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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF INFORMATION SCIENCE**

**MID TERM EXAMINATION**

**Winter Semester:** 2021 - 22

**Course Code:** BCA 2002

**Course Name:** Datastructures and Algorithms

**Program & Sem:** BCA, BCG, BCV, BSD & 2<sup>nd</sup>

**Date:** 11/May/2022

**Time:** 01:30 PM – 3:00 PM

**Max Marks:** 50

**Weightage:** 25%

**Instructions:**

(i) Read the all questions carefully and answer accordingly.

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each question carries THREE marks.**

**(5Qx 3M= 15M)**

1. Define stack. What are the different operations that be performed using stack ADT  
(C.O.No.1) [Knowledge]
2. Mr. Varun Gowda is told to maintain the student database where he has to store the student details like Student name(string), Student ID number(string), Fathers name(string), student age(int), Student email id(string), student cgpa(float), student section(character), student contact number(int). Identify datatype would be the best to store multiple student details as a single type. Help Mr. Varun Gowda to create the datatype with the above mentioned details.  
(C.O.No.1) [Knowledge]
3. Given the address of p is 1001, and p stores the value 25. And ptr1 holds the address of variable p. The address of ptr1 is 2001. Consider another pointer variable ptr2 is created which holds the address of ptr1. Write the output when we try to print the following variable content in the following order p, \*ptr1, ptr1, \*ptr2, ptr2, \*\*ptr2. (C.O.No.1) [Knowledge]
4. Define the following terms: Queue, Enqueue, Dequeue. (C.O.No.1) [Knowledge]
5. State the conditions we have to check while inserting an element into stack and queue. Write the condition for the same. (C.O.No.1) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer all the Questions. Each question carries TEN marks.**

**(2Qx10M=2M)**

6. An application is designed in such a way that whatever the recent number we have entered we can access that first. The application has to be written in C language. What are the important variable required for writing such application? Give the functions to insert and delete operation for the same using C. (C.O.No-1) [Comprehension]

7. In Café Coffee Day as many will be waiting near the shop while taking coffee or when someone orders, they want to create a smart reservation ordering system so that they will get to know the service is provided as per first come first serve basis. The people who sits on a table will scan the QR code and orders, the table number will be recorded according to which the services will be provided. At a time maximum of 8 tables the services can be provided. Give the modules to insert the ticket and delete the ticket number once the order is served

(C.O.No-1) [Comprehension]

### **Part C [Problem Solving Questions]**

**Answer all the Questions. Each question carries FIFTEEN marks.**

**(1Qx15M=15M)**

8. Mr. Himashu Joshi is in josh of creating a programming language “CB”. While writing the application for expression evaluation, part of the expression evaluation contains of verifying the matching parenthesis. He includes { }, [ ], ( ), < > these symbols as parenthesis. Help him to demonstrate a C application so that he can complete the remaining part of expression evaluation.

(C.O.No. 1) [Application]



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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF INFORMATION SCIENCE**

**END TERM EXAMINATION**

**Winter Semester:** 2021 - 22

**Course Code:** BCA 2002

**Course Name:** Data Structures and Algorithms

**Program & Sem:** BCA/2<sup>nd</sup>

**Date:** 29<sup>th</sup> June 2022

**Time:** 01:00 PM to 04:00 PM

**Max Marks:** 100

**Weightage:** 50%

**Instructions:**

- (ii) Read the all questions carefully and answer accordingly.  
(iii) All the questions are mandatory.

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each question carries Five marks.**

**(4Qx 5M= 20M)**

1. Give a general syntax for a Structure with an example. (C.O.No.1) [Knowledge]
2. State the definition of User defined function along with the elements of user defined function. (C.O.No.1) [Knowledge]
3. Define a pointer along with syntax of declaring and defining a pointer. (C.O.No.1) [Knowledge]
4. What is a Stack? Explain the operations of Stack. (C.O.No.1) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer all the Questions. Each question carries Ten marks.**

**(5Qx10M=50M)**

5. Mr. XYZ working as an office assistant in an organization. He will receive the files which he has to verify. Every day the files are kept on his table one above the other, where the latest one is on top. Help Mr. XYZ to demonstrate the functionalities such as
  - a. Ordering of files,
  - b. Display the order in which the files are kept on the table.
  - c. Verify the file and remove from the table which is on the top using suitable data structure. (C.O.No.2) [Comprehension]
6. A train in a railway station has 5 bogies which are connected to each other. Write a c code to add one more bogie(bno) from the last using linked list representation using following signature. Location insertlast(Location first, int bno), and delete a node from last with following signature Location deletelast(Location first). (C.O.No.2) [Comprehension]
7. Construct the Binary search Tree with the following elements. 100,50,75,25,55,78,80,79,10,28,200,150,220. Traverse this tree in pre-order, post-order, and In-order traversal. (C.O.No.3) [Comprehension]

8. There are six houses namely A, B, C, D, E, and F are there in a layout, which are aligned in the following order. A is a neighbor of B, E and F, B is a neighbor of A, C, D and F, C is neighbor of B, D, E and F, D is neighbor of B, C and E, E is neighbor of A, C, D and F, F is neighbor of A, B, C and E. Construct the graph accordingly. Traverse the graph starting from E using Depth First Search algorithm. (C.O.No.4) [Comprehension]
9. Write a BFS program for the above-mentioned graph (Refer Q.NO.8). (C.O.No.4) [Comprehension]

### **Part C [Problem Solving Questions]**

**Answer both the Questions. Each question carries Fifteen marks. (2Qx15M=30M)**

10. Given the Music player record which contains the details Song\_Number, Song\_Name and Film\_Name. Write a code segment to insert a song in last using Singly Linked List and also to delete a song from the first using song name. (C.O.No.3) [Application]
11. Mr. XYZ has a problem in storing and deleting records based on employee ID. He needs some functions for Inserting, Deleting, and displaying of the employee Ids. Develop program for the same if he has stored the data as and when arrived in FIFO manner. (C.O.No.2) [Application]