

MCSE 301 (A):Data Mining and Warehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNITII

Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori,Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K- Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNITIII

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models & linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNITIV

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNITV

Data warehousing :Data ware house, OLAP and Data mining. OLTP vs. OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

ReferenceBooks :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.

MCSE 301(B):SimulationandModeling

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III

Simulation of Queueing System: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT IV

System Dynamics & Probability concepts in Simulation:Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models , Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform ContinuouslyDistributed Random Numbers, Rejection Method.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :

1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

MCSE 301(C): HighPerformanceComputing

UNIT-I

Introduction to high performance computing: cluster, grid, meta-computing, middleware etc., examples of representative applications. Programming models: shared memory, message passing, peer-to-peer, broker-based. Introduction to PVM and MPI. Architecture of cluster-based systems, Issues in cluster design: performance, single-system-image, fault tolerance, manageability, programmability, load balancing, security, storage..

UNIT-II

High performance sequential computing: Effects of the memory hierarchy, Out-of-order execution, superscalar processors, Vector processing. Shared-memory processing: Architectures (extensions of the memory hierarchy), Programming paradigms, OpenMP Distributed-memory processing: Architectural issues(networks and interconnects), Programming paradigms, MPI (+MPI2)

UNIT-III

Grids: Computational grids, Data grids ,Architecture of Grid systems, Grid security infrastructure. Examples of Grids: Globus etc

UNIT-IV

Performance issues and measurement: Profiling and development tools, Sustained versus peak performance, Performance libraries and packages

UNIT-

The productivity crisis & future directions: Development overheads, Petaflops programming, New parallel languages: UPC, Titanium, Co-Array FORTRAN

BOOKS:

1. Charles Severance, Kevin Dowd “High Performance Computing”, Second Edition by, O’reilly, Second Edition July 1998
2. David j. Kuck “High Performance Computing” Oxford Univ Pr, 1996
3. Gary W. Sabot “High Performance Computing ” Addison-Wesley, 1995

MCSE 302(A): Wireless LAN and Mobile Computing

UNIT-I

Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth. Modern Wireless Communication Systems 2G/2.5G/3G/4G Wireless Networks and Standards, Wireless in Local loop & LMDS Cellular Concepts.

Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

UNIT-II

Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path loss from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT-III

Co channel Interference reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an Omni directional antenna system, Design of a directional antenna system,. Lowering the antenna height, reduction of co channel interference by mean of a notch in the tilted antenna Pattern, Power control.

UNIT-IV

Frequency management & channel Assignment: Frequency management, Frequency spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT-V

Handoffs and Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u .

Reference Books:

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH

MCSE 302(B): ADVANCED DISTRIBUTED SYSTEM

UNIT-I

Introduction to distributed System: comparison of distributed and centralized systems, Characterization of Distributed Systems , Resource Sharing and the Web -Challenges ,System Models , Architectural and Fundamental Models , Networking :-- Types of Networks , Network Principles - Internet Protocols – Case Studies.

UNIT-II

Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication- Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects , RPC, RPC Architecture, Events and Notifications - Java RMI -Case Study.

UNIT-III

Operating System Issues – I: The OS Layer - Protection - Processes and Threads - Communication and Invocation –OS Architecture, Security: introduction, security techniques, cryptographic algorithms, authentication and access control, File Systems :- File Service Architecture , Sun Network File System , The Andrew File System.

UNIT-IV

Operating System Issues – II: Name Services -Domain Name System - Directory and Discovery Services – Global Name Service - X.500 Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT-V

Distributed Transaction Processing: Transactions, Nested Transactions, Locks, Optimistic Concurrency Control , Timestamp Ordering, Comparison, Flat and Nested Distributed Transactions , Atomic Commit Protocols - Concurrency Control in Distributed Transactions , Distributed Deadlocks , Transaction Recovery - Overview of Replication And Distributed Multimedia Systems

Reference Books:

1. G Coulouris, J Dollimore, T Kindberg, Distributed Sys Concept- Design, Pearson
2. Sape Mullender, Distributed Systems, Addison Wesley,
3. A Fleishman, Distributed Systems- Software Design and Implementation, S Verlag
4. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education
5. AS Tanenbaum, Maarten van, ,Distibuted System Principles Paradigms, Pearson
6. M Singhal, Niranjana, Shivaratri, Advanced Concept in Operating System, TMH

MCSE 302(C): Parallel Computation and Applications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism- Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, “Fundamentals Of Parallel Processing”, Pearson Education, 2003
2. Kaihwang and Faye A. Briggs, “Computer Architecture and Parallel Processing”, McGraw Hill Series.
3. Kaihwang, “Advanced Computer Architecture – Parallelism, Scalability, Programmability”.
4. Michael J. Quinn, “Parallel Computing – Theory and Practice”, McGraw Hill Publication.