Riphah International University, Lahore Campus, Pakistan

Riphah School of Computing & Innovation

Data Structures and Algorithms – Fall 2022

Assignment # 3

Submission Deadline	8th Jan 2023	Total Marks	30
Instructions	Individual assignment. To be submitted in hardcopy	CLO Linked	1, 2, 3, 5

Course Learning Outcomes

At the end of this course students will be able to;

No.	Outcome	Relation with PLO	BT Level
1.	**Apply** OOP concepts during defining and using ADTs	PLO1,2	C2
2.	**Apply** the various linear and nonlinear data structures and their relevant operations for problem solving	PLO 3,4	C3
3.	**Apply** different types of searching and sorting techniques	PLO 4	C3
4.	**Analyze** time required for the execution of a program, as well as the correctness of a program.	PLO 3,4	C4
5.	**Measure** the performance of the various ADTs	PLO 3,4	C4
6.	**Implement** the various linear and nonlinear data structures and their relevant operations for problem solving	PLO 11,12	C4

Mapping of Questions with CLOs

Questions	Q1	Q2	Q3	Q4	Q5	Q6
CLO #	5	5	5	5	4	2
Marks Obtained						

Question 1: Write a C++ program to implement a stack using an array. The program should support the following operations:

- **push:** add an element to the top of the stack
- **pop:** remove the element at the top of the stack
- **is_empty:** check if the stack is empty

Question 2: Write a C++ program to implement a queue using an array. The program should support the following operations:

- **enqueue:** add an element to the end of the queue
- **dequeue:** remove the element at the front of the queue
- **is_empty:** check if the queue is empty

Question 3: Write a C++ program to convert an infix expression to a postfix expression using a stack. The program should support the following operations:

- **push:** add an element to the top of the stack
- **pop:** remove the element at the top of the stack
- **peek:** get the element at the top of the stack without removing it
- **is_empty:** check if the stack is empty