Enrollment No._____ Exam Seat No._____

# C. U. SHAH UNIVERSITY

## Summer Examination 2018

Subject Name: **Data Structure Using C**
Subject Code: **4CS04DSC1** Branch: **M.Sc. C.A. & I.T. (Integrated)**
Semester: **4** Date: 01/05/2018 Time: 10:30 To 01:30 Marks: **70**

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***Instructions:***

(1) Use of Programmable calculator and any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

**Q. 1 Attempt the Following questions.** **14**

**a)** malloc() used in Dynamic Memory Allocation is available in which header file? **1**
(1) stream.h (2) stdio.h (3) malloc.h (4) alloc.h

**b)** Identify from below the Array subscripts in C always start with? **1**
(1) 1 (2) -1 (3) as per programmer (4) 0

**c)** Which of the following is the correct way to declare a pointer of integer type? **1**
(1) int ptr; (2) *int *ptr; (3) int *ptr; (4) *int ptr;

**d)** Stack is also known as ? **1**
(1) Last in first out (2) First in last out (3) Last in last out (4) First in first out

**e)** Which of the following allows deleting data elements from and inserting at rear? **1**
(1) Queue (2) Linked List (3) Stack (4) Binary search tree

**f)** Which of the following number of comparisons done by sequential search? **1**
(1) (N/2)+1 (2) (N+2)/4 (3) (N-1)/2 (4) (N+1)/2

**g)** Which of the following method start searching information at the beginning of the list and check every element in the list? **1**
(1) Binary search (2) Linear search (3) Tree Search (4) Binary Tree search

**h)** A node that is connected to all lower-level nodes is called? **1**
(1) Successor node (2) Ancestor node (3) Internal node (4) None of these

**i)** Which of the following is not a Queue? **1**
(1) Single Ended Queue (2) Circular Queue (3) Dequeue (4) None of these

**j)** What is the disadvantage of selection sort? **1**
(1) It requires auxiliary memory (2) It can be used for small keys
(3) It is not scalable (4) None of the mentioned

**k)** What is the advantage of bubble sort over other sorting techniques? **1**
(1) It is faster (2) Detects whether the input is already sorted
(3) Consumes less memory (4) All of the mentioned

**l)** Where is linear searching used? **1**
(1) When the list has only a few elements
(2) When the list has only a huge number of elements

(3) Used all the time (4) None of these

**m)** Binary Search can be categorized into which of the following? **1**

(1) Conquer and Divide (2) Greedy algorithm

(3) Dynamic programming (4) Divide and conquer

**n)** Which of these best describes an array? **1**

(1) Array contains elements only of the same type (2) Contains information of mixed types

(3) Insertion and deletion of element becomes easy (4) None of these

**ATTEMPT ANY FOUR QUESTIONS FROM Q. 2 TO Q. 8**

**Q. 2 Attempt all questions.**

**a)** Explain declaration and calling of UDF with example. **7**

**b)** Write advantages and disadvantages of pointers. **7**

**Q. 3 Attempt all questions.**

**a)** Explain use of malloc(size), function calloc(n,size) and function free(block) with example. **7**

**b)** Describe Space complexity and Time complexity. **7**

**Q. 4 Attempt all questions.**

**a)** Explain the trace of selection sort on following data. **7**

49, 20, 77, 9, 59, 50, 103, 30, 91, 82

**b)** Write C program to implement Linear Search. **7**

**Q. 5 Attempt all questions.**

**a)** Differentiate between Primitive and Non Primitive data structures. **7**

**b)** What is Stack? List out different operation of it. Write algorithm for any two operations. **7**

**Q. 6 Attempt all questions.**

**a)** Write program code to implement below Singly Linked List operations: **7**

(i) Insertion of a node at the beginning

(ii) Insertion of a node at the end

**b)** What is Linked List? Write applications of Linked List. **7**

**Q. 7 Attempt all questions.**

**a)** With figure, explain the following terms: (1) Depth of a tree (2) Sibling nodes (3) Strictly binary tree (4) Ancestor nodes (5) Graph (6) Minimum spanning tree (7) Degree of a vertex. **7**

**b)** The Preorder traversal of the tree is: 7, 1, 0, 3, 2, 5, 4, 6, 9, 8, 10 **7**

The inorder traversal of the tree is : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

What is the postorder traversal? How a general tree can be converted to binary tree?

**Q. 8 Attempt all questions.**

**a)** Write algorithm for inserting and deleting an element in circular queue. **7**

**b)** Explain the concept of circular queue. Compare circular queue with simple queue. **7**