HABIB UNIVERSITY

Data Structures & Algorithms

CS/CE 102/171 Spring 2023

Instructor: Maria Samad

Implementing Stacks

Student 1: _____

Student 2: _____

INSTRUCTIONS:

1. **Project Pitch**
   - HU Summer Camp enrolls 13 students. There are two clubs in the Summer Camp that each student is asked to join at the time of filling out their application. The two clubs are: ***Sports Club*** and ***Literary Club***. They may or may not decide which club they want to join when applying, as they will have a chance later on to make that decision.
   - The main task is to go through a series of steps and get all students to join one of the clubs
2. **Requirements**
   - **LISTEN/READ** attentively, and then **ANALYZE** carefully
3. **Solution**
   - Follow the requirements and design an algorithm to implement, and show the outputs at each stage in the design
4. **Restrictions**
   - Use Tuples to represent the listed students in the Summer Camp
   - Use Stacks to represent the Clubs and/or unassigned set of students
   - **MUST NOT USE ANY OTHER DATA STRUCTURES EXCEPT FOR THE ONES MENTIONED IN RESTRICTIONS!**

ACTIVITIES:

1. Activity 1
2. Activity 2
3. Activity 3

ACTIVITY 1:

When a student joins the Summer Camp, they are listed in the order of their time of application. Go through each of these applications and place the students in the respective clubs. DO KEEP THE RESTRICTIONS IN MIND WHEN DESIGNING THE ALGORITHM

ACTIVITY 2:

Once the Summer Camp started, the unassigned students were given a new deadline to choose a club of their choice, however, the deadline passed and they still did not make the decision. The administration decides to take the students from the Unassigned group and place them in Literary Club, giving precedence to original Literary Club students. Make sure the order of students DOES NOT change just because they are transferred to different clubs. DO KEEP THE RESTRICTIONS IN MIND WHEN DESIGNING THE ALGORITHM

ACTIVITY 3:

The Sports Club is invited to a Volleyball tournament with other Summer Camps, but they don't have enough players to qualify for the tournament. In order to overcome the deficiency, they decided to take some members from the Literary Club and join them. However, some basic skills are required to be a part of the team. Each student in Literary Club will be tested, and based on the number of successes, they will decide if he/she can become a part of Sports Club or not. Each student will be served 4 throws. If the number of successful catches is even, that particular student can join the Sports Club. It is purely on first-come-first-serve basis. The first 4 students with even number of catches will join the Sports Club. As the new members will need more training, they will have higher precedence in the club so that they can be trained accordingly. The order in which they are trained does not matter. For the remaining students, they will remain a part of Literary Club. The order in which they are now in Literary Club does not matter anymore, as everyone has become experienced now. DO KEEP THE RESTRICTIONS IN MIND WHEN DESIGNING THE ALGORITHM