

B.E./B.TECH. Degree Examination, December 2020

Second Semester

CS16202 - Programming and Data Structures I

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. Determine the time complexity to count the number of elements in the linked list
 - a)O(1)
 - b)O(n)
 - c)O(log n)
 - d) O(n²)
2. If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed?
 - a)ABCD
 - b)DCBA
 - c)DCAB
 - d)ABDC
3. Pushing an element into stack already having five elements and stack size of 5, then stack becomes _____
 - a)Overflow
 - b)Crash
 - c)Underflow
 - d) User flow
4. Which of the following best defines a Hash function?
 - a)A function has allocated memory to keys
 - b)A function that computes the location of the key in the array
 - c)A function that creates an array
 - d) A function that computes the location of the values in the array
5. List few advantages of using files in C
6. Implement enqueue operation in ‘c’ on circular queues.
7. Write an algorithm to print the elements of an array in reverse order.
8. Differentiate linear and binary search in terms of its time complexity

PART B - (4 X16 = 64 marks)

9. (a) (i) Discuss on the advantages and disadvantages of using recursive functions. Write a program to print fibonacci series using recursions (8)
- (ii) For a banking application, create a structure to maintain its customer details that includes account no., balance and name. Write a program to print the customer details, calculate balance details after withdrawal and search for a customer. (8)

(OR)

- (b) (i) Write a program to compare two strings without library functions and present the compared output in numerical form (8)
- (ii) For a student information system, create a structure to maintain student details that includes name, roll number, department and year of joining. Write a program to list the student year wise and to print student details given a roll number. (8)
10. (a) Compare the performance of linked list and array. Give a detailed illustration with suitable algorithm to perform insertion and deletion on singly linked list. (16)

(OR)

- (b) List few real time applications of doubly linked list. Write the algorithm to insert, delete and search elements in doubly linked list. (16)
11. (a) Illustrate the real world application of queues with suitable examples. Write an algorithm to perform insertion and deletion on linked implementation of queues. (16)

(OR)

- (b) What are the advantages of postfix expression representation? With suitable example and algorithm, illustrate the conversion of infix to postfix expression (16)
12. (a) Why hashing is considered as on the best search approach? With suitable examples, explain the working of various hash techniques
- (b) Why merge sort is considered as one of the best sorting approach? Write the merge sort algorithm and analyse its time complexity. Perform merge sort for the following data: 2145, 25, 19, 121, 135, 549, 363, 878, 299, 634. (16)