Subject: Data Structures & Algorithms Lab   **Total Marks**: - 45
Course Code: CS – 214 L   **Date:** 28/12/2021
Class: BS(CS)   **Time:** 11:40am – 02:30pm
Semester: Fall 2021   **Max Time Allowed:** 03 Hours
Section(s): B   **FM(s) Name:** Mr. Sagheer Ahmed,

Signature:-

Instructions:

- Attempt all questions.
- Copied paper will be getting zero marks and further action will be taken as per university policy.
-Please specifically mention Question and part in answer sheet.

Question 1	CLO 3	PLO 3	C3 (Apply)	Marks: 30

You got an internship in a game developing company. They gave you first task of developing a mini dice rolling game using data structures and C++ as programming language. Your game should meet the following requirements.

Requirements:

1. Game should be built with the help of stack, link list, array and queue data structures.
2. Game will prompt user to enter the number of players in game.
3. Input the name of player and take 5 turns by rolling dice. Outcome of dice should be added into total scores of players.
4. Save each player's record into stack.
5. Stack should be implemented using link list.
6. Finally pop all player name and scores from stack and print them as summery.
7. Use queue data structure as dice, Take input the number of values on the dice form the user. Queue should be implemented with the help of array (circular array).
8. To randomly select the value from the queue, we will rotate a loop up to a random value (obtained with the help of built in method rand( )

Guidelines:

- ✓ Use stack data structure to save information of players. Each player will represent a node which will contain player name and scores.

- ✓ Use queue data structure to save dice numbers and get random number from dice. Use circular array to implement queue.

- ✓ Your solution should use these classes

    i.   **Player (Node) Class**: To save information of each player

    ii. **Stack Class**: To save different players

    iii. **Queue Class**: To save dice numbers given by user and get random number from dice.

- ✓ Before calling rand() method use this line (srand((unsigned) time(0));) to get different random numbers.

Note: *Use the following libraries in your program.*

#include <stdlib.h>
#include <ctime>
#include<unistd.h>

Question 2	CLO 3	PLO 3	C (Apply)	Marks: 15

You got a call from an organization to appear in their test to get a job of C++ developer. In the test, they gave you the following task which you had to build in C++ and 40 minutes were given for writing its solution.

Task Description:

- ✓ Take n values from the user and build BST from these values.

- ✓ Display the even and odd values of the left subtree and find their sum as well.

- ✓ Display the leave and parent nodes of the right subtree.

------------------------- **Best of Luck** -------------------------