U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2024 Supplementary Examinations

Programme: B.E. **Semester:**
Branch: Computer Science And Engineering **Duration: 3 hrs.**
Course Code: 19CS3PCDST **Max Marks: 100**
Course: Data Structures

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably assumed.

UNIT - I

1 a) Write an algorithm to convert given infix expression into postfix expression and also manually convert the below given expression into postfix format. **10**
Expression: ((P + Q) * (R – S) + T) / (U + V)

b) Write a recursive function to solve Tower of Hanoi problem and draw a recursive tree to show how function call tracing is achieved for 3 disks. **10**

UNIT - II

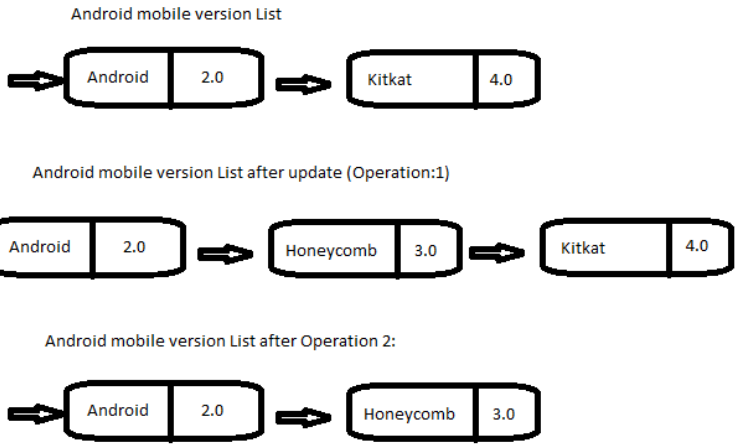
2 a) Analyze the below given code and complete the functionalities to simulate the working of circular queue. **10**

```
#include<stdio.h>
#include<conio.h>
#define SIZE 10

int queue[SIZE], front = -1, rear = -1;

Enqueue(x)
 {
  if( IsFull() )
    printf("Queue is Full")
 }
  Dequeue()
  {
   if( IsEmpty() )
     printf("Queue is Empty")
  }
void display(){
  if()
  else{
  }
}
```

b) Demonstrate the applications of Double Ended Queue with an example program. **10**

UNIT - III

3 a) Analyze the below given diagram and write a C program with suitable singly linked list functionalities to complete the operations given below. **10**



b) Fresh fruits maintained in an Inventory system are almost always cleared on the basis of First-In-First-Out basis because of maintaining the quality. How do you implement a Singly linked list concept to solve the above scenario? Write C code to implement the same. **10**

OR

4 a) Write a C program to demonstrate the functionalities of the stack using a singly linked list. **10**

b) Hotel Manager stores all the customer details like mobile number and amount paid in a separate list to verify at the end of the day. He requires to print the number of customers count and list of mobile number and amount in the reverse order. Write a C program to demonstrate the above scenario using a singly linked list. **10**

UNIT - IV

5 a) Analyze the below given code and complete the remaining part of the code and also write the output with a neat diagram. **10**

```
struct node {
   int sl_no;
   char USN[10];
   struct node *next;
};

struct node *head = NULL;
struct node *current = NULL;

//insert link at the first location
void insertFirst(int key, int data) {
   struct node *link = (struct node*) malloc(sizeof(struct node));
   link->sl_no = key;
   strcpy(link->USN, data);
```

```
if (isEmpty()) {
     head = link;
     head->next = head;
   } else {
     link->next = head;
     head = link;
   }    }

//delete Last item
struct node * deleteLast() {
   . . . . . .
   return tempLink;
}

//display the list
void printList() {
. . . .
}

void main() {
   insertFirst(1,1BM20CS001);
   insertFirst(2,1BM20CS002);
   insertFirst(3, 1BM20CS002);
   printf("Original List: ");
  printList();
  deleteLast()
   printf("\nList after deleting items: ");
   printList();
}
```

b) Bookmark option in the web browser has the functionality to access the URL stored in backward and forward direction, Write a C code to simulate the above scenario with suitable data structures to perform insertion and deletion of URL with dynamic memory implementation. **10**

OR

6 a) In order to design a password verification application, you will decide to implement it using Hashing techniques. How would you handle the collision, explain the different methods used to handle the collision that occurs in Hashing techniques? **10**

b) A web site can prevent leaking a user's raw (plain text) password in the event that its password database is breached. If an attacker breaches a database of password hashes, they wouldn't have access to users' plain text passwords, which could be used to compromise their identities. **10**

How does hashing work and what are the hashing functions available to implement the above scenario?

UNIT - V

7	a)	The travel agency decided to have a software application to store and access the data. Demonstrate the storing and searching the data in a non-linear fashion for the above requirement.	**10**
	b)	Construct a Binary Search Tree for the below given data and write the pseudo code of a traversal algorithm and show pre-order, post-order and in-order traversal of the constructed BST Data: 10, 5, 1, 7, 40, 50	**10**

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