(Please write your Exam Roll No.) Exam Roll No

END TERM EXAMINATION

SECOND SEMESTER [MCA] JUNE 2024

Paper Code: MCA-102 **Subject: Data And File Structures**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Answer **any four** of the following questions:- (4x5=20)

a) Write a C Program/algorithm to implement two stacks using a single array.

b) Why Binary Search algorithm is more efficient that linear search? Depict your answer with suitable example? Mention the time complexity level of two algorithms

c) Write the routine to convert a singly link list into circular link list. How can you check weather the circular queue is empty and full.

d) What is hash table? What are the properties of hash function? Explain midsquare hashing function.

e) Write a program in C to check a particular sub string is present in a given string or not? If found print its location

f) Evaluate the following postfix expression step by step using the algorithm A B C * / C D * + C B * -, where A=6, B=2, C=3 and D=4

g) Elaborate M way search tree. Write the value of max children, min children, min keys, max keys of a node if order of tree is 6. Compare B trees with B+trees.

h) Given Prefix expression: ABLMKNPQ and Infix expression: LBMANKQP. Draw the tree

i) Show all the passes using quick sort for the following list 54,26,93,17,77,31,44,55,20

j) Show the structure of the binary search tree after adding each of the following values in that order: 10, 1, 3, 5, 15, 12, 16. What is the height of the created binary search tree?

UNIT-I

Q2 a) How a linked list can be used to represent a polynomial 5x3 +4x2 +3x+2? Give an algorithm to perform addition of two polynomials using linked list (5)

b) Write a function in C is to find the middle of the singly linked list. If the number of nodes are even, then there would be two middle nodes, so return the second middle node. (5)

OR

Q3 a) Formulate an algorithm that detects and removes a cycle in link list. (5)

b) Given a linked list and two integers M and N. Write a function in C such that you retain M nodes then delete next N nodes, continue the same till end of the linked list. Eg. Convert 1,2,3,4,5,6,7, 8 to 1,2,5,6 if M=2 and N=2 (5)

UNIT-II

Q4 a) What do you know about B-trees? Write the steps to create a B-tree. Construct a B-tree of order 4 and insert the values 34, 45, 98, 1, 23, 41, 78, 100, 234, 122, 199, 10, 40. (5)

P.T.O.

b) Discuss the properties and characteristics of a max-heap and a min-heap. Explain how heapify operations ensure that these properties are maintained during insertion and deletion operations. Provide examples illustrating the construction of both max-heaps from a given array of elements. (5)

OR

Q5 a) Write a function in C for heap sort using heap. (5)

b) Compare AVL trees with binary tree. Construct an AVL tree by inserting following elements one by one and count the total number of left and right rotations after inserting all the elements 16, 27, 9, 11, 36, 54, 81, 63, 72, 78 (5)

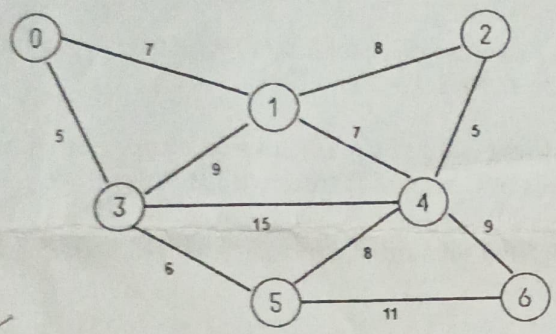
UNIT-III

Q6 a) Explain the concept of breadth-first search (BFS) in graph traversal. Develop an algorthim for breadth-first search (BFS). (5)

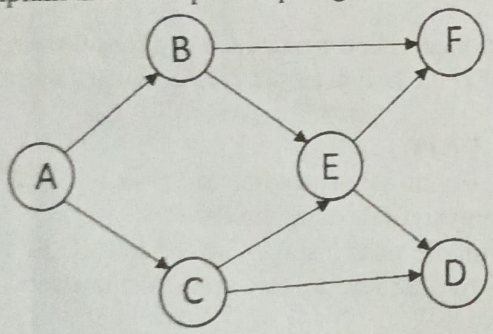
b) Develop an algorithm for Warshall's algorithm to compute the shortest distances between all pairs of vertices in a weighted directed graph. (5)

OR

Q7 a) Compute the Minimum Spanning Tree and its cost for the following graph using Prim's Algorithm. Indicate each step clearly. (5)



b) Explain the concept of topological sort for the following directed acyclic graph (DAG). (5)



UNIT–IV

Q8 a) Write a program in C that merges content of two files into a third file. (5)

b) Explain the concept of polyphase merge and how it differs from conventional merge sort algorithms. (5)

OR

Q9 a) Explain how sequential file access differs from indexed file access. (3)

b) Consider inserting the keys 10, 22, 31, 4, 15, 28, 17, 59, 88 into a hash table with m=11 slots using open addressing with primary hash function h1(k)=k mod m. Illustrate the inserting of these keys using linear probing, using quadratic probing with c1=1 and c2=2 and using double hashing with h2(k)= 1+ (kmod(m-1)) (7)

****

MCA-102

P2/2

(Please write your Exam Roll No.) Exam Roll No. 0791004423

END TERM EXAMINATION

SECOND SEMESTER [MCA] JUNE 2024

Paper Code: MCA-104 **Subject: Object Oriented Software Engineering**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Attempt **any four** out of the following: **(4x5=20)**

(a) Generalization and Specialization in UML.
(b) Draw the System Sequence diagram for Online Ordering System.
(c) Designing the data access layer
(d) Testing strategies
(e) Draw the deployment diagram for Hotel Management System.
(f) 4+1 view architecture of UML.
(g) Draw the use case diagram for Online Ordering system.

UNIT-I

Q2 Draw and explain the Rational Unified Process. Draw a comparison between traditional lifecycle v/s the Object-Oriented Model. **(10)**

OR

Q3 System Development is model building. Explain in detail. **(10)**

UNIT-II

Q4 Explain the Unified Process and Inception phase in detail. What does Project Monitoring and Control include? **(10)**

OR

Q5 Draw and explain the requirement model for the recycling machine case study. **(10)**

UNIT-III

Q6 How the analysis model serves as a basis for the design model. Explain by taking example of the recycling machine case study. **(10)**

OR

Q7 Explain the following reusable design patterns: **(10)**

(a) Singleton
(b) Iterator
(c) Adaptor
(d) Observer

UNIT-IV

Q8. Why is testing required? Explain the various types of tests. Also explain the difference between manual and automated testing. **(10)**

OR

Q9 Write short notes on: **(10)**

(a) Agile manifesto and Principles
(b) Lean processes

****

P

(Please write your exam roll no.) Exam Roll No. 07914004423

END TERM EXAMINATION

SECOND SEMESTER [MCA] JUNE-2024

Paper Code: MCA106 **Subject: Python Programming**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed. Internal Choice is indicated.

Q1 Attempt **any Four** of the following: **[4x5=20]**

i) Mention & explain the python features in brief.
ii) Explain the Identifiers, Keywords, Statements, Expressions, and Variables in Python programming language with examples.
iii) What is the Dictionary in Python?
iv) Discuss the relation between tuples and lists, tuples and dictionaries.
v) What are the three types of import statement in Python? Discuss.
vi) What are packages? Give an example of package creation in Python.
vii) Write python program to swap two variables.
viii) What is an exception? Explain with few examples.
ix) Explain what is meant by namespaces and scoping.

Q2 Explain the concept of decorators in Python functions. How do decorators enhance the functionality of existing functions? **[10]**

OR

Q3 a) Write a program that generates 5 random numbers in the range 10 to 50. Use a seed value of 6. Make a provision to change this seed value every time you execute the program by associating it with the time of execution. **[5]**

b) i) In the following statement, what do >5, >7 and >8 signify. **[2.5]**

```
print (f '{n:>5}{n² :>7}{n³ :>8}')
```

ii) What will be the output of the following code segment? **[2.5]**

```
Name = 'Sanjay'
Cellno = 9812345678
print ( f '{name: 15}:{cellno:10}')
```

Q4 a) Create a list of tuples. Each tuple should contain an item and its price in float. Write a program to sort tuples in descending order by price. **[5]**

b) Write a program to implement stack data structure using "list". Show the output for 5 numbers to illustrate the stack principle of LIFO. **[5]**

OR

Q5 Explain about Basic list Operations, Indexing, Slicing, & Built-in List Functions and Methods. How are positive and negative indices used to access substrings? **[10]**

Q6 Describe the principles of encapsulation, inheritance, and polymorphism in Object Oriented Programming. **[10]**

OR

Q7 Describe about Handling Exceptions with examples. Explain the syntax and usage of the **try-except** block in Python for catching and handling exceptions. **[10]**

P.T.O.

MCA-106

P1/2

Q8 Describe common array manipulation functions in NumPy, such as **numpy.reshape(), numpy.transpose(), numpy.concatenate(),** and **numpy.split()** **[10]**

OR

Q9 Explain series in pandas. How to create copy of series in pandas? **[10]**

****

(Please write your Exam Roll No.) Exam Roll No 0279400442

END TERM EXAMINATION

SECOND SEMESTER [MCA] JUNE, 2024

Paper Code: MCA-114 **Subject: Full Stack Development**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed. Internal Choice is indicated

1. Attempt any **four** of the following questions:- **4 x5=20**

(a) Define React and highlight the obstacles faced during development. Discuss the React library and its significance. **5**

(b) Describe the steps to create the first React application using Create React App, including React with JSX and React Element as JSX **5**

(c) Explain the difference between ES6 Classes and stateless functional components. **5**

(d) Describe React state management and state within the component tree. **5**

(e) Discuss the concept of templates, interpolation, and directives in Angular. How are directives used to manipulate the DOM? **5**

(f) Describe the process of handling forms, user input, and form validations in Angular. Explain how Angular facilitates two-way data binding in form elements. **5**

(g) Provide an introduction to Node.js, highlighting its features and the Node.js process model. **5**

(h) Describe the steps involved in setting up a local environment for Node.js development. What are the components of the Node.js runtime environment? **5**

(i) Explain the concept of Node.js modules and the types of modules available. **5**

(j) Discuss the role of Node Package Manager (NPM) in managing dependencies in Node.js projects. **5**

UNIT - I

2. (a) How does ES6 enhance the manipulation of objects and arrays compared to previous JavaScript versions? Provide examples **5**

(b) Describe the React library and its key features that make it a preferred choice for building user interfaces. **5**

OR

3. (a) Elaborate on constructing elements with data and rendering them in the DOM. Give examples to justify your answer **5**

(b) Develop a react component using the pure React code. The output must be in form of a table (No DB is required). The table must have the following details: Sr.No., Name, Enrollment Number, Programme, Semester. **5**

UNIT - II

4. (a) Examine the principles and considerations involved in designing a REST API. Exemplify the process of designing an identifier. **5**

(b) Develop a module to handle the get, post, put, patch methods from the 5004 clients, for every type of request the module responds to the client the name of the method in following format: (method: Name of Method) **5**

OR

5. (a) Specify React Router's classification and the integration procedure in detail. **5**

(b) Provide an exposition of your comprehension of JSON, encompassing its syntax and a suitable illustration. **5**

PTO

UNIT - III

6. (a) Depict various forms of data binding in Angular by providing pseudocode representations for each. **5**

   (b) Given a student data API. Develop angular UI retrieving data using HTTP to display. **5**

OR

7. (a) Compare Synchronous and Asynchronous file system. Justify their application. **5**

   (b) Explain Elucidate the concept of templates in Angular. **5**

UNIT – IV

8. (a) Distinguish between NoSQL and RDBMS databases. Explain the purpose and use of each item. **5**

   (b) Exemplify the utilization of Query objects in MongoDB. **5**

OR

9. Imagine a database structure for student management system and write a program for connecting to MongoDB from Node.js for displaying records of students. **10**

****

(Please write your exam roll no.) Exam Roll No. 07.9.1400.1423

END TERM EXAMINATION

SECOND SEMESTER [MCA] JUNE-2024

Paper Code: MCA128 **Subject: Digital Marketing**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed. Internal Choice is indicated.

Q1 Attempt **any four** of the following questions:- **(4x5=20)**

a) Identify and explain at least three different types of buying models commonly used for display advertisement, highlighting their key characteristics and advantages for advertisers.

b) Using a case study approach, describe the stages of the consumer decision journey for purchasing a high-tech gadget such as a smartphone, emphasizing the role of digital media in each stage.

c) Discuss the primary reasons why a company might continue to invest in search engine ads despite achieving a strong organic ranking, providing examples and insights into the strategic significance of paid search in digital marketing.

d) Elaborate on the differences between consumer-initiated and medium-initiated interaction with digital media, illustrating each with real-world examples and discussing their implications for marketing strategies.

e) Examine the critical role of online reputation management in the context of digital marketing, outlining its key objectives, strategies, and tools that organizations can utilize to maintain a positive brand image online.

f) Explain the purpose and significance of display advertising in digital marketing, elucidating how it contributes to brand visibility, audience engagement, and conversion optimization.

g) Differentiate between ad networks and ad exchanges in the digital advertising ecosystem, analyzing their respective functions, operation models, and the benefits they offer to advertisers and publishers.

h) Provide an overview of various metrics utilized in digital marketing to measure campaign performance and effectiveness. Include examples of key performance indicators (KPIs) for different digital channels.

i) Compare and contrast the use of long-tail and short-tail keywords for search engine queries, discussing their relevance, effectiveness, and application in search engine optimization (SEO) strategies.

j) Identify and explain the distinct purposes of Google Ads, Google for Publishers, and Google Ads within the broader framework of digital marketing

Q2 a) Define traditional marketing and discuss its key tools. How do these tools differ from those used in modern marketing? **(5)**

b) Compare and contrast the dotcom and post-dotcom eras in the context of marketing strategies. Highlight the major shifts and phenomena observed in modern marketing during these periods. **(5)**

OR

Q3 a) Enumerate and elucidate the platforms and techniques commonly utilized in modern marketing campaigns. How do these platforms facilitate targeted audience engagement? **(5)**

P.T.O.

MCA-128

b) Trace the origin and evolution of digital marketing. Identify and elaborate on the advantages that digital marketing offers over traditional marketing methods. **(5)**

Q4 a) Discuss various types of emails employed in digital marketing campaigns. Provide examples and explain the significance of opt-in email forms in building customer relationships. **(5)**

b) Analyze different types of display ads used in online marketing, highlighting their advantages and disadvantages in capturing audience attention and driving conversions. **(5)**

OR

Q5 a) Illustrate the functioning of programmable digital marketing by dissecting the roles of its various components. How does this approach optimize marketing efforts for better results? **(5)**

b) Examine the ad placement process on Google's search engine. Discuss the criteria utilized to calculate the quality score of an ad and its implications for campaign success. **(5)**

Q6 a) Describe the characteristics of major social media platforms such as Facebook, LinkedIn, Twitter, Instagram, and Snapchat. How can businesses tailor their marketing strategies to leverage the unique features of each platform? **(5)**

b) How does Facebook marketing differ from other forms of digital marketing, such as Google Ads or email marketing? Discuss the unique advantages and challenges associated with advertising on Facebook **(5)**

OR

Q7 a) How can businesses leverage LinkedIn for employee advocacy and recruitment purposes? Discuss the role of employee engagement in enhancing the company's LinkedIn presence. **(5)**

b) Compare and contrast Twitter marketing with other forms of digital marketing, such as Facebook or Instagram advertising. What are the unique features and advantages of using Twitter for marketing purposes? **(5)**

Q8 a) Discuss the difference between on-page and off-page optimization techniques in SEO. Provide examples of each technique and explain how they contribute to improving a website's search engine rankings and organic traffic. **(5)**

b) Explain various SEO tactics used to enhance a website's search engine performance. Discuss the role of keyword research, content optimization, link building, and technical SEO in improving website visibility and driving organic traffic. **(5)**

OR

Q9 a) Introduce social media metrics and their significance in measuring the effectiveness of social media marketing campaigns. Discuss key metrics such as reach, engagement, conversion, and ROI, and explain how they help businesses evaluate their social media performance. **(3)**

b) Describe the features and functionalities of Google Analytics and Google AdWords in web analytics and digital marketing campaigns. How can businesses utilize these tools to analyze website traffic, track user behavior, and optimize advertising campaigns for better results? **(7)**

****