical communication media: bounded media and unbounded media, Infrared technology, public switched telephone networks, digital modulation: ASK, PSK and FSK, half duplex and full duplex transmission, asynchronous and synchronous transmission, Need for computer communication networks, internet and world wide web: E-mail, File transfer, Remote login, Networking topologies, LAN, MAN, WAN, Ethernet LAN, Layer 2 and layer 3 switches, Wireless LAN, Switch hub and router, interconnecting networks, IP address and IP data grams, internet and intranet, inter security, virtual private networks, future of internet technology.

Books & References

1. Text Book:

- *Digital Design* - **M. Morris Mano**, Publication: PHI Eastern economy edition (Year-2001)

2. Reference Books:

- *Data communications and networking* - **A. Forouzan**, Publication: TMH Third edition (Year- 2004)
- *Computer Fundamentals – Architecture and Organization* - **B. Ram**
- *Computer networks* - **Andrew Tanenbaum**, Publication: PHI Fourth edition (Year- 2003)
- *Computer organization and architecture* - **William Stallings**, Publication: PHI Fifth edition (Year – 1999)



(MMCS0102-T) Programming in C

Unit No.	Topics
Unit 1	Introduction to Programming: Algorithms and Flowcharts, Problem solving using computers, History of C, Structure of C program, Data types, Constants, Variables, Identifiers, Operators (Arithmetic, Relational, Logical, Bitwise, Increment/Decrement), Expressions, Precedence and Associativity, Input/Output functions (<code>printf</code> , <code>scanf</code>).
Unit 2	Control Structures: Decision making statements (<code>if</code> , <code>if-else</code> , nested <code>if-else</code> , <code>switch-case</code> , <code>break</code> , <code>continue</code> , <code>goto</code>). Looping statements (<code>while</code> , <code>for</code> , <code>do-while</code>), Nested loops.
Unit 3	Functions and Arrays: Functions: User-defined functions, Function prototype, Function arguments and return values, Recursion, Parameter passing (Call by value, Call by reference). Arrays: One-dimensional and Two-dimensional arrays, Array initialization, Character arrays and Strings, String handling functions (<code>strcpy</code> , <code>strcat</code> , <code>strlen</code> , <code>strcmp</code>).
Unit 4	Pointers and Structures: Pointers: Pointer concept, Pointer variables, Pointer arithmetic, Pointers and Arrays, Pointers and Functions. Structures: Defining structures, Declaring structure variables, Accessing structure members, Array of structures, Union, Enumerated data types.
Unit 5	File Handling and Preprocessor: File Handling: File concept, File types, File operations (<code>fopen</code> , <code>fclose</code> , <code>fgetc</code> , <code>fputc</code> , <code>fprintf</code> , <code>fscanf</code> , <code>fseek</code> , <code>ftell</code>), Random access files. Preprocessor Directives: Macro substitution, File inclusion, Conditional compilation, Command line arguments.

Books & References

1. **Text Book:**
 - *Programming in ANSI C* - **E. Balagurusamy**, Tata McGraw-Hill.
2. **Reference Books:**
 - *Let Us C* - **Yashavant Kanetkar**, BPB Publications.
 - *The C Programming Language* - **Brian W. Kernighan and Dennis M. Ritchie**, PHI.
 - *Programming with C* - **Byron Gottfried**, Schaum's Outline Series.

(MMCS0102-P) Programming in C Lab

S.No.	Practical Topics
1	Basic I/O & Data Types: Program to calculate the area and circumference of a circle, and print the size of all primitive data types using <code>sizeof()</code> .
2	Operators: Program to swap two numbers using a third variable, and another without using a third variable (using arithmetic operators).
3	Decision Making: Program to check whether a given number is Even or Odd using <code>if-else</code> .
4	Decision Making: Program to find the largest of three numbers using nested <code>if-else</code> .
5	Switch Case: Program to create a simple menu-driven calculator (+, -, *, /) using <code>switch-case</code> .
6	Looping Statements: Program to calculate the sum of individual digits of a given positive integer (using <code>while</code> loop).
7	Looping Statements: Program to generate the first <code>n</code> terms of the Fibonacci sequence (using <code>for</code> loop).
8	Number Theory: Program to check whether a given number is a Prime number or not.
9	Number Theory: Program to check whether a given number is an Armstrong number or not.
10	Arrays: Program to find the largest and smallest element in a one-dimensional array.
11	Arrays & Matrix: Program to perform matrix addition and multiplication using two-dimensional arrays.
12	Strings: Program to check whether a given string is a palindrome or not without using <code>string.h</code> functions.
13	Functions: Program to find the factorial of a number using a recursive function.
14	Pointers: Program to demonstrate pointer arithmetic (accessing array elements using pointers).
15	File Handling: Program to copy the contents of one file to another file.

Books & References

1. **Text Book:**
 - *Programming in ANSI C* - E. Balagurusamy, Tata McGraw-Hill.
2. **Reference Books:**
 - *Let Us C* - Yashavant Kanetkar, BPB Publications.
 - *The C Programming Language* - Brian W. Kernighan and Dennis M. Ritchie, PHI.
 - *Programming with C* - Byron Gottfried, Schaum's Outline Series.

MMCS0103-T Computer Organization & Architecture

Unit No.	Topics
Unit 1	Introduction & Basic Computer Organization: Basic organization of the stored program computer, Functional units, Block diagram of a computer, Von Neumann architecture. Bus structures, Bus arbitration, I/O interfaces, I/O data transfer techniques (Programmed I/O, Interrupt-driven I/O, DMA).
Unit 2	Central Processing Unit (CPU): General register organization, Stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control. Reduced Instruction Set Computer (RISC) and Complex Instruction Set Computer (CISC) architectures.
Unit 3	Control Unit Design: Hardware control unit, Microprogrammed control unit, Microinstruction sequencing, Microinstruction formats, Bit-slice microprocessors.
Unit 4	Memory Organization: Memory hierarchy, Main memory (RAM, ROM), Auxiliary memory, Associative memory, Cache memory (Mapping functions, Replacement algorithms, Cache coherency), Virtual memory (Paging, Segmentation, Address translation).
Unit 5	Pipelining & Parallel Processing: Parallel processing concepts, Pipelining (Linear pipeline, Instruction pipeline), Pipeline hazards (Data hazards, Control hazards, Structural hazards), Vector processing, Array processors, Multiprocessor architecture (Flynn's classification).

Books & References

1. **Text Book:**
 - *Computer System Architecture* - **M. Morris Mano**, Pearson Education.
2. **Reference Books:**
 - *Computer Organization and Architecture* - **William Stallings**, Pearson Education.
 - *Computer Architecture: A Quantitative Approach* - **John L. Hennessy and David A. Patterson**, Morgan Kaufmann.
 - *Computer Organization* - **Carl Hamacher, Zvonko Vranesic, Safwat Zaky**, Tata McGraw-Hill.

MMCS0104-T Windows & PC-Software

Unit No.	Topics
Unit 1	Introduction to Windows Operating System: Overview of Windows, Windows GUI, Desktop, Taskbar, Start Menu, My Computer, Recycle Bin, Windows Explorer, Managing Files and Folders, Creating shortcuts, Customizing the Desktop, Windows Control Panel, Installing and Uninstalling Software, Windows Accessories (Notepad, Paint, Calculator).
Unit 2	Word Processing (MS-Word): Introduction to MS-Word, Document creation, Editing, Formatting text (Font, Size, Color, Alignment), Paragraph formatting, Working with tables, Mail Merge, Page setup, Header and Footer, Page numbers, Spell check, Thesaurus, Printing documents.
Unit 3	Spreadsheet (MS-Excel): Introduction to MS-Excel, Workbook and Worksheet, Data entry, Editing, Formatting cells, Formulas and Functions (Arithmetic, Logical, Statistical, Text), Chart creation and formatting, Data sorting and filtering, Pivot Tables, Protecting Worksheets.
Unit 4	Presentation Software (MS-PowerPoint): Introduction to MS-PowerPoint, Creating presentations, Adding slides, Slide layouts, Formatting slides, Inserting pictures, Shapes, Charts, Adding transitions and animations, Slide show settings, Custom animation, Speaker notes, Printing presentations.
Unit 5	Database Management System (MS-Access): Introduction to MS-Access, Database concepts, Creating databases and tables, Data types, Table relationships, Creating forms, Designing queries, Generating reports, Importing and exporting data.

Books & References

- Text Book:**
 - *MS Office 2010 Training Guide* - **S. Jain**, BPB Publications.
- Reference Books:**
 - *Windows 7 Inside Out* - **Ed Bott, Carl Siechert, Craig Stinson**, Microsoft Press.
 - *Microsoft Office 2010 Bible* - **John Walkenbach**, Wiley.

MMCS0104-P Windows & PC-Software Lab

S.No.	Practical Topics
1	Windows Basics: Creating, renaming, copying, and deleting files and folders in different directories.
2	Desktop Management: Customizing the desktop wallpaper, screen saver, and taskbar settings.
3	Control Panel: Installing and uninstalling a software application and configuring system date and time.
4	MS-Word: Creating a new document and using basic formatting tools like Bold, Italic, Underline, Font style, and Size.
5	MS-Word: Inserting tables, images, and shapes into a document and formatting them.
6	MS-Word: Using Page Layout features like Margins, Orientation, and Column formatting.
7	MS-Word: Implementing Mail Merge to create and send personalized letters to multiple recipients.
8	MS-Excel: Creating a worksheet for a student marksheet and applying basic formulas (SUM, AVERAGE).
9	MS-Excel: Using advanced functions like IF, VLOOKUP, and HLOOKUP for data analysis.
10	MS-Excel: Creating different types of charts (Pie chart, Bar chart) to represent data visually.
11	MS-Excel: Using Data Sorting and Filtering options to manage large datasets.
12	MS-PowerPoint: Creating a presentation with proper slide layouts, themes, and backgrounds.
13	MS-PowerPoint: Applying slide transitions and custom animations to objects in a presentation.
14	MS-Access: Creating a database, defining tables with appropriate data types, and setting primary keys.
15	MS-Access: Designing simple queries and reports to retrieve and present data from a table.

Books & References

1. **Text Book:**
 - *MS Office 2010 Training Guide* - **S. Jain**, BPB Publications.
2. **Reference Books:**
 - *Windows 7 Inside Out* - **Ed Bott, Carl Siechert, Craig Stinson**, Microsoft Press.
 - *Microsoft Office 2010 Bible* - **John Walkenbach**, Wiley.

MMCS0105-T Communication Skills

Unit No.	Topics
Unit 1	Introduction to Communication: Process of communication, Language as a tool of communication, Levels of communication (Intrapersonal, Interpersonal, Group, Mass), Barriers to communication, Technical communication vs. General communication.
Unit 2	Functional Grammar and Vocabulary: Parts of speech, Tenses, Sentence structure, Active and Passive voice, Direct and Indirect speech, Punctuation, Synonyms, Antonyms, Idioms and Phrases, One-word substitution.
Unit 3	Writing Skills: Paragraph writing, Essay writing, Formal and Informal letters, Business correspondence (Emails, Memorandums, Notices, Agenda, Minutes of meeting), Report writing (Structure, Types, Importance).
Unit 4	Reading and Listening Skills: Reading techniques (Skimming, Scanning, Intensive reading, Extensive reading), Note-taking, Listening process, Types of listening, Barriers to effective listening.
Unit 5	Speaking and Presentation Skills: Public speaking, Group discussion (GD), Interviews, Presentation skills (Structure, Visual aids, Body language), Professional ethics.

Books & References

- 1. Text Book:**
 - *Technical Communication: Principles and Practice* - **Meenakshi Raman and Sangeeta Sharma**, Oxford University Press.
- 2. Reference Books:**
 - *Effective Technical Communication* - **M. Ashraf Rizvi**, Tata McGraw-Hill.
 - *Business Communication* - **Meenakshi Raman and Prakash Singh**, Oxford University Press.
 - *High School English Grammar and Composition* - **Wren and Martin**, S. Chand.

MMCS0201-T Data Structures and algorithms

Unit No.	Topics
Unit 1	Introduction to Data Structures: Data types, Data structures, Abstract Data Types (ADT), Algorithms and their complexity (Time and Space complexity, Big-O notation). Arrays: Representation of linear arrays in memory, Traversing linear arrays, Insertion and deletion, Multidimensional arrays, Sparse matrices.
Unit 2	Linked Lists: Linked list representation in memory, Traversing a linked list, Searching a linked list, Memory allocation and garbage collection, Insertion into and deletion from a linked list, Doubly linked lists, Circular linked lists.
Unit 3	Stacks and Queues: Stacks: Array and Linked representation of stacks, Operations on stacks, Application of stacks (Recursion, Polish notation, Evaluation of postfix expressions). Queues: Array and Linked representation of queues, Operations on queues, Deques, Priority queues, Circular queues.
Unit 4	Trees and Graphs: Trees: Binary trees, Representation of binary trees in memory, Traversing binary trees (Preorder, Inorder, Postorder), Binary search trees (Searching, Inserting, Deleting). Graphs: Graph terminology, Representation of graphs (Adjacency matrix, Adjacency list), Graph traversal techniques (Breadth-First Search, Depth-First Search).
Unit 5	Sorting and Searching: Searching algorithms: Linear search, Binary search. Sorting algorithms: Bubble sort, Insertion sort, Selection sort, Quick sort, Merge sort, Heap sort. Hashing techniques: Hash functions, Collision resolution techniques.

Books & References

1. **Text Book:**
 - *Data Structures* - **Seymour Lipschutz**, Tata McGraw-Hill.
2. **Reference Books:**
 - *Fundamentals of Data Structures in C* - **Ellis Horowitz and Sartaj Sahni**, Universities Press.
 - *Data Structures Using C* - **Reema Thareja**, Oxford University Press.
 - *Introduction to Algorithms* - **Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein**, MIT Press.

MMCS0201-P Data Structures and algorithms lab

S.No.	Practical Topics
1	Array Operations: Write a program to implement menu-driven array operations: Insertion, Deletion, and Searching (Linear Search).
2	Sparse Matrix: Write a program to represent a sparse matrix and display its transpose.
3	Singly Linked List: Write a program to implement a singly linked list and perform insertion, deletion, and traversal operations.
4	Doubly Linked List: Write a program to implement a doubly linked list and perform insertion and deletion operations.

5	Circular Linked List: Write a program to implement a circular linked list and perform insertion and deletion operations.
6	Stack Implementation: Write a program to implement a stack using arrays and perform PUSH and POP operations.
7	Stack Application: Write a program to convert an infix expression to a postfix expression using a stack.
8	Queue Implementation: Write a program to implement a linear queue using arrays and perform INSERT and DELETE operations.
9	Circular Queue: Write a program to implement a circular queue using arrays.
10	Binary Search Tree: Write a program to construct a binary search tree and perform inorder, preorder, and postorder traversals.
11	Graph Traversal: Write a program to implement Breadth-First Search (BFS) for a graph.
12	Graph Traversal: Write a program to implement Depth-First Search (DFS) for a graph.
13	Searching Algorithms: Write a program to implement the Binary Search algorithm.
14	Sorting Algorithms: Write a program to implement Bubble Sort and Selection Sort algorithms.
15	Sorting Algorithms: Write a program to implement Quick Sort and Merge Sort algorithms.

Books & References

1. **Text Book:**
 - *Data Structures* - **Seymour Lipschutz**, Tata McGraw-Hill.
2. **Reference Books:**
 - *Fundamentals of Data Structures in C* - **Ellis Horowitz and Sartaj Sahni**, Universities Press.
 - *Data Structures Using C* - **Reema Thareja**, Oxford University Press.
 - *Introduction to Algorithms* - **Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein**, MIT Press.

MMCS0202-T Operating systems

Unit No.	Topics
Unit 1	Introduction to Operating Systems: Definition, Functions, Evolution, Types (Batch, Multiprogramming, Time-sharing, Real-time, Distributed), OS structure (Monolithic, Layered, Microkernel).
Unit 2	Process Management: Process concept, Process states, Process Control Block (PCB), Context switching, Threads. CPU Scheduling: Scheduling criteria, Scheduling algorithms (FCFS, SJF, Priority, Round Robin), Multilevel queue scheduling.
Unit 3	Process Synchronization: Critical section problem, Synchronization hardware, Semaphores, Classical problems of synchronization (Producer-Consumer, Readers-Writers, Dining Philosophers). Deadlocks: Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Avoidance (Banker's Algorithm), Detection and Recovery.
Unit 4	Memory Management: Logical and physical address spaces, Swapping, Contiguous memory allocation, Paging, Segmentation, Segmentation with paging. Virtual Memory: Demand paging, Page replacement algorithms (FIFO, Optimal, LRU), Thrashing.
Unit 5	File System and I/O Management: File concept, Access methods, Directory structure, File system structure, Allocation methods (Contiguous, Linked, Indexed), Free space management. Disk scheduling algorithms (FCFS, SSTF, SCAN, C-SCAN), RAID structures.

Books & References

1. **Text Book:**
 - *Operating System Concepts* - **Silberschatz, Galvin, and Gagne**, Wiley.
2. **Reference Books:**
 - *Operating Systems: Internal and Design Principles* - **William Stallings**, Pearson Education.
 - *Modern Operating Systems* - **Andrew S. Tanenbaum**, Pearson Education.
 - *Operating Systems: A Concept-Based Approach* - **D.M. Dhamdhere**, Tata McGraw-Hill.

MMCS0203-T Computer networks with windows

Unit No.	Topics
Unit 1	Introduction to Networking: Definition, Network Topologies, Types of Networks (LAN, MAN, WAN), Network Software and Hardware, ISO-OSI Reference Model, TCP/IP Reference Model.
Unit 2	Physical Layer & Data Link Layer: Transmission Media (Twisted pair, Coaxial cable, Fiber optics), Modulation techniques (ASK, FSK, PSK). Data Link Layer Design Issues, Error Detection and Correction (CRC, Hamming Code), Sliding Window Protocols, Medium Access Control Sublayer (ALOHA, CSMA/CD, Ethernet).
Unit 3	Network Layer & Transport Layer: Network Layer Design Issues, Routing Algorithms (Shortest Path, Distance Vector, Link State), Congestion Control Algorithms. Transport Layer Services, Addressing, Establishing and Releasing a Connection, Flow Control, Multiplexing.
Unit 4	Windows Networking Basics: Introduction to Windows Server networking, Windows Workgroups vs. Domain Model, IP Addressing in Windows (Static vs. Dynamic IP), Configuring Network Interface Cards (NIC), Sharing Resources (Files and Printers) in Windows.
Unit 5	Windows Network Services & Security: Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Active Directory Services, Remote Desktop Services. Network Security Concepts, Firewalls, Windows Firewall Configuration, Virtual Private Networks (VPN) in Windows.

Books & References

1. **Text Book:**
 - *Computer Networks* - **Andrew S. Tanenbaum**, Pearson Education.
2. **Reference Books:**
 - *Data Communications and Networking* - **Behrouz A. Forouzan**, Tata McGraw-Hill.
 - *Networking Essentials* - **Jeffrey S. Beasley**, Pearson Education.
 - *Windows Server 2012 Inside Out* - **William R. Stanek**, Microsoft Press.

MMCS0204-T Programming in Java

Unit No.	Topics
Unit 1	Introduction to Java: History, Features, Java Virtual Machine (JVM), Bytecode, Java Development Kit (JDK), Structure of a Java Program, Data Types, Variables, Type Casting, Operators, Control Statements (if-else, switch-case, loops).
Unit 2	Classes and Objects: Defining Classes, Creating Objects, Methods, Constructors, Constructor Overloading, Method Overloading, <code>this</code> keyword, Garbage Collection, Access Specifiers, Static members, Command-line arguments.
Unit 3	Inheritance and Packages: Types of Inheritance, <code>super</code> keyword, Method Overriding, Dynamic Method Dispatch, <code>final</code> keyword, Abstract Classes, Interfaces, Multiple Inheritance using Interfaces, Packages, Importing Packages.
Unit 4	Exception Handling and Multithreading: Exception Handling: Hierarchy, <code>try-catch</code> , <code>finally</code> , <code>throw</code> , <code>throws</code> , User-defined exceptions. Multithreading: Creating threads (Thread class, Runnable interface), Thread Life Cycle, Thread Priorities, Synchronization, Inter-thread communication.
Unit 5	Applets and GUI Programming: Applet Life Cycle, Creating Applets, Passing parameters to Applets. GUI Programming: AWT Components, Layout Managers, Event Handling (Delegation Model, Event Listeners), Introduction to Swing components.

Books & References

1. **Text Book:**
 - *Java: The Complete Reference* - **Herbert Schildt**, Tata McGraw-Hill.
2. **Reference Books:**
 - *Programming with Java* - **E. Balagurusamy**, Tata McGraw-Hill.
 - *Core Java Volume I—Fundamentals* - **Cay S. Horstmann and Gary Cornell**, Prentice Hall.

MMCS0204-P Programming in Java Lab

- 1 **Java Basics:** Write a program to print "Hello World" and demonstrate the use of command-line arguments.
- 2 **Operators & Control Structures:** Write a program to find the largest of three numbers using if-else and another to print the Fibonacci series using for loop.
- 3 **Classes & Objects:** Write a program to create a class Student with methods to accept and display student details.
- 4 **Constructors:** Write a program to demonstrate constructor overloading in Java.
- 5 **Inheritance:** Write a program to implement single and multilevel inheritance.

- 6 **Method Overriding:** Write a program to demonstrate method overriding using super keyword.
- 7 **Abstract Classes:** Write a program to create an abstract class Shape and its subclasses Circle and Rectangle.
- 8 **Interfaces:** Write a program to implement multiple inheritance using interfaces.
- 9 **Packages:** Write a program to create and use a user-defined package in Java.
- 10 **Exception Handling:** Write a program to demonstrate try-catch block and handling multiple exceptions.
- 11 **User-Defined Exception:** Write a program to create and throw a user-defined exception.
- 12 **Multithreading:** Write a program to create a thread by extending Thread class.
- 13 **Multithreading:** Write a program to implement a thread using Runnable interface and demonstrate thread synchronization.
- 14 **Applets:** Write a program to create a simple applet that displays a string.
- 15 **GUI Programming:** Write a program using AWT/Swing to create a login form with text fields and buttons, and handle button click events.



MMCS0205- T Organization & Management Concepts

Unit No.	Topics
Unit 1	Introduction to Management: Definition, Nature, Purpose, and Scope of management, Management as a science or art, Functions of management, Managerial roles and skills, Evolution of management thought (Classical, Neo-classical, and Modern approaches).
Unit 2	Planning and Decision Making: Planning: Definition, Nature, Importance, Types of plans, Steps in planning process. Decision Making: Importance, Types of decisions, Decision-making process, Techniques of decision-making.
Unit 3	Organizing: Definition, Importance, Principles of organization, Types of organization structures (Line, Functional, Matrix), Span of management, Centralization vs. Decentralization, Delegation of authority.
Unit 4	Staffing and Directing: Staffing: Definition, Importance, Manpower planning, Recruitment, Selection, Training and Development. Directing: Elements of directing, Motivation (Theories of Maslow, Herzberg), Leadership (Styles and Theories), Communication process and barriers.
Unit 5	Controlling: Definition, Importance, Controlling process, Types of control, Techniques of controlling (Budgetary and Non-budgetary control), Need for coordination.

Books & References

1. **Text Book:**
 - *Management* - **Stephen P. Robbins and Mary Coulter**, Pearson Education.
2. **Reference Books:**
 - *Principles of Management* - **Harold Koontz and Heinz Weihrich**, Tata McGraw-Hill.
 - *Management: Tasks, Responsibilities, Practices* - **Peter F. Drucker**, Harper Business.
 - *Principles of Management* - **L.M. Prasad**, Sultan Chand & Sons.

MMCS0301-T RDBMS concepts and Oracle

Unit No.	Topics
Unit 1	Introduction to DBMS: Database System Applications, Purpose of Database Systems, View of Data, Data Abstraction, Instances and Schemas, Data Models, Database Languages, Database Architecture, Database Users and Administrators.
Unit 2	Relational Model and Database Design: Structure of Relational Databases, Fundamental Relational-Algebra Operations, Entity-Relationship Model (E-R Model), Entities and Entity Sets, Relationships and Relationship Sets, Mapping Constraints, Keys, E-R Diagrams.
Unit 3	SQL and PL/SQL Basics: SQL Data Definition Language (DDL), SQL Data Manipulation Language (DML), SQL Data Control Language (DCL), Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Subqueries, Joins. Introduction to PL/SQL, PL/SQL Block Structure, Variables, Control Structures.
Unit 4	Advanced SQL and PL/SQL: Views, Triggers, Stored Procedures, Functions, Cursors, Exception Handling in PL/SQL, Packages, Transactions, Concurrency Control, Database Recovery techniques.
Unit 5	Relational Database Design and Normalization: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Normal Forms (1NF, 2NF, 3NF, BCNF), Lossless-Join Decomposition, Dependency Preservation.

Books & References

1. **Text Book:**
 - *Database System Concepts* - **Silberschatz, Korth, and Sudarshan**, McGraw-Hill.
2. **Reference Books:**
 - *Oracle PL/SQL Programming* - **Steven Feuerstein**, O'Reilly Media.
 - *Database Management System* - **Ramakrishnan and Gehrke**, McGraw-Hill.
 - *SQL, PL/SQL: The Programming Language of Oracle* - **Ivan Bayross**, BPB Publications.

MMCS0301-P RDBMS concepts and Oracle LAB

S.No.	Practical Topics
1	DDL Commands: Write SQL queries to create, alter, and drop tables using <code>CREATE</code> , <code>ALTER</code> , and <code>DROP</code> commands.
2	Constraints: Write SQL queries to create tables with constraints like <code>PRIMARY KEY</code> , <code>FOREIGN KEY</code> , <code>UNIQUE</code> , <code>NOT NULL</code> , and <code>CHECK</code> .
3	DML Commands: Write SQL queries to insert, update, and delete data from tables using <code>INSERT</code> , <code>UPDATE</code> , and <code>DELETE</code> commands.

4	Basic SQL Queries: Write SQL queries to select data using <code>SELECT</code> , <code>DISTINCT</code> , <code>WHERE</code> clause, and logical operators (<code>AND</code> , <code>OR</code> , <code>NOT</code>).
5	Ordering & Grouping: Write SQL queries to sort data using <code>ORDER BY</code> and group data using <code>GROUP BY</code> and <code>HAVING</code> clauses.
6	Aggregate Functions: Write SQL queries using <code>SUM</code> , <code>AVG</code> , <code>COUNT</code> , <code>MIN</code> , and <code>MAX</code> functions.
7	Joins: Write SQL queries to perform inner join, left join, right join, and full outer join on two or more tables.
8	Subqueries: Write SQL queries using nested subqueries and correlated subqueries.
9	Views: Write SQL queries to create, update, and drop views based on existing tables.
10	PL/SQL Block: Write a basic PL/SQL block to display a message using <code>DBMS_OUTPUT.PUT_LINE</code> .
11	Control Structures: Write a PL/SQL block using <code>IF-THEN-ELSE</code> and <code>LOOP</code> statements.
12	Cursors: Write a PL/SQL block to declare, open, fetch, and close an explicit cursor.
13	Procedures: Write a PL/SQL procedure to insert or update data in a table with parameters.
14	Functions: Write a PL/SQL function to calculate and return a value (e.g., factorial of a number).
15	Triggers: Write a PL/SQL trigger to automatically update a table or validate data before an <code>INSERT</code> or <code>UPDATE</code> operation.

Books & References

1. Text Book:

- *Database System Concepts* - **Silberschatz, Korth, and Sudarshan**, McGraw-Hill.

2. Reference Books:

- *Oracle PL/SQL Programming* - **Steven Feuerstein**, O'Reilly Media.
- *Database Management System* - **Ramakrishnan and Gehrke**, McGraw-Hill.
- *SQL, PL/SQL: The Programming Language of Oracle* - **Ivan Bayross**, BPB Publications.

MMCS0302-T Multimedia Tools And Applications

Unit No.	Topics
Unit 1	Introduction to Multimedia: Definition, Components of Multimedia, Hypermedia, Applications of Multimedia, Multimedia Hardware and Software, Multimedia Authoring Tools.
Unit 2	Graphics and Images: Raster vs Vector Graphics, Image File Formats (JPEG, GIF, BMP, TIFF, PNG), Image Scanning, Color Models (RGB, CMYK, HSV), Image Editing Software (Photoshop basics).
Unit 3	Audio and Video: Sound Fundamentals, Digital Audio, Audio File Formats (WAV, MP3, MIDI), Audio Recording and Editing. Video Standards (NTSC, PAL), Digital Video Concepts, Video Compression Techniques, Video Editing Software.
Unit 4	Multimedia Authoring & Animation: Authoring Metaphors (Card based, Icon based, Time based), Animation Principles, 2D Animation, 3D Animation Concepts, Animation Software (Flash/Animate basics).
Unit 5	Multimedia on Web and Virtual Reality: Multimedia Content for Web, Streaming Technologies, Multimedia File Compression and Optimization. Introduction to Virtual Reality (VR) and Augmented Reality (AR), VR Hardware and Software.

Books & References

1. **Text Book:**
 - *Multimedia: Computing, Communications and Applications* - **Ralf Steinmetz and Klara Nahrstedt**, Pearson Education.
2. **Reference Books:**
 - *Multimedia Making It Work* - **Tay Vaughan**, Tata McGraw-Hill.
 - *Fundamentals of Multimedia* - **Z.N. Li and M.S. Drew**, Pearson Education.

MMCS0303-T Software Eng.

Unit No.	Topics
Unit 1	Introduction to Software Engineering: Definitions, Software crisis, Software Engineering paradigms, Software Life Cycle Models (Waterfall, Prototyping, Iterative, Spiral), Software Requirements Analysis and Specification (SRS).
Unit 2	Software Project Management: Software Project Planning, Project estimation techniques (COCOMO Model), Project scheduling, Staffing, Risk Management, Software Configuration Management.
Unit 3	Software Design: Design principles, Design process, Function-oriented design (Data Flow Diagram, Structure Charts), Object-oriented design (UML Diagram basics), User Interface Design.
Unit 4	Software Coding and Testing: Coding standards and guidelines, Programming style, Software Documentation. Testing fundamentals, Testing levels (Unit, Integration, System, Acceptance), Testing techniques (Black-box, White-box), Debugging.
Unit 5	Software Maintenance and Quality: Software Maintenance types (Corrective, Adaptive, Perfective, Preventive), Maintenance cost, Re-engineering. Software Quality Assurance (SQA), Software Reliability, Quality Metrics, ISO 9000, SEI CMM.

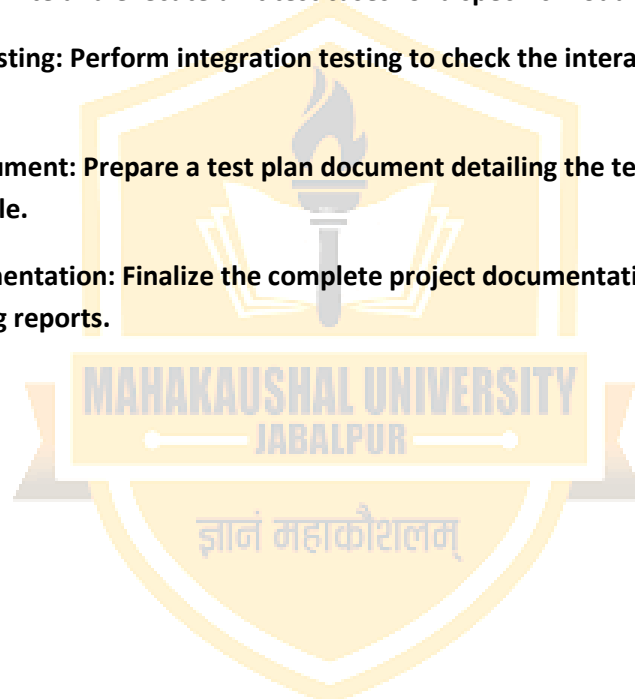
Books & References

1. **Text Book:**
 - *Software Engineering: A Practitioner's Approach* - **Roger S. Pressman**, McGraw-Hill.
2. **Reference Books:**
 - *Fundamentals of Software Engineering* - **Rajib Mall**, PHI Learning.
 - *Software Engineering* - **Ian Sommerville**, Pearson Education.

MMCS0303-P Software Eng. LAB

- 1 **Problem Analysis:** Define the problem statement for a software project and identify the stakeholders.
- 2 **SRS Document:** Prepare a Software Requirements Specification (SRS) document for a given project (e.g., Library Management System).
- 3 **Use Case Diagram:** Create a Use Case Diagram to identify actors and use cases for the system.
- 4 **Data Flow Diagram (DFD):** Draw Level 0 and Level 1 DFDs to represent the data flow in the system.
- 5 **ER Diagram:** Design the Entity-Relationship (ER) diagram for the database of the project.

- 6 **UML Class Diagram:** Create a Class Diagram to represent the structural design of the system.
- 7 **Sequence Diagram:** Draw a Sequence Diagram to represent the interaction between objects over time.
- 8 **Activity Diagram:** Create an Activity Diagram to show the workflow of a specific functionality.
- 9 **Project Scheduling:** Develop a Project Plan and schedule using Gantt Charts (tools like MS Project).
- 10 **Cost Estimation:** Calculate the cost estimation for the project using the COCOMO model.
- 11 **Coding Standards:** Write a small module of code following specific coding standards and guidelines.
- 12 **Unit Testing:** Write and execute unit test cases for a specific module of the project.
- 13 **Integration Testing:** Perform integration testing to check the interaction between different modules.
- 14 **Test Plan Document:** Prepare a test plan document detailing the testing strategy, resources, and schedule.
- 15 **Project Documentation:** Finalize the complete project documentation including design documents and testing reports.



MMCS0304-T Advanced java Programming

Unit No.	Topics
Unit 1	JDBC (Java Database Connectivity): JDBC Drivers, JDBC Architecture, Connecting to Database, Statement, PreparedStatement, CallableStatement, Result Sets, Batch Processing, Transaction Management.
Unit 2	Servlets: Servlet API, Servlet Life Cycle, HttpServlet, Handling Get and Post Requests, Session Tracking (HttpSession, Cookies), Servlet Chaining, Event Handling in Servlets.
Unit 3	JSP (JavaServer Pages): JSP Architecture, JSP Life Cycle, JSP Tags (Scripting Elements, Directives, Actions), Implicit Objects, EL (Expression Language), JSTL (JSP Standard Tag Library).
Unit 4	JavaBeans and Networking: JavaBeans Properties, Events, Persistence. Java Networking: InetAddress, Socket, ServerSocket, URL Handling.
Unit 5	RMI and Swing Advanced: Remote Method Invocation (RMI) Architecture, RMI Registry, Client-Server Application using RMI. Advanced Swing: JTree, JTable, JTabbedPane, Layout Managers (GridBagLayout).

Books & References

1. **Text Book:**
 - *Java: The Complete Reference* - **Herbert Schildt**, Tata McGraw-Hill.
2. **Reference Books:**
 - *Advanced Java Programming* - **Rashmi Kanta Das**, Vikas Publishing House.
 - *Core Java Volume II—Advanced Features* - **Cay S. Horstmann and Gary Cornell**, Prentice Hall.
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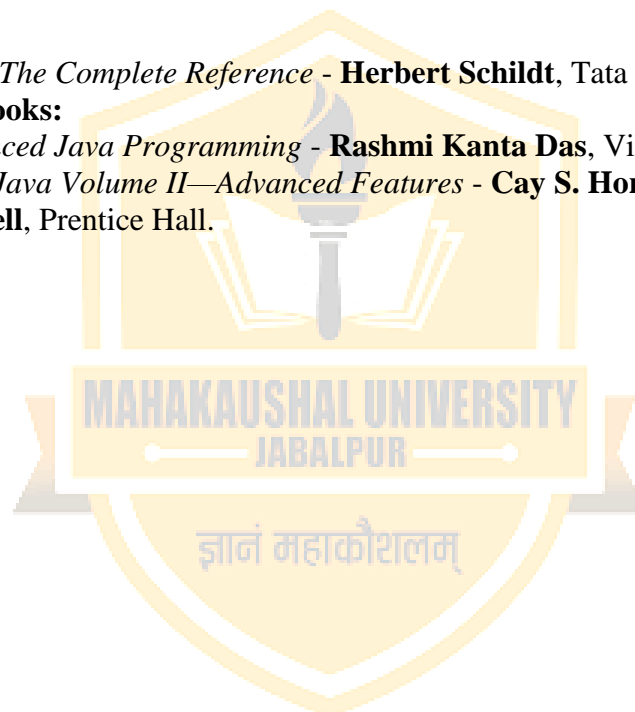
MMCS0304-P Advanced java Programming LAB

S.No.	Practical Topics
1	JDBC Connection: Write a program to connect to a database (MySQL/Oracle) using JDBC and execute a <code>SELECT</code> query.
2	PreparedStatement: Write a program to insert data into a database table using <code>PreparedStatement</code> .
3	CallableStatement: Write a program to call a stored procedure in the database using <code>CallableStatement</code> .
4	ResultSet Management: Write a program to navigate through a <code>ResultSet</code> (forward, backward, absolute) and display data.
5	Basic Servlet: Write a simple Servlet that displays "Hello World" on the browser.
6	HTTP Get/Post: Write a Servlet to handle HTTP <code>GET</code> and <code>POST</code> requests from an HTML form.
7	Session Tracking: Write a program to demonstrate session tracking using <code>HttpSession</code> to maintain user state.
8	Cookies: Write a program to implement cookie management to store and retrieve user preferences.

9	Basic JSP: Write a simple JSP program to display the current date and time.
10	JSP Implicit Objects: Write a JSP program demonstrating the use of implicit objects like <code>request</code> , <code>response</code> , and <code>out</code> .
11	JavaBean with JSP: Write a program using <code>jsp:useBean</code> to access a JavaBean class in a JSP page.
12	Socket Programming: Write a client-server application using TCP sockets to send messages between client and server.
13	RMI Application: Write a simple Remote Method Invocation (RMI) application to add two numbers remotely.
14	Advanced Swing (JTable): Write a program using <code>JTable</code> to display data fetched from a database.
15	GUI App: Develop a complete application using JSP, Servlets, and JDBC to perform CRUD operations on a database table.

Books & References

1. **Text Book:**
 - *Java: The Complete Reference* - **Herbert Schildt**, Tata McGraw-Hill.
2. **Reference Books:**
 - *Advanced Java Programming* - **Rashmi Kanta Das**, Vikas Publishing House.
 - *Core Java Volume II—Advanced Features* - **Cay S. Horstmann and Gary Cornell**, Prentice Hall.



MMCS0305-T Artificial Intelligence

Unit No.	Topics
Unit 1	Introduction to AI: Definition, History, Turing Test, AI Applications, Intelligent Agents and their types, Environment types, Problem Solving Agents, Problem Formulation.
Unit 2	Searching Techniques: Uninformed Search Strategies (BFS, DFS, Uniform-cost search), Informed Search Strategies (Best-first search, A* search), Heuristic Functions, Constraint Satisfaction Problems.
Unit 3	Knowledge Representation: Knowledge-Based Agents, Propositional Logic, First-Order Logic (FOL), Inference rules, Unification, Resolution in FOL, Knowledge Engineering, Semantic Nets.
Unit 4	Reasoning and Planning: Reasoning under Uncertainty, Bayesian Networks, Probabilistic Reasoning, Planning, Hierarchical Planning, Learning from Observations.
Unit 5	AI Applications: Introduction to Machine Learning (Supervised, Unsupervised), Neural Networks basics, Natural Language Processing (NLP), Expert Systems, Fuzzy Logic.

Books & References

1. **Text Book:**
 - *Artificial Intelligence: A Modern Approach* - **Stuart Russell and Peter Norvig**, Pearson Education.
2. **Reference Books:**
 - *Artificial Intelligence* - **Elaine Rich and Kevin Knight**, Tata McGraw-Hill.
 - *Introduction to Artificial Intelligence and Expert Systems* - **Dan W. Patterson**, Prentice Hall.

MMCS0401-T UNIX Internals, Shell Programming & Linux

Unit No.	Topics
Unit 1	Overview of UNIX/Linux: History, Philosophy, Architecture, Kernel, Shell, System Calls, File System Structure, Basic Commands (<code>ls</code> , <code>cd</code> , <code>pwd</code> , <code>cp</code> , <code>mv</code> , <code>rm</code>).
Unit 2	File Management & Permissions: File Types, File System Hierarchy Standard (FHS), inode structure, Linking files (Hard links vs. Soft links), <code>chmod</code> , <code>chown</code> , <code>chgrp</code> , <code>umask</code> .
Unit 3	Process Management: Process concept, Life cycle of a process, Context switching, Process states, <code>fork()</code> , <code>exec()</code> , <code>wait()</code> , <code>exit()</code> system calls, Signals, Scheduling basics.
Unit 4	Shell Programming: Types of Shells, Shell variables, Command substitution, Control structures (<code>if-else</code> , <code>case</code> , <code>while</code> , <code>for</code>), Functions, Positional parameters, Redirection, Pipes.
Unit 5	System Administration Basics: User Management (<code>useradd</code> , <code>usermod</code> , <code>userdel</code>), Disk Management (<code>df</code> , <code>du</code> , <code>mount</code>), Package management in Linux, Basic Networking commands (<code>ifconfig</code> , <code>ping</code> , <code>netstat</code>).

Books & References

1. **Text Book:**
 - *The Design of the UNIX Operating System* - **Maurice J. Bach**, Pearson Education.
2. **Reference Books:**
 - *UNIX Concepts and Applications* - **Sumitabha Das**, Tata McGraw-Hill.
 - *Linux Administration Handbook* - **Evi Nemeth, Garth Snyder, and Trent R. Hein**, Prentice Hall.
 - *Your UNIX/Linux: The Ultimate Guide* - **Sumitabha Das**, Tata McGraw-Hill.

MMCS0401-P UNIX Internals, Shell Programming & Linux LAB

S.No.	Practical Topics
1	Basic Commands: Practice basic file management commands (<code>ls</code> , <code>cp</code> , <code>mv</code> , <code>rm</code> , <code>mkdir</code> , <code>rmdir</code>) and understand file permissions (<code>chmod</code>).
2	File Manipulation: Use commands like <code>cat</code> , <code>more</code> , <code>less</code> , <code>head</code> , <code>tail</code> , <code>wc</code> , <code>sort</code> , <code>uniq</code> to manipulate and view file content.
3	Searching & Filtering: Use <code>grep</code> , <code>find</code> , and <code>awk</code> commands to search for patterns and files in the system.
4	Pipes & Redirection: Demonstrate the use of pipes (<code> </code>)
5	Shell Scripting (Basics): Write a shell script to display system information (<code>date</code> , <code>time</code> , <code>username</code> , <code>current directory</code>).
6	Shell Scripting (Control Structures): Write a shell script using <code>if-else</code> to check if

	a file exists or if a number is even/odd.
7	Shell Scripting (Loops): Write a shell script using <code>for</code> or <code>while</code> loop to print numbers from 1 to 10 or calculate the factorial of a number.
8	Shell Scripting (Case): Write a shell script using <code>case</code> statement to create a menu-driven program for basic operations.
9	Shell Scripting (Functions): Write a shell script using functions to perform arithmetic operations.
10	Process Management: Use commands like <code>ps</code> , <code>top</code> , <code>kill</code> , <code>bg</code> , <code>fg</code> to manage running processes.
11	System Administration (Users): Create, modify, and delete user accounts using <code>useradd</code> , <code>usermod</code> , <code>userdel</code> .
12	System Administration (Disk): Check disk usage and manage file systems using <code>df</code> , <code>du</code> , and <code>mount</code> .
13	Archiving & Compression: Use <code>tar</code> , <code>gzip</code> , and <code>zip</code> to archive and compress files and directories.
14	Networking Commands: Use <code>ping</code> , <code>ifconfig</code> or <code>ip</code> , <code>netstat</code> to troubleshoot network connectivity.
15	Advanced Scripting: Write a script to automate a task, such as backing up a directory, using <code>cron</code> to schedule it.

Books & References

1. Text Book:

- *The Design of the UNIX Operating System* - **Maurice J. Bach**, Pearson Education.

2. Reference Books:

- *UNIX Concepts and Applications* - **Sumitabha Das**, Tata McGraw-Hill.
- *Linux Administration Handbook* - **Evi Nemeth, Garth Snyder, and Trent R. Hein**, Prentice Hall.
- *Your UNIX/Linux: The Ultimate Guide* - **Sumitabha Das**, Tata McGraw-Hill.

MMCS0402-T Compiler Design

Unit No.	Topics
Unit 1	Introduction to Compiling: Compilers, Analysis of the source program, Phases of a compiler, Cousins of the compiler, Grouping of phases, Compiler construction tools.
Unit 2	Lexical Analysis: Role of the lexical analyzer, Token, Pattern, Lexeme, Input buffering, Specification of tokens, Recognition of tokens, Finite automata, Conversion from regular expression to NFA and DFA.
Unit 3	Syntax Analysis: Role of the parser, Context-free grammars, Writing a grammar, Top-down parsing (Recursive descent parsing, Predictive parsing), Bottom-up parsing (Shift-reduce parsing, Operator-precedence parsing, LR parsers).
Unit 4	Syntax-Directed Translation & Intermediate Code Generation: Syntax-directed definitions, Construction of syntax trees, Bottom-up evaluation of S-attributed definitions. Intermediate languages, Declarations, Assignment statements, Boolean expressions, Case statements, Backpatching.
Unit 5	Code Generation & Optimization: Issues in the design of a code generator, The target machine, Run-time storage management, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment. Introduction to code optimization, Peephole optimization.

Books & References

1. **Text Book:**
 - *Compilers: Principles, Techniques, and Tools* - **Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman**, Pearson Education.
2. **Reference Books:**
 - *Compiler Design* - **Santanu Chattopadhyay**, PHI Learning.
 - *Engineering a Compiler* - **Keith Cooper and Linda Torczon**, Morgan Kaufmann.

MMCS0402-P Compiler Design LAB

S.No.	Practical Topics
1	Lexical Analyzer: Write a program to identify tokens (keywords, identifiers, constants, operators) from a given input string.
2	Lex Specification: Implement a lexical analyzer using LEX tool to recognize tokens of a programming language.
3	Regular Expression to DFA: Write a program to convert a regular expression into a Non-deterministic Finite Automata (NFA) and then to a Deterministic Finite Automata (DFA).
4	Recursive Descent Parser: Implement a top-down parser to parse a given grammar

	(e.g., expression grammar).
5	Predictive Parser: Construct a predictive parser table for a given grammar and implement the parser.
6	Shift-Reduce Parser: Implement a bottom-up parser to parse a given grammar.
7	Operator Precedence Parser: Implement an operator precedence parser for a given language.
8	YACC Specification: Implement a syntax analyzer using YACC tool for a given programming language grammar.
9	Intermediate Code Generation: Write a program to generate intermediate code (Three-Address Code) for assignment statements.
10	Syntax Tree Construction: Write a program to construct a syntax tree for a given expression.
11	Code Optimization: Implement common subexpression elimination technique to optimize the intermediate code.
12	Dead Code Elimination: Write a program to perform dead code elimination on a given set of intermediate instructions.
13	Code Generation: Implement a simple code generator to produce assembly language instructions from intermediate code.
14	Symbol Table Management: Write a program to create and manage a symbol table for a programming language.
15	Compiler Integration: Integrate the lexical analyzer, syntax analyzer, and intermediate code generator to form a basic compiler.

Books & References

1. Text Book:

- *Compilers: Principles, Techniques, and Tools* - **Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman**, Pearson Education.

2. Reference Books:

- *Compiler Design* - **Santanu Chattopadhyay**, PHI Learning.
- *Engineering a Compiler* - **Keith Cooper and Linda Torczon**, Morgan Kaufmann.

MMCS0403-T ASP.NET and C#

Unit No.	Topics
Unit 1	Introduction to .NET Framework & C#: .NET Architecture, Common Language Runtime (CLR), Framework Class Library (FCL), C# Basics: Data types, Control structures, Classes and Objects, Inheritance, Polymorphism, Interfaces, Exception Handling.
Unit 2	ASP.NET Web Forms: ASP.NET Page Life Cycle, Server Controls (Web Server Controls, Validation Controls, User Controls), State Management (View State, Session State, Application State, Cookies), Master Pages, Themes and Skins.
Unit 3	Data Access with ADO.NET: ADO.NET Architecture, Data Providers, Connected and Disconnected Architecture, Connection, Command, DataReader, DataAdapter, DataSet, Data Binding with GridView, DataList, and Repeater controls.
Unit 4	ASP.NET Web Services & AJAX: Introduction to Web Services, SOAP, WSDL, Creating and Consuming Web Services. ASP.NET AJAX: ScriptManager, UpdatePanel, AJAX Control Toolkit.
Unit 5	Security and Deployment: Authentication (Forms, Windows), Authorization, Role-based security. Application Configuration (<code>web.config</code>), Deployment techniques, Publishing Web Applications to IIS.

Books & References

1. **Text Book:**
 - *Programming C#* - **Jesse Liberty**, O'Reilly Media.
2. **Reference Books:**
 - *ASP.NET: The Complete Reference* - **Matthew MacDonald**, Tata McGraw-Hill.
 - *Professional C#* - **Simon Robinson et al.**, Wrox Publications.
 - *Beginning ASP.NET 4.5 in C#* - **Matthew MacDonald**, Apress.

MMCS0403-P ASP.NET and C# LAB

S.No.	Practical Topics
1	C# Basics: Write a C# program to demonstrate Object-Oriented concepts like Inheritance and Polymorphism.
2	Exception Handling: Write a C# program to demonstrate <code>try-catch-finally</code> block for exception handling.
3	ASP.NET Web Form: Create a simple ASP.NET web form to accept user input (Name, Age, Address) and display it on the same page.
4	Validation Controls: Implement form validation using <code>RequiredFieldValidator</code> , <code>RangeValidator</code> , and <code>CompareValidator</code> in a registration form.
5	State Management (Session): Create a login page and use <code>Session</code> object to

	maintain user session state across multiple pages.
6	State Management (Cookies): Demonstrate the use of cookies to store and retrieve user preferences (e.g., theme color).
7	Master Pages: Create a Master Page with a menu navigation and apply it to multiple content pages.
8	ADO.NET Connection: Write a program to establish a connection to a SQL Server database using ADO.NET <code>SqlConnection</code> .
9	Data Binding (GridView): Retrieve data from a database and bind it to a <code>GridView</code> control using <code>SqlDataAdapter</code> and <code>DataSet</code> .
10	CRUD Operations: Develop a web application to perform Insert, Update, and Delete operations on a database table using ASP.NET controls.
11	DataList Control: Use <code>DataList</code> control to display database records in a customized layout.
12	Web Service: Create a simple ASMX Web Service to perform arithmetic operations and consume it in an ASP.NET web application.
13	AJAX (UpdatePanel): Use <code>ScriptManager</code> and <code>UpdatePanel</code> to update a specific portion of the web page without a full page postback.
14	Forms Authentication: Implement Forms Authentication to restrict access to certain pages based on user login.
15	Mini Project: Develop a complete functional web application (e.g., Online Bookstore) using C#, ASP.NET, and ADO.NET.

Books & References

1. **Text Book:**
 - *Programming C#* - **Jesse Liberty**, O'Reilly Media.
2. **Reference Books:**
 - *ASP.NET: The Complete Reference* - **Matthew MacDonald**, Tata McGraw-Hill.
 - *Professional C#* - **Simon Robinson et al.**, Wrox Publications.
 - *Beginning ASP.NET 4.5 in C#* - **Matthew MacDonald**, Apress.

MMCS0404(A)-T Artificial Intelligence and Expert System

Unit No.	Topics
Unit 1	Introduction to AI & Search Techniques: Definition, History, Turing Test, AI Applications, Intelligent Agents. Searching: BFS, DFS, Heuristic Search Techniques (Best-First Search, A* Search), Constraint Satisfaction Problems.
Unit 2	Knowledge Representation: Knowledge-Based Agents, Propositional Logic, First-Order Logic (FOL), Inference rules, Unification, Resolution in FOL, Knowledge Engineering, Semantic Nets, Frames.
Unit 3	Reasoning & Planning: Reasoning under Uncertainty, Bayesian Networks, Probabilistic Reasoning, Planning, Hierarchical Planning, Learning from Observations.
Unit 4	Expert System Architecture: Definition, Characteristics of Expert Systems, Components of Expert Systems (Knowledge Base, Inference Engine, User Interface, Explanation Module), Stages in Expert System Development, Knowledge Acquisition.
Unit 5	Expert System Tools & Applications: Knowledge Representation in Expert Systems (Rules, Frames), Inference Techniques (Forward Chaining, Backward Chaining), Expert System Shells, Case Studies of Expert Systems (MYCIN, DENDRAL).

Books & References

- Text Book:**
 - *Artificial Intelligence: A Modern Approach* - **Stuart Russell and Peter Norvig**, Pearson Education.
- Reference Books:**
 - *Artificial Intelligence* - **Elaine Rich and Kevin Knight**, Tata McGraw-Hill.
 - *Introduction to Artificial Intelligence and Expert Systems* - **Dan W. Patterson**, Prentice Hall.
 - *Expert Systems: Principles and Programming* - **Joseph C. Giarratano and Gary D. Riley**, Course Technology.

