

MCAC-0511

Theory of Computation

UNIT-I

FINITE AUTOMATA (FA)

Introduction, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)- Definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion.

UNIT – II

REGULAR EXPRESSIONS (RE)

Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions. REGULAR GRAMMARS: Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages.

UNIT – III

CONTEXT FREE GRAMMER (CFG)

Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG's, Minimization of CFG's, CNF, GNF, Pumping Lemma for CFL's, Enumeration of Properties of CFL (Proof's omitted).

UNIT-IV

PUSHDOWN AUTOMATA

Definition, Model, Acceptance of CFL, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA. TURING MACHINES (TM): Formal definition and behaviour, Languages of a TM, TM as accepters, and TM as a computer of integer functions, Types of TMs.

UNIT- V

RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL)

Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context sensitive language and linear

bounded automata (LBA), Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and Computation, 3rd edition, Pearson Education, India.

REFERENCE BOOKS

1. K. L. P Mishra, N. Chandrashekar (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.

MCAC-0512

Advanced Database Management System

Unit-1

Comparison between different databases

Significance of Databases, Database System Applications, Advantages and Disadvantages of different Database Management systems, Comparison between DBMS, RDBMS, Distributed and Centralized DB.

Unit-II

RDBMS and SQL

Relational Query Languages, The SQL Query Language, Querying Multiple Relations, Creating Relations in SQL, Destroying and Altering Relations, Adding and Deleting Tuples, Integrity Constraints (ICs), Primary and Candidate Keys in SQL, Foreign Keys, Referential Integrity in SQL, Enforcing Referential Integrity, Categories of SQL Commands, Data Definition, Data Manipulation Statements: SELECT - The Basic Form Subqueries, Functions, GROUP BY Feature, Updating the Database, Data Definition Facilities, Views, Embedded SQL *, Declaring Variables and Exceptions, Embedding SQL Statements, Transaction Processing, Consistency and Isolation, Atomicity and Durability, Dynamic SQL.

Unit-III

Normalization

Functional Dependency, Anomalies in a Database, The normalization process: Conversion to first normal form, Conversion to second normal form, Conversion to third normal form, The boyce-code normal form(BCNF), Fourth Normal form and fifth normal form, normalization and database design, Denormalization

Unit-IV

Query Optimization

Algorithm for Executing Query Operations: External sorting, Select operation, Join operation, PROJECT and set operation, Aggregate operations, Outer join, Heuristics in Query Optimization, Semantic Query Optimization, Converting Query Tree to Query Evaluation Plan, multiquery optimization and application, Efficient and extensible algorithms for multi-query optimization, execution strategies for SQL sub queries, Query Processing for SQL Updates

Unit-V

Query Execution

Introduction to Physical-Query-Plan Operators, One-Pass Algorithms for Database, Operations, Nested-Loop Joins, Two-Pass Algorithms Based on Sorting, Two-Pass, Algorithms Based on Hashing, Index-Based Algorithms, Buffer Management, Parallel Algorithms for Relational Operations, Using Heuristics in Query Optimization, Basic Algorithms for Executing Query Operations, Query processing mechanisms, Enforcing, Serializability by Locks, Locking Systems With Several, Lock Modes, Architecture for a Locking Scheduler, ACID properties, , Managing Hierarchies of Database Elements, Concurrency Control by Timestamps, Concurrency Control by Validation, Database recovery management, distributed locking.

Referred/Text Books:

1. A. Silberschatz, H. Korth, S. Sudarshan, Database system concepts, 5/e, McGraw Hill, 2008.
2. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education India

MCAC-0513

Programming with C++

Unit-I

Basics

Overview, Input/output, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures, Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments, friend functions, virtual functions

Unit-II

Basics of object and class in C++, Private, Public and Protected members, static data and function members, constructors and their types, destructors, operator overloading, type conversion, Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, virtual base class.

Unit-III

Pointers in C++, Pointers and Objects, this pointer, virtual and pure virtual functions, implementing polymorphism, Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream, C++ File stream classes, File management functions, File modes, Binary and random Files.

Unit-IV

Template, function templates, Overloading of Function templates, Arguments in function templates, class templates, inheritance of class Templates, class templates with overloaded operators

Unit-V

Introduction to exception, try-catch-throw, multiple catch, catch all, rethrowing exception, implementing user defined exceptions, Overview and use of Standard Template Library, Exceptions in constructors and Destructors, Uncaught Exceptions handling, Exceptions in Class Templates, Exceptions in operator overloaded functions.

Referred/Text Books

1. KR Venugopal, Rajkumar, T Ravishankar, Mastering C++, TATA McGRAW HILL
2. E Balguruswami, Object-Oriented Programming with C++, McGraw Hill Education
3. Herbert Schildt, C++: The Complete Reference, McGraw Hill Education

MCAC-0514

Probability and Statistics

Unit-I

The axioms of probability, Random experiment, outcome, trial and event, Exhaustive events, favourable events, Independent events, sample space, definition of probability, addition theorem of probability, conditional probability, independent events, Mutually and pair wise independent events, multiplication theorem of probability for independent events, Baye's theorem.

Unit-II

Random Variable, Distribution function, discrete random variable, Probability mass function, Distribution function of discrete random variable, Continuous random variable, Probability density function. Distribution functions of continuous random variable. Two dimensional probability mass function, Marginal probability function, conditional probability function, Two dimensional distribution function, marginal distribution function, Joint density function, marginal density function.

Unit-III

Expected value of random variable, expected value of function of a random variable, properties of expectations, Various measures of Central Tendency, Dispersion, skewness and Kurtosis for continuous probability distribution, continuous distribution function, Variance, Properties of variance, covariance.

Unit-IV

Moment Generating Function, Properties of moment generating function, cumulants. Explain the meaning and application of averages, define the meaning and calculation of positional averages, and discuss merits, demerits and limitations of averages.

Unit-V

Control charts for measurements -X and R charts, – Control charts for attributes p, c and np charts – Tolerance limits – Acceptance sampling. Explain the meaning of dispersion, describe the measures of dispersion, and classify the measures of shape of data. raw moments & central moments, Effect of change of origin and scale on moments, Pearsonian coefficients Measures of skewness, kurtosis, Standard Distribution- Binomial, Poisson, Negative Binomial Distribution, Normal Distribution and their properties.

Referred/Text Books:

1. Modern Mathematical Statistics by E.J.Dudewicz & S.N. Mish
2. Introduction to the Theory of Statistics by A.M. Mood, F.A. Graybill and D.C. Boes

MCAC-0515

Management Accountancy

Unit-I

Introduction to Management Accountancy, Features, Scope, Importance, Functions, Differences between Financial accounting, Cost accounting and Management accounting, Budgetary Control, Characteristics, Objectives, Steps, Advantages, Limitations, Types of budgets Fixed and Flexible Budget, Cash Budget and master Budget, Zero based Budgeting

Unit-II

Cost, Technique of Costing, Classification of Cost, Elements of Cost, Statement of Cost Sheet, Solved Problems, Standard Costing, Advantages, Limitations, Preliminaries, Steps in setting up of standard costs, Differences between Budgetary control and standard costing, Estimated cost, Marginal Costing, Merits and Demerits, Absorption Costing, Difference between Absorption Costing and Marginal Costing, Cost-Volume-Profit (CVP) Analysis, Contribution, Break even analysis, Profit Volume Ratio, Margin of safety. Variance Analysis, Favorable and Unfavorable variances, Controllable and uncontrollable variances, Uses of variances, Analysis of variances, Types of variances

Unit-III

Final Accounts, Adjustments before preparing final accounts , Depreciation , Bad Debts and accounting treatment of bad debts , Provision for doubtful debts , Reserves for Discount on Debtors , Reserve for Discount on Creditors , Closing Stock, Trading Account , Profit and Loss Account, Balance Sheet. Dividend policy, Types of dividend policy, Factors influencing dividend policy.

Unit-IV

Management accounting ,The Role of Management Accounting , Management Accounting Framework , Functions of Management Accounting ,Tools of Management Accounting ,The Balanced Scorecard , Cost Management System , Value Added Concept , Merits of Management Accounting , Demerits of Management Accounting , Distinction between Management Accounting and Financial Accounting, Financial Statement Analysis, Meaning of Ratio , Steps in Ratio Analysis ,Classification of Ratios , Du Pont Chart , Solved Problems , Advantages of Ratio Analysis , Limitation of Ratio analysis. Working capital, kinds of working capital, estimation of working capital requirement.

Unit-V

Funds Flow Analysis, Funds Flow Statement, Ascertainment of flow of funds, Technique of preparing funds flow statement, Schedule of Changes in Working Capital, Adjusted Profit and Loss account, Funds Flow Statement, Cash Flow Analysis, Cash Flow Statement , Purpose of Cash Flow Statement , Preparation of Cash Flow Statement , Format of Cash Flow Statement (AS3: Revised Method) , Cash Flow from Operating Activities , Cash Flow Statement under Direct Method , Different between Cash Flow Analysis and Fund Flow Analysis, Uses of Cash Flow Statement

Referred/Text Books:

1. Jawahar Lal, Cost Accounting, Tata McGraw Hill New Delhi
2. B.M. Lall Nigam and I.C. Jain, Cost Accounting, Principles, Methods and Techniques, PHI Pvt. Ltd, New Delhi
3. H. V. Jhamb, H. V. Jhamb, Fundamentals of Cost Accounting, Ane Books Pvt Ltd, New Delhi