Third Semester MCA

Code No	Subject		Theory			Practical		
		Lecture	Credit	University	Internal	Hours/Week	Credit	Marks
		Hrs/ Week	Theory	Marks	Evaluation	L/T	Practical	
	Semester – 3							
NMCA 301	Design Analysis and Algorithms	3	3	100	50	2	1	50
NMCA 302	Theory of Computation	3	4	100	50			
NMCA 303	Computer Networks	3	3	100	50	2	1	50
NMCA 304	Database Management Systems	3	3	100	50	2	1	50
NMCA 305	Quantitative Techniques (OR & SM)	3	4	100	50			
NMCA 306	Advance OS	3	4	100	50			
NMCA 307	Minor Project					6	2	100
TOTAL		18	21	600	300	14	05	250
TOTAL Marks: 1150								
Total Credits: 26								

NMCA 301 DESIGN AND ANALYSIS OF ALGORITHMS

Module 1 (10 Hours)

INTRODUCTION

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.Amortized Analysis.

Module 2(10 Hours)

BRUTE FORCE AND DIVIDE-AND-CONQUER

Brute Force – Closest-Pair and Convex-Hull Problems-Exhaustive Search – Traveling Salesman Problem – Knapsack Problem – Assignment problem. Divide and conquer methodology – Merge sort –Heap Sort- Quick sort – Binary search – Multiplication of LargeIntegers – Strassen's Matrix Multiplication-Closest-Pair and Convex-Hull Problems.

Module 3(10 Hours)
DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE
Computing a Binomial Coefficient – Warshall's and Floyd's algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees.

Module 4 (10 Hours)
ITERATIVE IMPROVEMENT
The Simplex Method-The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs- the Stable marriage Problem.

COPING WITH THE LIMITATIONS OF ALGORITHM POWER
Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems–Coping with the Limitations – Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem.
Module 5 (6 Hours)
(as per choice of faculty)
Portion covered can be tested through Internal evaluation only not to be included in University examination)

Text Books:
1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

2. Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education, 2012.

REFERENCES:

1. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.
2. Donald E. Knuth, “The Art of Computer Programming”, Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, “The Algorithm Design Manual”, Second Edition, Springer, 2008
3. http://nptel.ac.in/

NMCA 302 THEORY OF COMPUTATION

Module 1 (10 Hours)
Alphabet, languages and grammars. Production rules and derivation of languages.Chomsky's hierarchy of languages and Grammars. Regular grammars, regular expressions and finiteautomata (deterministic and nondeterministic). Closure and decision properties ofregular sets. Pumping lemma of regular sets. Minimization of finite automata. Leftand right linear grammars.DFA/NFA to regular expression and vice versa using Arden's Formula.

Module 2 (10 Hours)
Context free grammars and pushdown automata. Chomsky and Griebach normalforms. Parse trees, Cook, Younger, Kasami, and Early's parsing algorithms.Ambiguity and properties of context free languages. Pumping lemma, Ogden'slemma, Parikh's theorem. Deterministic pushdown automata, closure properties of deterministic context free languages.

Module 3 (10 Hours)
Turing machines and variation of Turing machine model, Turing computability, Type 0 languages. Linear bounded automata and context sensitive languages. Primitive recursive functions. Cantor and Gödel numbering. Ackermann's function, murecursive functions, recursiveness of Ackermann and Turing computable functions.

Module 4 (10 Hours)
Church Turing hypothesis. Recursive and recursively enumerable sets.. UniversalTuring machine and undecidable problems. Undecidability of Post correspondence problem. Valid and invalid computations of Turing machines and some undecidable properties of context free language problems.
Time complexity class P, class NP, NP completeness.

Module 5 (6 Hours)
(as per choice of faculty)
Portion covered can be tested through Internal evaluation only not to be included in University examination)

Text Books:

1. Introduction to Automata Theory, Languages and Computation: J.E. Hopcroft and J.DUllman, Pearson Education, 3rd Edition.
2. Introduction to the theory of computation: Michael Sipser, Cengage Learning

Reference Books:

1. Automata Theory: Nasir and Srimani , Cambridge University Press.
2. Introduction to Computer Theory: Daniel I.A. Cohen, Willey India, 2nd Edition.

NMCA 303 COMPUTER NETWORKS

Module 1 (10 Hours)

Network architecture – layers – Physical links – Channel access on links – Hybrid multiple accesstechniques - Issues in the data link layer - Framing – Error correction and detection – Link-level FlowControl

Module 2 (10 Hours)

Medium access – CSMA – Ethernet – Token ring – FDDI - Wireless LAN – Bridges andSwitches,Circuit switching vs. packet switching / Packet switched networks – IP – ARP – RARP – DHCP – ICMP –Queueing discipline – Routing algorithms – RIP – OSPF – Subnetting– CIDR – Interdomain routing – BGP – Ipv6 – Multicasting – Congestion avoidance in network layer

Module 3 (10 Hours)

UDP – TCP – Adaptive Flow Control – Adaptive Retransmission -Congestion control – Congestionavoidance – QoS

Module 4 (10 Hours)

Email (SMTP, MIME, IMAP, POP3) – HTTP – DNS- SNMP – Telnet – FTP –Security – PGP - SSH

Module 5 (6 Hours)

(as per choice of faculty)

Portion covered can be tested through Internal evaluation only not to be included in University examination)

Preferably use of NetSim, NS2

TEXT BOOK :

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Third Edition,Morgan Kauffmann Publishers Inc., 2003.

REFERENCES:

1. JamesF.Kuross,KeithW.Ross,“Computer Networking,ATop DownApproachFeaturingtheInternet”,Third Edition,Addison Wesley, 2004.
2. NaderF.Mir,“Computer andCommunicationNetworks”,PearsonEducation,2007
3. Comer, “ComputerNetworks andInternetswithInternetApplications”,Fourth Edition, PearsonEducation,2003.
4. Andrew S.Tanenbaum,“Computer Networks”,FourthEdition,2003.
5. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education,2000

NMCA 304 DATABASE MANAGEMENT SYSTEMS

Module1 :(10Hours)
Introductory concepts of DBMS:
Introduction and applications of DBMS, Purpose of data base, Data, Independence, Database System architecture- levels, Mappings, Database, users and DBA

Relational Model:
Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, relational algebra queries, tuple relational calculus

Module2: (16 Hours)
Entity-Relationship model:
Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema.

Relational Database design:
Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1NF, 2NF, 3NF, Decomposition using FD- dependency preservation, BCNF, Multi- valued dependency, 4NF, Join dependency and 5NF.

Module3: (10 Hours)
Query Processing & Query Optimization:
Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, materialized views

Transaction Management:
Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking

Module 4 (10 Hours)
Security:
Introduction, Discretionary access control, Mandatory Access Control, Data Encryption
SQL Concepts:
Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator,Functions - aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries,

correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. transaction control commands – Commit, Rollback, Savepoint Distributed Data Base concepts.

PL/SQL Concepts:

Cursors, Stored Procedures, Stored Function, Database Triggers

Module 5 (6 Hours)

(As per choice of faculty)

(Portion covered can be tested through Internal evaluation only not to be included in University examination)

Text Books:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, “Database Systems Concepts”, McGraw-Hill Education , New Delhi
2. RamezElmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Pearson Education Inc., New Delhi.

1. Hector Garcia-Molina, Jeffret D. Ullman, JennifferWidom, “Database Systems: A Complete Book”, Pearson Education Inc., New Delhi.
2. C. J. Date “An introduction to Database System”, Pearson Education Inc., New Delhi.
3. Bipin Desai, “An introduction to Database System”, Galgotia Publications.
4. Peter Rob & Carlos Coronel, “Database Systems: Design, Implementation, and Management”, CENGAGE Learning India Pvt. Ltd., New Delhi.
5. Mark L. Gillenson, “Fundamentals of Database Management Systems”, Wiley India Pvt. Ltd., New delhi.
6. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw-Hill Education (India), New Delhi.

NMCA 305 QUANTITATIVE TECHNIQUES
OR (OPERATIONS RESEARCH) &SM(SIMULATION & MODELING)

Module 1 (10 Hours)

Introduction to OR

Concepts, genesis, Art of modeling, components of model, Types of OR models, effect of data availability on modeling, Computations in OR, Phases of OR study

Linear Programming (LP)

Concepts, Formulation of model, Graphical solution, Maximization / Minimization – Simplex Algorithm, Use of slack / surplus / artificial variables, BigM and Two phase method – Nature & type of solutions, Interpretation of optimal solution. Dual problem – relation between primal and dual , Dual simplex method – Interpretation of dual variables, Revised Simplex Method, Introduction to Integer programming, Developing software for LP solution methods and exposure to available LP & IP Packages.

Module 2(10 Hours)

Transportation & Assignment problems

Concepts, formulations of models, Solution procedures, Optimality checks, Balanced/Unbalanced, Maximum/Minimum problems, Prohibited case – degeneracy

Network Analysis

Network Definition, Minimal spanning tree problem, shortest route problem, Maximal flow problem concepts and solution algorithm as applied to problems. Project planning and control by PERT/CPM network, Probability assessment in PERT network.

Introduction to resource smoothing and allocation

Development of software for the techniques and exposure to Project Management Packages.

Module 3(10 Hours)

Queuing Models

Concepts relating to Queuing systems, types of queuing system (use of six character code), Basic elements of Queuing Model, Role of Poison & Exponential Distribution, Concepts of Birth and Death process, Steady state measures of performance, M/M/1

model with and without limitation of q-size M/G/1, single channel with Poisson arrival rate and general service time.

Module 4 (10 Hours)

Computer Modeling& Simulation

Use of Computer in modeling real life situations, Distribution functions, Random number generation, Selection of input probability distribution, Design of simulation models Experimental design, output analysis variance reduction techniques. Introduction to simulation languages Programming tools for developing simulation models.

Replacement & Maintenance Models

Replacement of items, subject to deterioration of items subject to random failure Group Vs. Individual replacement policies.

Module 5 (6 Hours)

Stress on Non-Linear Programming & its Applications.

(as per choice of faculty)

Portion covered can be tested through Internal evaluation only not to be included in University examination)

Books:

1. Operation Research, KantiSwaroop
2. Operation Research,V.K. Kapoor
3. Operation Research,PaneerSelvam,PHI
4. Operations Research, Hillier & Lieberman, TMH

NMCA 306 ADVANCED OS

Module 1 (10 Hours)

Architectures of Distributed Systems - System Architecture types - issues in distributedoperating systems - communication networks – communication primitives. TheoreticalFoundations - inherent limitations of a distributed system – lamp ports logical clocks –vector clocks – casual ordering of messages – global state – cuts of a distributedcomputation – termination detection. Distributed Mutual Exclusion – introduction – theclassification of mutual exclusion and associated algorithms – a comparativeperformance analysis.

Module 2 (10 Hours)

Distributed Deadlock Detection -Introduction - deadlock handling strategies indistributed systems – issues in deadlock detection and resolution – control organizationsfor distributed deadlock detection – centralized and distributed deadlock detectionalgorithms –hierarchical deadlock detection algorithms. Agreement protocols – introduction-the system model, a classification of agreement problems, solutions to theByzantine agreement problem, applications of agreement algorithms. Distributedresource management: introduction-architecture – mechanism for building distributed filesystems – design issues – log structured file systems.

Module 3 (10 Hours)

Distributed shared memory-Architecture– algorithms for implementing DSM – memorycoherence and protocols – design issues. Distributed Scheduling – introduction – issuesin load distributing – components of a load distributing algorithm – stability – loaddistributing algorithm – performance comparison – selecting a suitable load sharingalgorithm – requirements for load distributing -task migration and associated issues.Failure Recovery and Fault tolerance: introduction– basic concepts – classification offailures – backward and forward error recovery, backward error recovery- recovery inconcurrent systems – consistent set of check points – synchronous and asynchronouscheck pointing and recovery – check pointing for distributed database systems- recoveryin replicated distributed databases.

Module 4 (10 Hours)

Protection and security -preliminaries, the access matrix model and its implementations.-safety in matrix model- advanced models of protection. Data security –cryptography:Model of cryptography, conventional cryptography- modern cryptography, privatekey cryptography, data encryption standard- public key cryptography – multiple encryption –authentication in distributed systems.

Multiprocessor operating systems - basic multiprocessor system architectures – interconnection networks for multiprocessor systems – caching – hypercube architecture.Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling.Database Operating systems :Introduction- requirements of a database operatingsystem Concurrency control : theoretical aspects – introduction, database systems – aconcurrency control model of database systems- the problem of concurrency control –serializability theory- distributed database systems, concurrency control algorithms –introduction, basic synchronization primitives, lock based algorithms-timestamp basedalgorithms, optimistic algorithms – concurrency control algorithms, data replication.

Module 5 (6 Hours)

Preferably use of MapReduce.
(as per choice of faculty)
Portion covered can be tested through Internal evaluation only not to be included in University examination)

Text Book:

1. Andrew S. Tanenbaum and Maarten van Steen. “Distributed Systems: Principles and Paradigms”, Prentice Hall, 2nd Edition, 2007. (Required)

References:

1. MukeshSinghal, NiranjanG.Shivaratri, "Advanced concepts in operating systems:Distributed, Database and multiprocessor operating systems", TMH, 2001
2. PradeepK.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.

NMCA 307 MINOR PROJECTS

Small project on MapReduce, Maple, NetSim, NS2

Practical

MCA 301 DESIGN AND ANALYSIS OF ALGORITHM LAB

Design, develop and implement the specified algorithms for the following problems using C/C++ Language in LINUX /Windows environment.

1. Sort a given set of elements using the Quicksort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.The elements can be read from a file or can be generated using the random number generator.

2. Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

3. a. Obtain the Topological ordering of vertices in a given digraph.
b. Compute the transitive closure of a given directed graph using Warshall's algorithm.

4. Implement 0/1 Knapsack problem using Dynamic Programming.

5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.

6. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.

7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
b. Check whether a given graph is connected or not using DFS method.

8. Find a subset of a given set S = {sl, s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S={1, 2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}.A
suitable message is to be displayed if the given problem instance doesn't have a solution.

9. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.

10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.

11. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm,
implement it using OpenMP and determine the speed-up achieved.

12. Implement N Queen's problem using Back Tracking.

List of Practice Experiments:

1. Write C++ programs to implement the following:
a) Prim's algorithm.
b) Kruskal's algorithm.
2. Write a C++ program to find optimal ordering of matrix
multiplication. (Note: Use Dynamic programming method).
3. Consider the problem of eight queens on an (8x8) chessboard.
Two queens are said to attack each other if they are on the same row, column, or diagonal.
Write a C++ program that implements backtracking algorithm to solve the problem i.e.place eight non-attacking queens on the board.
4. Write a C++ program to find the strongly connected components in a digraph.
5. Write a C++ program to implement file compression (and un-compression) usingHuffman's algorithm.
6. Write a C++ program to implement dynamic programming algorithm to solve all pairsshortest path problem.
7. Write a C++ program to solve 0/1 knapsack problem using the following:
a) Greedy algorithm.
b) Dynamic programming algorithm.

c) Backtracking algorithm.

d) Branch and bound algorithm.

8. Write a C++ program that uses dynamic programming algorithm to solve the optimal binary
search tree problem.

9. Write a C++ program for solving traveling sales persons problem using the following: a) Dynamic programming algorithm.

b) The back tracking algorithm.

c) Branch and Bound.

REFERENCEBOOKS :

1. Richard F.Gilberg, BehrouzA.Forouzan, Thomson, “Data Structures, A PseudocodeApproach with C++”, 1st ed., Business Information Press, 2007.
2. D.S.Malik, Thomson, “Data Structures Using C++”, 1st ed., Cengage Learning, 2007.
3. Ellis Horowitz, SatrajSahni and Rajasekharam, “Fundamentals of Computer Algorithms”, 2nd ed., Galgotia publications pvt.Ltd, 2006.

NMCA 303 COMPUTER NETWORKS LAB

1.1 PC-to-PCCOMMUNICATIONSUNDERWIN98/WIN2000'sDIRECTCABLE CONNECTIONwithNULLMODEM

a) Using Serial PortsandRS-232CCable Connection
b)UsingParallelPortsandDirectParallelCableConnecti on

1.2.1 PC-to-PCCOMMUNICATIONS UNDER WIN98/WIN2000'sDIAL-UP NETWORKING with**MODEM**and4-LINEEXCHANGE

1.3. PC-to-PCCOMMUNICATIONS UNDERWIN98/WIN2000'sHYPERTERMINALwithMODEMand4-LINEEXCHANGE

1.4 LANWITHBUS/STAR(SwitchorHub)TOPOLOGYwithaminimumoftwo systems)WindowsPeer-to-PeerNetwork ii)WindowsNTClient-ServerNetwork

1.5 LANWITHBUS/STAR(SwitchorHub)TOPOLOGYwithaminimumoftwosystemsusing NOVELL Netware

1.6 TERMINALNETWORKWITHUNIX/LINUXSERVERandoneortwo TerminalsusingSerialPorts

1.7 TERMINALNETWORKWITHUNIX/LINUXSERVER,8–port Terminal Server and one or two terminals

LIST OF EXPERIMENTS:

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting.
8. Applications using TCP Sockets like
a. Echo client and echo server
b. Chat
c. File Transfer
9. Applications using TCP and UDP Sockets like
d. DNS
e. SNMP
f. File Transfer
10. Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS/NetSim
11. Perform a case study about the different routing algorithms to select the network path with itsoptimum and economical during data transfer.
i. Link State routing
ii. Flooding
iii. Distance vector

Reference Books:

TheCompleteReferenceSeries:WIN98/WIN2000/UNIX/REDHATX/Networking,TMH Edition

NMCA 304 DATABASE MANAGEMENT SYSTEM LABS

CourseDescription:ThiscourseexploresdatabaseprogrammingusingbothnativeandembeddedANSI-standardStructuredQueryLanguage(SQL).Topicsincludeenterprise databasemanagementsystems,databasemiddleware,datadefinitionlanguage,data manipulationlanguage,datacontrollanguage,databasequeriesreporting,query optimization,anddatabaseviews.Studentassignmentsincludedatabasecreation,query designandprogramming,anddatabasemanipulationviaembeddedSQLcallsfroma programminglanguage.

CourseGoal: Successfulgraduatesofthiscourseshouldbeableto:

1. Understandthefundamentalsofarelationaldatabase
2. Understandthefundamentalsofclient-server and multi-tieredapplications
3. UnderstandtheuseofStructuredQueryLanguage(SQL)asadatadefinitionlanguage,data Manipulationlanguage,anddatacontrollanguage
4. Understand and write SQL/PL_SQLqueriestocreate,report,andupdatedatain arelationaldatabase
5. Understandthepurposeofandbeabletocreateviews,scripts,triggers,and transactions
6. Understandandbeabletoimplementthefundamentalsofsecurityand permissionsinSQLServer
7. Designentityrelationshipmodelsforabusinessproblemanddevelopa normalizeddatabasestructure.

LIST OF EXPERIMENTS:

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
6. Study of PL/SQL block.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
9. Creation of Procedures.
10. Creation of database triggers and functions

11. Mini project (Application Development using Oracle/ Mysql)

a) Inventory Control System.

b) Material Requirement Processing.

c) Hospital Management System.

d) Railway Reservation System.

e) Personal Information System.

f) Web Based User Identification System.

g) Timetable Management System.

h) Hotel Management System

12. Using Oracle or DB2 under Windows platform and MySQL under Linux/Unix platform

Reference Books:

1. IntroductiontoRelationalDatabasesandSQLProgramming,ChristopherAllen, SimonChatwin,CatherineA.VrearyTataMcGraw-Hill
2. OracleSQLandPL/SQLHandbook,JohnAdolphPalinski,PearsonEducation
3. Oracle11iPL/SQLProgramming,ScottUrman,TataMcGraw-Hill
4. MySQL:TheCompleteReference,VikramVaswani,TataMcgraw-Hill
5. MySQLBible,SteveSuehring,Wiley