

BACHELOR OF COMPUTER APPLICATIONS (BCA_NEW/BCAOL)

**ASSIGNMENTS OF BCA_NEW/BCAOL
PROGRAMME SEMESTER-V**

(July 2026 & January 2027 Session)

BCS-151, BCS-042, BCSL-159, BCOS-184, MSEI-023, BECS-184



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

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Important Notes

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Course Code : **BECS-184**
Course Title : **Data Analysis**
Assignment Number : **BCA_NEW/BCAOL(V)184/Assign/2026-27**
Maximum Marks : **100**
Last Date of Submission : **31st October, 2026 (For July 2026 Session)**
: **30th April, 2027 (For January 2027 Session)**

Note: Answer the following questions. Each question carries 20 marks

Part-I

(2 × 20 = 40 Marks)

Q1: The following table presents the list of agencies owning different number of rental cars. The annual income for each of these agencies is given here.

Agency	Cars (in ten thousand)	Revenue (in Rs Crores)
A	63.0	7.0
B	29.0	3.9
C	20.8	2.1
D	19.1	2.8
E	13.4	1.4
F	8.5	1.5

- (a) The study wanted to analyse whether there is any significant relationship between the number of rental cars that the agency owns and its annual income. Compute the correlation coefficient from the given table.
- (b) Test the significance of the correlation coefficient considering $\alpha=0.05$ and critical values obtained from t-distribution table is ± 2.776 .
- Q2:** Explain the term 'qualitative research design'. How it is different from quantitative research design? What are the various techniques of qualitative research design?

Part-II

(5 × 12 = 60 Marks)

Answer the following questions. Each question carries 12 marks.

- Q3:** Differentiate between Census and Survey data. What are the various stages involved in planning and organizing the censuses and surveys?
- Q4:** Explain the following:
- Multivariate analysis
 - Coefficient of variation
 - Data mining
 - Normal distribution curve

- Q5:** What are the characteristics of a good questionnaire? Suppose you have to conduct a study in village to assess the effectiveness of a recent government scheme. Prepare a questionnaire with atleast 10 questions to conduct this study.
- Q6:** What do you mean by the term 'Composite index'? State with illustration the procedure to work out composite index by simple ranking method.
- Q7:** Differentiate between:
- t test and f test
 - Phenomenology and Ethnography
 - Point estimate and interval estimate
 - ANOVA and MANOVA

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Course Code : **BCS-042**
Course Title : **Introduction to Algorithms Design**
Assignment Number : **BCA_NEW/BCAOL(V)042/Assign/2026-27**
Maximum Marks : **100**
Last Dates for Submission : **31st October, 2026 (For July 2026 Session)**
: **30th April, 2027 (For January 2027 Session)**

This assignment has 8 questions of 10 Marks each; answer all questions. The remaining 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Consider the following sorted array DATA with 13 elements. Illustrate the working of the binary search technique, while searching for elements: (i) 42 (ii) 82

11	22	27	35	42	45	55	60	65	70	75	82	85
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Q2: Use Strassen's matrix multiplication algorithm to multiply the following two matrices:

$$A = \begin{bmatrix} 5 & 9 \\ 8 & 7 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 6 \\ 4 & 2 \end{bmatrix}$$

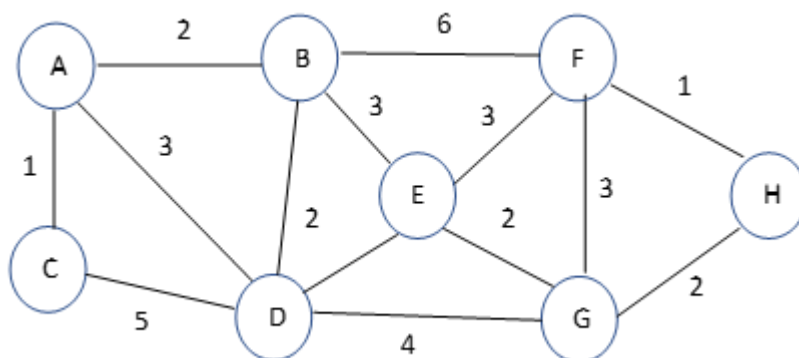
Q3: Find GCD(595,252) by Euclid's algorithm. Also, do the best-case, worst-case, and average-case time complexity analysis of it.

Q4: Compute a^{283} using left-to-right and right-to-left binary exponentiation.

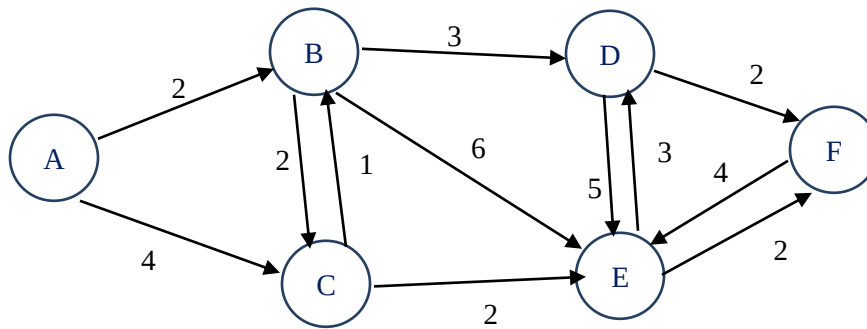
Q5: Analyze the best-case, average-case, and worst-case time complexities of the following algorithms with the help of suitable examples.

- (i) Insertion sort
- (ii) Selection sort
- (iii) Quick sort
- (iv) Merge sort

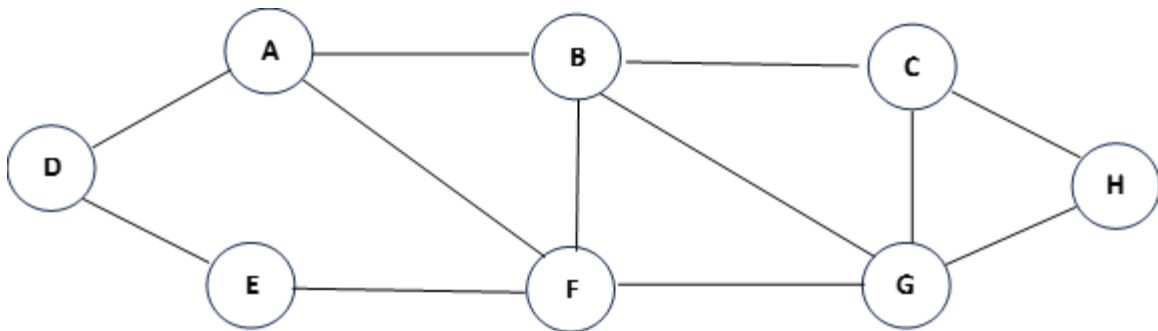
Q6: Apply Prim's Algorithm on the following graph to find the minimum cost spanning tree



Q7: Apply the Bellman-Ford algorithm to find the shortest path from source vertex 'A' to all other vertices for the following graph.



Q8: Apply DFS and BDS Graph traversal algorithms on the following graph and find the traversal order of nodes. Select vertex A as the starting point.



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Course Code	:	BCS-151
Course Title	:	Introduction to Software Engineering
Assignment Number	:	BCA_NEW/BCAOL(V)151/Assign/2026-27
Maximum Marks	:	100
Last Dates for Submission	:	31st October, 2026 (For July 2026 Session)
	:	30th April, 2027 (For January 2027 Session)

Note: This assignment has eight questions carrying 10 marks each for a total of 80 marks. Answer all questions. The remaining 20 marks are for Viva Voce. Draw suitable diagrams wherever necessary.

- Q1:(a)** Explain the characteristics of a **good Software Requirements Specification (SRS)**. Discuss any **five characteristics** recommended for preparing an effective SRS document. **(5 Marks)**
- (b)** A university intends to develop an **Online Examination Management System**. Identify **five functional requirements** and **five non-functional requirements** that should be included in its SRS. **(5 Marks)**
- Q2:** An organization plans to automate its **Library Management System**.
- (a)** Draw a **Context Diagram** showing the interaction between the system and external entities. **(4 Marks)**
- (b)** Develop a **Level-1 Data Flow Diagram (DFD)** consisting of at least **four major processes**. **(6 Marks)**
- Q3:** A company wishes to develop an **Online Grocery Delivery System** using an object-oriented approach.
- (a)** Identify the major classes, their attributes and operations. **(5 Marks)**
- (b)** Draw a **Use Case Diagram** showing the interaction among Customer, Delivery Executive and Administrator. **(5 Marks)**
- Q4:** A software company estimates that a project consists of **480 Function Points**. The productivity of the development team is **12 Function Points per Person-Month**.
- The project is expected to be completed in **8 months**.
- (a)** Calculate the estimated effort in person-months. **(3 Marks)**
- (b)** Estimate the required team size. **(3 Marks)**
- (c)** Discuss any **four advantages** of Function Point Analysis over LOC-based estimation. **(4 Marks)**
- Q5:(a)** Explain the concept of **Cohesion** and **Coupling**. Illustrate different types of Cohesion and Coupling with suitable examples. **(5 Marks)**
- (b)** Why are **High Cohesion** and **Low Coupling** considered desirable in software design? **(5 Marks)**
- Q6:** An e-Commerce company has completed the development of its shopping portal.
- (a)** Prepare **four Black Box Test Cases** for the Login Module. **(5 Marks)**
- (b)** Differentiate between: **(5 Marks)**

- Verification and Validation
- Alpha Testing and Beta Testing

with suitable examples.

Q7:(a) Describe the major activities involved in **Software Project Management**. **(5 Marks)**

(b) Explain how **Risk Management** contributes to the successful completion of software projects. Illustrate the software risk management process with a suitable diagram. **(5 Marks)**

Q8:(a) Compare any **five Software Development Life Cycle (SDLC) Models** based on: **(5 Marks)**

- Requirement Stability
- Risk Handling
- Customer Participation
- Cost
- Suitable Applications

(b) Discuss the role of the following in Software Engineering: **(5 Marks)**

- Software Configuration Management (SCM)
- Software Maintenance
- Software Quality Assurance (SQA)

Explain how these activities collectively improve software quality.

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Course Code	:	BCOS-184
Course Title	:	E-Commerce
Assignment Number	:	BCA_NEW/BCAOL(V)184/Assign/2026-27
Maximum Marks	:	100
Last Dates for Submission	:	31st October, 2026 (For July 2026 Session)
	:	30th April, 2027 (For January 2027 Session)

Note: Attempt all the questions.

- Q1:** Analyze the role of Emerging Technologies in E-Commerce. Discuss how Artificial Intelligence (AI), the Internet of Things (IoT), and Blockchain are transforming online business processes. **(10 Marks)**
- Q2:** Explain the Website Development Process in detail. Describe the significance of each step, from "Innovative Requirement" to "Maintenance". **(10 Marks)**
- Q3:** Discuss the various E-Commerce Business Models based on target customers. Provide real-world examples for B2B, B2C, C2C, and D2C models. **(10 Marks)**
- Q4:** Examine the Information Technology (IT) Act, 2000. What are its primary objectives, and how does it provide a legal framework for E-Commerce in India? **(10 Marks)**
- Q5:** Evaluate the "7C's of the E-Retail Mix." How do these components help an e-tailer provide superior value to customers compared to traditional 4P marketing? **(10 Marks)**
- Q6:** Distinguish between Inventory-based and Marketplace-based E-tailing models. Use examples like Amazon or Alibaba to illustrate your answer. **(6 Marks)**
- Q7:** What is a Payment Gateway? Explain its role as a "middleman" in securing online transactions between a customer and a merchant. **(6 Marks)**
- Q8:** Explain the "C.I.A. Triad" in the context of Cyber Security. Why is each component (Confidentiality, Integrity, and Availability) critical for an e-commerce business? **(6 Marks)**
- Q9:** Discuss the advantages and disadvantages of E-tailing for retailers. Focus on aspects like location utility and complex logistics management. **(6 Marks)**
- Q10:** What are the different types of Website Hosting? Briefly explain Shared, VPS, and Cloud hosting. **(6 Marks)**
- Q11:** Differentiate between HTTP and HTTPS. Why is the "S" version essential for e-commerce websites? **(5 Marks)**
- Q12:** Write a short note on FinTech. How is it redefining traditional banking services? **(5 Marks)**
- Q13:** What are the features of Virtual Currency? Mention why Distributed Ledger Technology (DLT) is used for these transactions. **(5 Marks)**
- Q14:** Briefly describe E-Governance in India. List at least three popular e-governance schemes (e.g., Digital India). **(5 Marks)**

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Course Code : **MSEI-023**
Course Title : **Cyber Security**
Assignment Number : **BCA_NEW/BCAOL(V)023/Assign/2026-27**
Maximum Marks : **20**
Last Date of Submission : **31st October, 2026 (For July 2026 Session)**
(For latest updates, refer SED Notification
On IGNOU's website)

There are two questions in this assignment. Answer all the questions. You may use illustrations and diagrams to enhance your explanations.

- Q1:** All the security measures that the organization adopts go in vain when employees get “social engineered” by strangers. Do you agree with this statement and also suggest the measures. **(10 Marks)**
- Q2:** The Internet is not just a vast array of computers connected to each other. There are a host of networking devices like the router, which control the data traffic between and within networks. Explain Internet routing in detail? **(10 Marks)**

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Course Code	:	BCSL-159
Course Title	:	Introduction to Algorithm Design Lab
Assignment Number	:	BCA_NEW/BCAOL(V)L-159/Assign/2026-27
Maximum Marks	:	100
Last Date of Submission	:	31st October, 2026 (For July 2026 Session)
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- Q1:** Write a C program to generate the Fibonacci sequence using recursion. **(10 Marks)**
- Q2:** Write a recursive C program to solve the Tower of Hanoi problem. Also, analyse its time complexity. **(10 Marks)**
- Q3:** Write a C program to evaluate a polynomial efficiently using Horner's method. **(10 Marks)**
- Q4:** Write a C program to multiply two $n \times n$ matrices using nested loops. **(10 Marks)**
- Q5:** Write a C program to solve the Fractional Knapsack problem and maximise the total profit using a greedy approach. **(10 Marks)**
- Q6:** Write a C program to construct a Huffman tree and generate the corresponding Huffman codes. **(10 Marks)**
- Q7:** Write a recursive C program to perform large integer multiplication using the Karatsuba multiplication algorithm. **(10 Marks)**
- Q8:** Write a C program to detect a cycle in an undirected graph. **(10 Marks)**