G 601 DC1.5   Reg. No.

St Aloysius College (Autonomous) Mangaluru

B.C.A. Semester V – Degree Examination
November/December – 2023

DESIGN AND ANALYSIS OF ALGORITHMS

Time: 2½ hrs.   Max Marks: 60

PART – A

Answer any SIX of the following.   (6x2=12)

1. a) Define Big Theta.

   b) Define Average case efficiency

   c) Write the worst case and average case complexity of Brute force String Matching.

   d) What is Exhaustive search?

   e) What is a cross edge? Give an example.

   f) Define Topological sorting.

   g) Define spanning tree and minimum spanning tree.

   h) Differentiate fixed length encoding and variable length encoding in Huffman tree.

PART – B

Answer any ONE FULL question from each unit.   (12x4=48)

UNIT – I

2. a) Write an algorithm to Check whether all the elements in the given array are distinct. What is the worst-case efficiency, explain?   **(4)**

   b) Define asymptotic notation used for best, worst and average case analysis of an algorithm.   **(4)**

   c) Mention types of recursion. Explain Mathematical analysis of recursive algorithm with an example.   **(4)**

OR

3. a) Explain recursive and non-recursive algorithms with example.   **(4)**

   b) Explain Fundamentals of the Analysis of Algorithm Efficiency.   **(4)**

   c) Write an algorithm for linear search and analyse the efficiency classes.   **(4)**

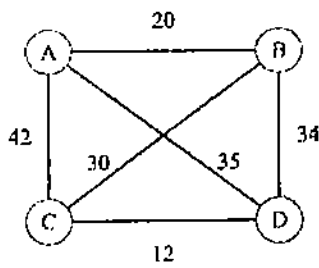### UNIT – II

4. a) Explain Selection sort and write the algorithm.   **(4)**

   b) Explain the Closest Pair problem and write the algorithm.   **(4)**

   c) Explain Brute Force technique and write an algorithm for TSP.   **(4)**

OR

5. a) Write an algorithm of 0/1 Knapsack problem.   **(4)**

b) Solve Travelling salesman problem. For the below graph.   **(4)**

c) Write an algorithm for Bubble sort and Analyse the time efficiencies.   **(4)**

UNIT – III

6. a) Write an algorithm to sort N numbers using Insertion sort. Derive the time complexity for worst, best and average case.   **(4)**

   b) Compute 234 x 526 using divide and conquer approach for the multiplication of two large numbers.   **(4)**
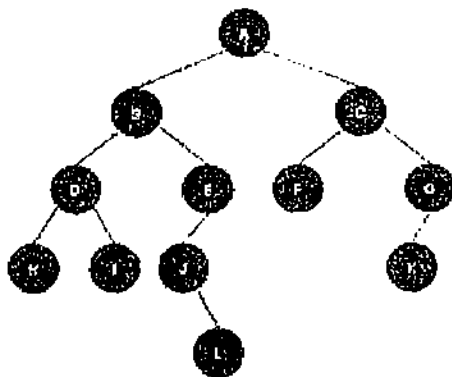
   c) Give any four comparisons among Depth First Search and Breadth First Search.   **(4)**

OR

7. a) Write and explain Depth-First Search with time complexity.   **(4)**

   b) Write an algorithm to sort N numbers using Quick sort. Derive the time complexity.   **(4)**

   c) Write the pre-order, in-order and post-order for the following binary tree.

   (4)

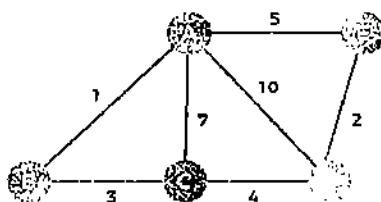## UNIT – IV

8. a) Write and explain the Prim's algorithm and write the time complexity.   **(4)**

   b) Find the minimum spanning tree for the following graph using Kruskal's algorithm.   **(4)**

   c) Write a note on decision tree.   **(4)**

OR

9. a) Solve the given problem.

(6)
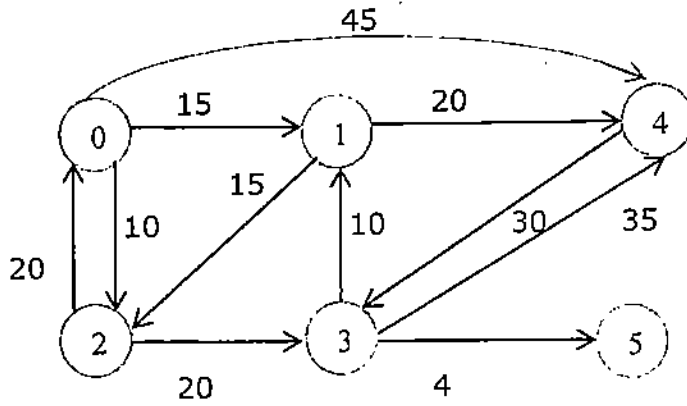
b) Construct a Huffman code for the following data.

Characters	A	B	C	D	–
Probability	0.4	0.1	0.2	0.15	0.15

(4)

c) Explain NP-complete problems.   **(2)**

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St Aloysius College (Autonomous) Mangaluru

B.C.A. Semester V – Degree Examination
November/December - 2023

STATISTICAL COMPUTING AND R PROGRAMMING

Time: 2½ hrs.   Max Marks: 60

PART – A

Answer any <u>SIX</u> of the following.   (6x2=12)

1. a) What is vector? Give an example to create a vector.

   b) How do you find the class of an object? Give an example.

   c) Differentiate local and global variables.

   d) Define type conversion.

   e) Describe the purpose of the plot function in R.

   f) What is an Experiment? Give an example.

   g) What is Type-I Error? Give an example.

   h) Differentiate Correlation and Regression.

PART – B

Answer any <u>ONE</u> FULL question from each unit.   (12x4=48)

UNIT – I

2. a) How do you create matrix in R? Explain with Its necessary attributes? Give an example.   **(6)**

   b) What is a factor? How do you order levels in a factor? Give an example.   **(6)**

OR

3. a) Explain different special values used in R with an example for each.   **(6)**

   b) What is data frame? Create a data frame as shown in the given table and write R commands
       i. To extract the third, fourth, and fifth elements of the third column
       ii. To extract the elements of age column using dollar operator.

person	Age	sex
Peter	42	M
Lois	40	F
Meg	17	F
Chris	14	M
Stewie	1	M

                                                                          (6)

UNIT – II

4. a) Explain while loop and for loop with syntax and example.   **(6)**

   b) What is exception handling? How do you catch errors with try Statements? Explain with example.   **(6)**

OR

5. a) How do you read external data files into R? Explain with an example.   **(6)**

b) Explain how the all() and any() functions are used in R ? Provide an example. **(6)**

UNIT – III

6. a) Write a note on Quantiles, Percentiles, and the Five-Number Summary. Also write R commands to find these. **(6)**

b) Write a R program to perform the following task using the given data set

A data set contains the following 7 values

| 6 | 2 | 4 | 9 | 1 | 3 | 5 |

i) Find the range   ii) Find the mean

iii)Find the variance   iv) Find the standard deviation **(6)**

OR

7. a) With neat graphs explain the concepts of Skewness and Kurtosis. **(6)**

b) Write a note on following:

    i. Event

    ii. Mutually Exclusive Events

    iii. Independent Events

(6)

UNIT – IV

8. a) How to get Pearson's sample correlation coefficient? Write a R program to calculate Pearson's sample correlation coefficient of following data

    xdata <- c(2,4.4,3,3,2,2.2,2,4)

    ydata <- c(1,4.4,1,3,2,2.2,2,7) **(6)**

b) Explain different types of Correlation with suitable scatter diagram. **(6)**

OR

9. a) What is Hypothesis? List and explain different types of Hypothesis. **(6)**

b) Explain the purpose and key steps of one sample t-Test. **(6)**

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St Aloysius College (Autonomous)
Mangaluru
B.C.A. Semester V – Degree Examination
November/December - 2023
SOFTWARE ENGINEERING

Time: 2½ Hours.   Max Marks: 60

PART –A

1. **Answer any SIX of the following.**   (6x2=12)

   a) What is software engineering?
   b) What is corrective and adaptive maintenance?
   c) Define Fault and Failure.
   d) Draw a context diagram for restaurant management system.
   e) Define Review.
   f) What do you mean by test oracles?
   g) What are the 2 classes of software?
   h) Mention any two advantages of Iterative Enhancement Model.

PART –B

Answer any ONE FULL question from each unit.   (4x12=48)

UNIT - I

2. a) Explain the components of an SRS.   (6)
   b) List and explain the different functions of Requirement Engineering
      Task.   (6)

OR

3. a) Explain various characteristics of a software.   (6)
   b) With a neat diagram, explain Waterfall model.   (6)

UNIT – II

4. a) Draw a class diagram for ATM Management System.   (6)
   b) Define software quality. Explain the different software quality (6)
      attributes.

OR

5. a) What is DFD? Draw Level-0 and Level-1 DFD for online movie ticket
      booking system.   (6)
   b) Define Software Quality Assurance. List out the various objectives of
      Software Quality Assurance.   (6)

UNIT – III

6. a) Explain the different levels of cohesion that a module might exhibit. (6)
   b) Write a note on i) Flowchart   ii) Pseudo-code.   (6)

OR

7. a) Explain Top-Down and Bottom-Up approach.   (6)
   b) List and explain different levels of testing.   (6)

UNIT – IV

8. a) What is code walkthrough? Explain.   (6)
   b) Explain different debugging techniques.   (6)

OR

9. a) Explain the categories of software maintenance.   (6)
   b) Explain the various software configuration activities.   (6)

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St Aloysius College (Autonomous)
Mangaluru
B.C.A. Semester V – Degree Examination
November/December - 2023
CLOUD COMPUTING

Time: 2½ hrs.   Max Marks: 60

PART – A

Answer any **SIX** of the following.   (6x2=12)

1. a) Write any 2 applications of Cloud Computing.
   b) Define Cloud Computing.
   c) Mention the Windows Azure Standards.
   d) How do you administrate the cloud?
   e) List the types of Virtualization.
   f) What is Cloud Backup?
   g) Explain ERP in Cloud Business.
   h) What is AWS?

PART – B

Answer any **ONE** FULL question from each unit.   (12x4=48)

UNIT – I
2. a) Explain Cube Model of Cloud Computing.   (6)
   b) Mention the benefits of Cloud Computing.   (6)

OR

3. a) Explain NIST Model in Cloud Computing.   (6)
   b) What are the different steps to connect to the cloud? Explain.   (6)

UNIT – II
4. a) How do you administer the cloud?   (7)
   b) What is brokered cloud storage access?   (5)

OR

5. a) What is Security Data? Explain.   (6)
   b) With a neat diagram explain the CSA Cloud Reference Model with security boundaries.   (6)

UNIT – III
6. a) Explain the features of Virtualization.   (4)
   b) What are virtual storage containers?   (4)
   c) Explain Server Virtualization.   (4)

OR

7. a) Differentiate Cloud Computing and Virtualization.   (6)
   b) Outline cloud backup solutions.   (6)

UNIT – IV
8. a) Write a note on Google App engine.   (6)
   b) Explain SQL Azure in Detail.   (6)

OR

9. a) Describe the Satellite Image Processing in cloud computing   (6)
   b) Explain Communication services of AWS.   (6)

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St Aloysius College (Autonomous) Mangaluru

B.C.A. Semester V – Degree Examination
November/December - 2023
DIGITAL MARKETING

Time: 2½ hrs.   Max Marks: 60

PART – A

Answer any <u>SIX</u> of the following.   **(6x2=12)**

1. a) List importance of analytics in digital marketing.

   b) List any 4 limitations of EDI.

   c) What is social media content calendar?

   d) Mention the types of social media advertising.

   e) What is email bounce rate? Explain the types.

   f) What is Geo-Targeting?

   g) What do you mean by SEO?

   h) What is Google AdWords?

PART – B

Answer any <u>ONE</u> FULL question from each unit.   **(12x4=48)**

UNIT – I

2. a) Explain SMART goals in digital marketing strategy.   **(4)**

   b) Write a note on E Checks.   **(4)**

   c) Explain P-O-E-M framework in digital marketing.   **(4)**

OR

3. a) How do traditional and digital marketing differ?   **(4)**

   b) Outline the process for establishing a budget for digital marketing.   **(4)**

   c) What is a digital marketing campaign? Explain the process to constitute a digital marketing plan.   **(4)**

UNIT – II

4. a) Explain the steps in social media content strategies.   **(4)**

   b) Explain the concept of Content Management and distribution.   **(4)**

   c) Explain benefits of social media marketing.   **(4)**

OR

5. a) Briefly explain the various social media platforms.   **(4)**

   b) How social media marketing can benefit a business? Explain.   **(4)**

   c) Explain the steps to optimize social media profile.   **(4)**

UNIT – III

6. a) Explain the types of blog posts in content marketing.   **(4)**

8

  b) What is an email campaign?   **(4)**

  c) What do you mean by content creation?   **(4)**

<div align="center">OR</div>

7. a) Explain briefly Content Promotion and amplification.   **(4)**

  b) Write a note on Content Planning Tools.   **(4)**

  c) Advantages and disadvantages in Email marketing.   **(4)**

<div align="center">UNIT – IV</div>

8. a) Explain the Five Ways to Improve website's Ranking (SEO).   **(4)**

  b) What is conversion tracking? What are the benefits of conversion tracking?   **(4)**

  c) What are the three essential steps for conducting keyword searches?   **(4)**

<div align="center">OR</div>

9. a) Describe On-page and off-page optimizations.   **(4)**

  b) Explain the importance of analytics in digital marketing.   **(4)**

  c) Explain the various buying models.   **(4)**

<div align="center">**********</div>

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St Aloysius College (Autonomous)
Mangaluru
B.C.A. Semester V – Degree Examination
November/December - 2023
(Skill enhancement Course)
CYBER SECURITY

Time: 2½ Hours   Max Marks: 60

SECTION A

Answer ALL the following questions: (15x1=15)

1. Why is information security crucial for organizations?
   a) To enhance employee productivity
   b) To ensure data privacy and integrity
   c) To reduce electricity consumption
   d) To streamline communication channels

2. Which of the following is an example of an information security management practice?
   a) Data encryption
   b) Social media marketing
   c) Employee team-building activities
   d) Office interior design

3. What is a common type of malicious software that disguises itself as legitimate software?
   a) Worm
   b) Trojan
   c) Logic bomb
   d) Phishing

4. What are the three fundamental principles of information security known as the CIA Triad?
   a) Confidentiality, Integrity, Availability
   b) Compatibility, Infallibility, Accuracy
   c) Confidentiality, Invisibility, Authorization
   d) Consistency, Intensity, Accessibility

5. Why is social engineering considered a significant threat to information security?
   a) It enhances employee productivity
   b) It manipulates human psychology to gain unauthorized access
   c) It increases network speed
   d) It improves hardware performance

6. What is the primary focus of cybercrime classification?
   A) Target devices
   B) Motivation of the perpetrator
   C) Geographic location
   D) Time of the attack

7. What type of cybercrime involves manipulating individuals into divulging confidential information?
   A) Financial frauds
   B) Social engineering attacks
   C) Malware attacks
   D) Zero click attacks

8. Which legislation governs cybercrimes in India, including its amendments?
   A) Cybercrime Act 2010
   B) IT Act 2000
   C) Cyber Security Law 2015
   D) Digital Protection Act 2018

9. Which organization in India is primarily responsible for dealing with cybercrime and cybersecurity?
   A) Ministry of Finance
   B) National Crime Records Bureau (NCRB)
   C) Indian Computer Emergency Response Team (CERT-In)
   D) Reserve Bank of India (RBI)
10. Zero click attacks require user interaction for successful execution.
    A) True
    B) False
11. What is the primary focus of social media monitoring?
    A) Assessing platform popularity
    B) Analyzing user demographics
    C) Tracking online conversations and mentions
    D) Evaluating marketing strategies
12. Hashtags are primarily used for organizing files on social media platforms.
    A) True
    B) False
13. What term is used to describe content that rapidly spreads across social media platforms?
    A) Trending content
    B) Sponsored content
    C) Private content
    D) Static content
14. What is the primary concern regarding social media privacy?
    A) Exposure to advertisements
    B) Unauthorized access to personal information
    C) Limited connectivity
    D) Lack of trending content
15. What is the purpose of social media marketing?
    A) Enhancing personal privacy
    B) Promoting social media platforms
    C) Building brand awareness and engaging with audiences
    D) Reducing online conversations

SECTION B

Answer any TEN of the following: (10x2=20)

16. Define the term "Information Security" and provide two examples of threats to information systems.
17. Enumerate four common reasons emphasizing the need for Information Security in organizations.
18. What is Cyber Security?
19. Mention any four damages caused due to VIRUS attacks.
20. Define cybercrime. Give two examples.
21. Differentiate between Malware attack and Ransom-ware attack.
22. List the types of cybercriminals modus-operandi.
23. What you mean by Spoofing? Give an example.
24. Write the objectives for social media monitoring.
25. Name any four key features of Social Media Platforms.
26. What is a Hashtag? Give any two popular Hashtags.
27. Describe four best practices for social media security.

Answer any FIVE of the following: (5x5=25)

28. What are Information System Attacks? Explain briefly the types of attacks.
29. Define TROJANS. Elaborate the types of TROJANS and mention any four protection tips for them.

30. Differentiate between Qualitative and Quantitative Risk Analysis.
31. Write a short note on: (a) Social Engineering attacks
                              (b)Remedial and Mitigation measures for Cyber Crime
32. What is IT Act 2000? Briefly describe its salient features.
33. Explain various types of social media with examples.
34. Read the following case study carefully and answer the following reflection questions based on your analysing skills.

Case Scenario:

Alex, a 28-year-old graphic designer with a growing online presence, received a connection request on a professional networking site from a profile claiming to be a renowned industry professional. The imposter had meticulously replicated the profile of a respected figure in the design community, complete with a convincing profile picture and a history of professional accomplishments.

Excited about the apparent opportunity to connect with a respected figure, Alex promptly accepted the request. Over the next few weeks, the imposter engaged Alex in seemingly genuine conversations, gradually building trust. The imposter then proposed a collaborative project, expressing interest in Alex's unique design concepts.

Under the guise of collaboration, the imposter requested detailed design proposals and sensitive business information. Trusting the legitimacy of the connection, Alex, eager for professional recognition, shared confidential design concepts and proprietary information.

As the imposter gathered valuable data, Alex began to grow suspicious. Seeking to verify the legitimacy of the profile, Alex attempted to cross-reference information with other industry professionals. It was only through this investigation that Alex discovered the impersonation, leading to the realization of the potential damage caused by the inadvertent disclosure of sensitive information.

This incident not only impacted Alex on a professional level but also raised broader concerns about the vulnerabilities users face on social media platforms due to increasingly sophisticated impersonation tactics.

Reflection Questions:

1. How can users like Alex verify the authenticity of profiles on social media to prevent falling victim to impersonation scams?

2. How can social media platforms educate users about the tactics used in impersonation scams and the risks of sharing sensitive information with unknown contacts?

3. To what extent can the widespread adoption of two-factor authentication on social media enhance security against impersonation scams?

4. What legal avenues are available for individuals like Alex to pursue against impersonators, considering potential business and reputation damage?

5. How can social media platforms improve responsiveness to user reports of suspected impersonation, ensuring timely investigation and mitigation of threats to security and privacy?

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