

Chandigarh Business School of Administration

Vision of Chandigarh Business School of Administration	
“To be recognized as the leading business school creating committed professionals determined to serve the society”	
Mission of Chandigarh Business School of Administration	
M1	To continuously grow and become a fountainhead among the business schools through effective teaching learning processes and pre-placement training.
M2	To strengthen connections with the academia, industry and alumni to facilitate overall development of the students.
M3	To enhance business and technological knowledge of students by providing state-of-the-art facilities.
M4	To provide opportunities to the students for global exposure through international tie-ups.
M5	To develop research, innovation and entrepreneurial culture among students and faculty.
M6	To create ethical and socially responsible professionals for the society.

Department of Computer Applications

Vision of Department of Computer Applications

The Department of Computer Applications endeavors to create the most encouraging environment for quality academics and nurturing students into global IT professionals.

Mission of Department of Computer Applications

M1	To bridge the gap between industry and academia through Training and Placement practices.
M2	To foster a culture of technical excellence among both students and faculty.
M3	The department strives for building quality professionals that are committed and self-motivated with specific skills and to prepare the students for the diverse workplace of the global Environment.
M4	To nurture a community of ethical and socially conscious professionals.
M5	To empower the students through strategic international collaborations and providing global exposure.

Program Outcomes (POs) of MCA

1	Computational Knowledge	Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.
2	Problem Analysis	Identify, formulate, research literature, and solve complex computing problem searching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.
3	Design /Development of Solutions	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

4	Conduct investigations of complex Computing problems	User search-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern Tool Usage	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
6	Professional Ethics	Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practices.
7	Project management and finance	Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team to manage projects and in multidisciplinary environments.
8	Communication Efficacy	Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
9	Societal and Environmental Concern	Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practices.
10	Individual and Team Work	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
11	Innovation and Entrepreneurship	Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.
12	Life-long Learning	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.

MCA Program Educational Objectives (PEOs)

PEO1	To provide opportunities for acquiring in-depth knowledge of fundamental concepts and programming skills for holistic development.
PEO2	To develop the abilities to face the changing industry trends and to apply current tools and technologies to create systems for solving industry oriented problems.
PEO3	To demonstrate the ability to work effectively as a team member and to embed strong human values and professional ethics for becoming social responsibilities.

Course Outcomes of MCA- 1st Semester	
After the Completion of the Course, students will be able to:	
Computer Programming using C(Bridge Course) (26C2CAP-B1)	
Course Code	Course Outcomes
CO1	Explain the fundamentals of programming including data representation, algorithms, flowcharts, pseudo code, character sets, identifiers, variables, constants and expressions.
CO2	Apply arithmetic, relational, logical, assignment and conditional operators along with library functions to develop basic programs.
CO3	Make use of input-output operations and control statements such as loops and decision-making structures in program development.
CO4	Utilize arrays, strings and storage classes for efficient data handling and manipulation in programs.
CO5	Create programs using functions, recursion and basic object-oriented concepts including classes and objects.
Course Outcomes of MCA- 1st Semester	
After the Completion of the Course, students will be able to:	
Computer Science Essentials(Bridge Course) (26C2CAP-B2)	
Course Code	Course Outcomes
CO1	Explain the basic concepts of computer systems including hardware, software, data, information, and various input-output devices.
CO2	Describe different types of memory and apply number systems, conversions, and binary arithmetic in data representation.
CO3	Make Use of word processing and spreadsheet software to create, edit, format documents, perform calculations, and generate charts.
CO4	Analyze the presentation using graphics software and explain the basic concepts and components of a Database Management System.
CO5	Interpret the fundamentals of operating systems, data communication methods and different types of computer networks and topologies.
Course Outcomes of MCA- 1st Semester	
After the Completion of the Course, students will be able to:	
Mathematics(Bridge Course) (26C2CAP-B3)	
Course Code	Course Outcomes
CO1	Explain the basic concepts of sets including representation methods types of sets and operations on sets.
CO2	Apply logical statements and connectives to perform basic logical operations and identify logical equivalence, tautologies, and contradictions.
CO3	Describe different types of matrices and perform matrix operations such as addition, subtraction, multiplication, and transpose.
CO4	Interpret the concepts of arithmetic progression to identify terms and compute the sum of finite series.
Course Outcomes of MCA- 1st Semester	
After the Completion of the Course, students will be able to:	
Discrete Structures & Optimization (26C2CAP-101)C:101	
Course Code	Course Outcomes
C101.1	Apply the operations of sets, relations and functions including equivalence, compatibility, and partial order relations using Venn diagrams and set identities to solve applied problems.
C101.2	Analyze properties of Rings, Boolean Algebra, logic gates and Karnaugh maps to simplify Boolean

	expressions and solve problems using symbolic logic.
C101.3	Solve counting problems by applying elementary counting techniques using the product and sum rules, permutations, combinations, the pigeon-hole principle.
C101.4	Explain algebraic structures including semigroups, monoids, groups, cosets and normal subgroups and apply morphisms and congruence relations to solve problems.
C101.5	Evaluate the properties of directed and undirected graphs including Eulerian and Hamiltonian paths, graph coloring, connectivity, planarity and apply isomorphism and homomorphism concepts.
Programming in Python (26C2CAP-102)C:102	
Course Code	Course Outcomes
C102.1	Describe the history, features, limitations and major applications of Python and outline the steps to set up and run Python programs.
C102.2	Apply Python data types, variables, type conversions and input/output functions to write basic Python programs.
C102.3	Analyze and use Python operators, expressions, decision-making statements, loops and control structures along with native data types.
C102.4	Design Python programs using functions, recursion and modules, including standard modules and packages to solve complex programming problems.
C102.5	Make use of Python programs using exception handling, file operations and object-oriented programming concepts including classes, objects, attributes and garbage collection.
Advanced Data Structures (26C2CAP-103)C:103	
Course Code	Course Outcomes
C103.1	Explain the fundamental concepts of data structures, including their types, basic algorithms and different methods of analyzing algorithm efficiency.
C103.2	Compare the different sorting algorithms along with hashing techniques to solve computational problems and evaluate their efficiency.
C103.3	Analyze the structure and operational behavior of advanced data structures to determine their efficiency and suitability for different computational problems.
C103.4	Investigate different graph representations and determine appropriate approaches to obtain efficient solutions in graph-based scenarios.
C103.5	Formulate efficient solutions for string processing problems by utilizing string operations and advanced string matching algorithms .
Advanced Database Management System (26C2CAP-104)C:104	
Course Code	Course Outcomes
C104.1	Describe the need of DBMS over traditional data storage systems and describe basic DBMS concepts including architecture, users, data models, and ER model components.
C104.2	Apply normalization techniques along with functional, multivalued and join dependencies to design efficient relational database schemas while enforcing integrity constraints.
C104.3	Analyze transaction management, concurrency control techniques and database recovery methods to ensure database consistency and reliability.
C104.4	Explain distributed database concepts including data storage, transactions, commit protocols, concurrency control and distributed query processing.
C104.5	Design Big Data and NoSQL database solutions, including XML databases for effective data management and usage.
Technical Communication (26C2CAP-105)C:105	
Course Code	Course Outcomes

C105.1	Describe the principles of effective technical communication and describe the importance of clear communication in professional environments.
C105.2	Explain various communication techniques to write and design technical documents such as reports, manuals, and proposals.
C105.3	Make use of different communication channels and tools for delivering technical information to diverse audiences, including emails, presentations, and collaborative platforms.
C105.4	Classify the effectiveness of technical communication by reviewing documents and presentations for clarity, coherence, and accuracy in conveying technical content.
C105.5	Create well-structured technical documents and multimedia presentations that address specific technical problems and provide solutions for targeted audiences.
Data Structures using Python Laboratory(26C2CAP-111)C:106*	
Course Code	Course Outcomes
C106*.1	Explain the basic concepts of arrays and perform operations such as insertion, deletion, traversal, and searching.
C106*.2	Demonstrate the searching and sorting algorithms including linear search, binary search, bubble sort, selection sort, and quick sort.
C106*.3	Implement and manipulate linked lists including singly and circular linked lists.
C106*.4	Identify linear data structures such as stack and queue and perform their basic operations.
C106*.5	Apply tree and graph concepts by implementing binary search trees, tree traversals and graph traversal algorithms such as BFS and DFS.
Advanced Database Management System Laboratory(26C2CAP-112)C:107*	
Course Code	Course Outcomes
C107*.1	Apply advanced SQL queries, joins, and subqueries to manipulate and retrieve data from complex database schemas.
C107*.2	Analyze the normalization techniques to design efficient and optimized database schemas.
C107*.3	Explain the performance of various database management systems by comparing their query optimization techniques and execution plans.
C107*.4	Identify transaction management and concurrency control techniques in multi-user database environments to ensure consistency and isolation.
C107*.5	Create distributed databases along with the replication and partitioning techniques to improve data availability and fault tolerance.
Technical Communication Laboratory(26C2CAP-113)C:108*	
Course Code	Course Outcomes
C108*.1	Describe effective listening skills to understand spoken English in different communication contexts.
C108*.2	Apply listening and speaking skills to communicate effectively in everyday and professional situations.
C108*.3	Make Use of appropriate language for conversations and dialogues in common everyday situations.
C108*.4	Analyze conversational contexts and converse fluently in English with appropriate clarity and coherence.
C108*.5	Create clear and coherent written texts independently for academic and professional purposes.
Career and Placement Planning - 1(26C2CAP-114)C:109**	
C109**.1	apply mental calculation techniques and mathematical shortcuts to simplify and solve numerical expressions efficiently.
C109**.2	analyze coded information and spatial relationships to interpret patterns and determine accurate logical conclusions.

C109**.3	implement numerical properties and mathematical relationships to solve problems involving numbers, factors, multiples, and divisibility.
C109**.4	analyze quantitative relationships to solve problems involving averages, proportional reasoning, and real-life numerical situations.
C109**.5	evaluate patterns and logical sequences to identify inconsistencies and determine the correct classification.
Course Outcomes of MCA- 2nd Semester	
After the Completion of the Course, students will be able to:	
Web Technologies (26C2CAP-201)C:201	
Course Code	Course Outcomes
C201.1	Explain the basic concepts of the Internet, TCP/IP protocol, IP addressing, and web technologies.
C201.2	Apply HTML tags, text formatting, lists and color coding for creating webpages.
C201.3	Make use of images, tables and graphical elements using HTML attributes during web page development.
C201.4	Develop interactive web pages using hyperlinks, frames, CSS and basic JavaScript.
C201.5	Create dynamic web forms by applying JavaScript objects and user-defined objects for client-side.
Design & Analysis of Algorithms(26C2CAP-202)C:202	
Course Code	Course Outcomes
C202.1	Classify algorithms based on complexity, asymptotic notation and orders of growth to compare the performance of recursive and non-recursive algorithms.
C202.2	Apply the algorithm using an appropriate design technique for solving a given problem.
C202.3	Design solutions for combinatorial problems using Backtracking and Branch-and-Bound techniques.
C202.4	Analyze the sorting and searching algorithms and apply them to appropriate problems.
C202.5	Classify problems as P, NP or NP Complete.
Advanced Java(26C2CAP-203)C:203	
Course Code	Course Outcomes
C203.1	Describe Servlets for handling HTTP requests, responses, cookies and session tracking.
C203.2	Apply JSP concepts including directives, scripting elements, implicit objects and session management.
C203.3	Develop web applications using the Struts framework and MVC architecture with database connectivity.
C203.4	Make use of the Hibernate framework and JavaBeans/EJB concepts for database interaction and enterprise applications.
C203.5	Explain RMI and CORBA concepts for distributed computing.
Linux Administration(26C2CAP-204)C:204	
Course Code	Course Outcomes
C204.1	Describe the fundamentals of the Linux operating system including distributions, kernel structure, installation, booting and shutdown procedures and usage of the vi editor.
C204.2	Apply Linux file system concepts to organize directories, manage file structures, assign appropriate file permissions and perform file management operations effectively.
C204.3	Analyze the process of installing and removing software in Linux, including package retrieval, unpacking,

	configuration, compilation, installation and the management of users and groups.
C204.4	Explain the configuration of DNS services ,BIND database setup, DNS client configuration, and web server deployment using Apache HTTP Server .
C204.5	Justify the configuration and administration of E-Mail servers and Samba server services for managing mail communication and file sharing in network environments.
Information Security & Cyber Law(26C2CAP-205)C:205	
Course Code	Course Outcomes
C205.1	Explain the basic concepts of information technology law and cyber law.
C205.2	Describe the legal framework of the Information Technology Act 2000 and its amendments.
C205.3	Identify various cyber crimes and analyze their legal implications and penalties.
C205.4	Interpret legal issues related to digital signatures, electronic records, and cyber security.
C205.5	Make use of cyber laws in protecting privacy, data and intellectual property in cyberspace.
Web Technologies Laboratory(26C2CAP-211)C:206*	
Course Code	Course Outcomes
C206*.1	Develop basic web pages using HTML tags, text formatting, hyperlinks and lists.
C206*.2	Design structured web pages using tables, frames, multimedia elements and layouts.
C206*.3	Create interactive web forms such as login, registration and data entry forms using HTML.
C206*.4	Apply JavaScript to perform basic computations and decision-making operations such as arithmetic calculations, prime number checking and factorial.
C206*.5	Build dynamic web pages using JavaScript for user interaction, validation and event handling.
Advanced Java Laboratory(26C2CAP-212)C:207*	
Course Code	Course Outcomes
C207*.1	Develop web applications using Servlets to handle HTTP requests, responses, cookies and session tracking.
C207*.2	Create dynamic web pages using JavaServer Pages (JSP) and reusable components using JavaBeans (BDK).
C207*.3	Implement Enterprise Java Beans (EJB) concepts including Session Beans and Entity Beans used in enterprise applications.
C207*.4	Design web applications using the Struts framework with MVC architecture and database connectivity.
C207*.5	Apply Hibernate framework and SEO techniques including keyword analysis, image optimization and creation of robots.txt and sitemap files.
Linux Administration Laboratory(26C2CAP-213)C:208*	
Course Code	Course Outcomes
C208*.1	Describe the installation process and features of Linux desktop and server operating systems.
C208*.2	Apply Linux commands to perform file, process and user management operations.
C208*.3	Make use of Linux administration commands for system configuration and monitoring.
C208*.4	Explain server requirements and configuration strategies for Linux servers.
C208*.5	Implement Linux administration tasks to ensure security ,efficiency and reliability in system operations.
Career and Placement Planning - 2(26C2CAP-214)C:209**	
Course Code	Course Outcomes

C209**.1	Demonstrate improved group communication and workplace interaction skills.
C209**.2	Apply verbal ability concepts in grammar, vocabulary, and reading tasks relevant to employability.
C209**.3	Participate effectively in group discussions, case-based conversations, and structured speaking tasks.
C209**.4	Develop foundational professional documents and workplace communication habits.
C209**.5	Analyse communication situations and respond with clarity, logic, and confidence.

Course Outcomes of MCA- 3rd Semester	
After the Completion of the Course, students will be able to:	
Advanced Computer Networking (25C2CAP-301)C:301	
Course Code	Course Outcomes
C301.1	Explain the fundamentals of computer networks, network architecture, OSI reference model and physical layer concepts.
C301.2	Describe data link layer and network layer concepts including error detection techniques, ARQ protocols, addressing and routing algorithms.
C301.3	Illustrate transport layer and application layer protocols such as TCP, UDP, DNS, WWW and FTP and compare TCP/IP with the OSI model.
C301.4	Classify wireless and mobile networking technologies like WLAN, cellular networks, adhoc networks etc.
C301.5	Analyze wireless communication systems, cellular network evolution, frequency reuse, channel assignment and handoff strategies.
Artificial intelligence & machine learning (25C2CAP-302)C:302	
Course Code	Course Outcomes
C302.1	Explain the fundamentals of Artificial Intelligence, intelligent agents and apply search algorithms for problem solving.
C302.2	Apply knowledge representation techniques and reasoning methods including logic, inference and expert systems for solving problems.
C302.3	Describe Machine Learning concepts and implement basic algorithms for regression, classification and model evaluation.
C302.4	Classify advanced Machine Learning techniques such as SVM, ensemble methods, clustering and artificial neural networks.
C302.5	Analyze Deep Learning, NLP and Reinforcement Learning concepts along with the AI applications and ethical issues.
Theory of computation (25C2CAP-303)C:303	
Course Code	Course Outcomes
C303.1	Describe formal languages, paradoxes and automata models and finite automata minimization.
C303.2	Apply regular expressions, grammars and context-free grammar techniques, including simplification and normal forms, to characterize languages.
C303.3	Analyze pushdown automata concepts, including parse trees, derivation trees, PDAs.
C303.4	Interpret Turing machine models, variations and Church-Turing thesis for solving simple computational problems.
C303.5	Categorize the various problems and measure the computational complexity.
Software Testing & Quality Assurance(25C2CAP-PE2-04)C:304	
Course Code	Course Outcomes

C304.1	Summarize software testing concepts, verification and validation, test strategies, debugging processes and various types of testing.
C304.2	Make use of black-box, white-box and object-oriented testing techniques to design and execute effective test cases.
C304.3	Analyze test planning, phase testing and specialized system testing including web, client-server and real-time systems.
C304.4	Explain software quality assurance concepts, standards, metrics, and methodologies and formulate strategies to enhance software quality.
C304.5	Develop risk management and software configuration management plans to ensure project stability.

Data Mining and Business Intelligence(25C2CAP-PE1-03)C:305

Course Code	Course Outcomes
C305.1	Illustrate the lifecycle of data, building blocks of data warehouses and marts along with the concepts, roles and processes of business intelligence.
C305.2	Identify BI and DW architectures, OLAP/OLTP concepts, and dimensional analysis techniques.
C305.3	Classify data mining ,data preprocessing,data clearing and data reduction methods.
C305.4	Explain association rule mining and classification methods,prediction methods with neural networks.
C305.5	Analyze data mining and analytics strategies for business intelligence applications in various industries.

Advanced Computer Networking Laboratory (25C2CAP-311)C:306*

Course Code	Course Outcomes
C306*.1	Describe networking components, transmission media, LAN topologies and basic TCP/IP configuration in Windows and Linux environments.
C306*.2	Identify cabling techniques, configure file and printer sharing, set up networks and implement subnet planning for practical network scenarios.
C306*.3	Classify network designs and simulate routing algorithms for Adhoc networks using packet capture and network simulation tools.
C306*.4	Configure WLAN, wireless access points and Wireless Local Loop to optimize network performance.
C306*.5	Design wired and wireless network solutions, including Adhoc and infrastructure networks, using open-source tools and protocols.

AI & ML Laboratory (25C2CAP-312)C:307*

Course Code	Course Outcomes
C307*.1	Summarize the role of Python with NumPy and Pandas in data handling, preprocessing and analysis.
C307*.2	Create visualizations using Matplotlib and Seaborn along with the exploratory data analysis(EDA).
C307*.3	Design machine learning models such as Linear Regression, Logistic Regression, KNN, Decision Trees, and SVM.
C307*.4	Apply unsupervised learning and dimensionality reduction techniques such as K-Means clustering and PCA to solve real world problems.
C307*.5	Analyze deep learning models and end-to-end ML applications using TensorFlow/Keras, model evaluation, optimization, and simple deployment.

Software Testing & Quality Assurance Laboratory(25C2CAP-PE2-14)C:308*

Course Code	Course Outcomes
C308*.1	Explain the concepts of software testing, test cases, and the process of documenting test scenarios and results.
C308*.2	Classify the manual testing techniques to validate functionalities such as login, registration, and flight reservation systems while recording test cases.

C308*.3	Experiment with the data flow and path testing techniques for application scenarios including product description, payment, and order history..
C308*.4	Implement boundary value conditions, image upload features, and web templates to formulate effective testing strategies including load and performance testing.
C308*.5	Develop automated testing solutions using tools such as Selenium, LoadRunner, or Rational Test Manager to improve testing efficiency.
Career and Placement Planning-1(25C2CAP-314)C:309**	
C309**.1	Explain the concepts of software testing, test cases, and the process of documenting test scenarios and results.
C309**.2	Classify the manual testing techniques to validate functionalities such as login, registration, and flight reservation systems while recording test cases.
C309**.3	Experiment with the data flow and path testing techniques for application scenarios including product description, payment, and order history..
C309**.4	Implement boundary value conditions, image upload features, and web templates to formulate effective testing strategies including load and performance testing.
C309**.5	Develop automated testing solutions using tools such as Selenium, LoadRunner, or Rational Test Manager to improve testing efficiency.
Course Outcomes of MCA- 4th Semester	
After the Completion of the Course, students will be able to:	
Machine Learning and Data Analytics using Python (25C2CAP-401)C:401	
Course Code	Course Outcomes
C401.1	Describe basic Machine Learning concepts and fundamental Python concepts like data types, operators, control structures, functions, modules and basic NumPy operations.
C401.2	Apply linear regression models to analyze relationships between variables and implement logistic regression techniques to solve linear classification problems.
C401.3	Analyze clustering and classification techniques such as KNN, Decision Trees and Random Forest to solve the ML problems.
C401.4	Differentiate classification and dimensionality reduction techniques like Naïve Bayes and PCA and role of neural networks in solving complex problems.
C401.5	Categorize data handling and visualization methods using Pandas and Matplotlib .
IOT & Blockchain Technology (25C2CAP-PE3-04)C:402	
Course Code	Course Outcomes
C402.1	Describe the concepts, architecture and enabling technologies of the Internet of Things (IoT).
C402.2	Analyze the hardware, software components and communication protocols used in IoT systems.
C402.3	Make Use of domain-specific IoT applications for solving various real-world problems.
C402.4	Explain the core concepts and mechanisms of blockchain including transactions, consensus and smart contracts.
C402.5	Apply blockchain technologies to Bitcoin operations and enterprise applications.
Machine Learning and Data Analytics using Python Laboratory (25C2CAP-411)C:403*	
Course Code	Course Outcomes
C403*.1	Explain Python-based data science environments and fundamental concepts of NumPy, Pandas, and data visualization tools.
C403*.2	Make use of Python libraries to perform data preprocessing, statistical analysis, feature scaling, and exploratory data analysis on datasets.
C403*.3	Create a program of machine learning such as Linear Regression, Logistic Regression, KNN, Decision Trees, and SVM for predictive modeling.

C403*.4	Implement clustering and dimensionality reduction techniques such as K-Means and PCA and formulate deep learning models using ANN, MLP, and CNN.
C403*.5	Demonstrate end-to-end AI/ML solutions including model evaluation, hyperparameter optimization, deployment, and interpretation of results.
IOT &Blockchain Technology Laboratory(25C2CAP-PE3-14) C:404*	
Course Code	Course Outcomes
C404*.1	Describe the fundamental concepts, terminology and enabling technologies of Internet of Things (IoT) and Blockchain.
C404*.2	Implement the steps involved in IoT system design methodology.
C404*.3	Explain the working of Bitcoin cryptocurrency, including blockchain, mining, transactions and security mechanisms.
C404*.4	Apply the fundamentals of blockchain technology including hashing, peer-to-peer networks, smart contracts and cryptocurrency transactions to solve real world problems .
C404*.5	Design integrated IoT and blockchain-based applications for secure data monitoring and management.
Career and Placement Planning - 2(25C2CAP-413) C:405**	
Course Code	Course Outcomes
C405**.1	Explain stack concepts and implement stack operations using arrays and linked lists.
C405**.2	Apply stack techniques to solve expression evaluation and conversion problems.
C405**.3	Implement queue data structures including circular queue, deque, and priority queue.
C405**.4	Analyze binary trees and perform traversal, insertion, and deletion operations.
C405**.5	Evaluate graph algorithms such as breath first search, depth first search, and shortest-path techniques.