Daffodil International University
Faculty of Science & Information Technology
Mid Term Examination, Spring 2023
Course Code: CSE134: Course Title: Data Structure
Level-1, Term-2, Batch-63

Time: 1.50 Hrs

Marks: 25

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1 (A) Suppose a data set S contains n elements.   2   CO1

    i)   Explain an average running time T_l of the linear search algorithm with the running time T_2 of the binary search algorithm when (a) $n = 1024$ and (b) $n = 4096$.   3

    ii)   Interpret searching mechanism for a given item in S when S is sorted as a linked list.   5

(B) Consider a **CourseInfo** from the following Table 1

CourseName	TeacherName
Data Structure	Ali
Computer Networks	Oli
Database	Poli
Math	Ali
English	Oli
Physics	Ali
Computer Fundamentals	Poli
Discrete math	Ali

Construct singly and doubly linked lists graphically from the above table.

2. (A) Mr. Rahim is a faculty member of the CSE department at PQR university. During the Fall-22 semester, he has taken a Data Structure course with different sections. When the final exam was over Rahim checked all the scripts and wrote down the marks on the mark sheet. That typical system had many drawbacks, for example, marks can be lost anytime. At that time, he felt that if a system was built and he was able to upload the marks in the system then marks can never be lost. That time he decided to write a program to solve the matter. While uploading the marks he found that the following information is needed.   i) StudentID —> int, ii) Marks —> float, iii) Section —> character   5   CO1

While writing the code, he gave a thought that he should not waste the memory.

    I.   Now help Mr. Rahim by writing the code, so that he can store 10 students' information in the database. Select appropriate data structure for solving the matter.

    II.   Show the code segments line-by-line of searching any student information using StudentID.

3. (A) Consider the situation of a library management system, where library authority stores books in such an order that when a new book of a particular subject arrives, the book is stored in the top of the books in the corresponding shelf. As we all are aware that there is a minimum capacity of each shelf. Say the capacity of the self is N. Now, apply array and linked lists according to programming concepts when the shelf is empty.   2   CO2

(B) Consider an empty stack and queue. Now do the following operations and draw your visualization: push (5), push (6), push (7), push (8), pop (8), enqueue (8), push (15), push (45), pop (45), enqueue (45), pop(15), enqueue(15), pop(7), enqueue(7), pop(6), enqueue(6) pop(5), enqueue(5), push(2), dequeue(8), dequeue(45). Now, construct the final state of stack and queue. You need to show intermediary stage also.   3

(C) Build a postfix expression from the following expression E using stack application. Must show all the steps during conversion from infix to postfix. $E:$ **V+ (W/Z- (Q*R^S)/T) *U**   5