**COMP 203 Data Structures and Algorithms, Fall 2024**

**Lab Assignment 6**

**Deadline: 18.11.2024 11:00 am**

**Read the questions and rules carefully. They are clear and well defined.**

**Rules:**

1. **No Cheating:** You are not allowed to collaborate with your friends and use any kind of websites or AI. If your homework gives a sign of any of them, **directly it will be graded as zero**.
2. **Goal:** Please do your homework alone. Our main aim is to **learn**.
3. **Submission:** Submit your work in **TWO java files.** **DON’T USE ZIP/RAR etc. In these cases, your points will be deducted by 30%.**
4. **Coding policy:** Explain your code in comments. **This is a must!**
5. **Latency policy:** A 30% deduction will be applied for each day of late submission.

**Files to submit:** ArrayStack.java, SLLQueue.java

**Submit ArrayStack.java to Canvas.**

1. Implement Stack abstract data structure as a fixed size array like we learned in the class. **(50pt)**

Implement Integer ArrayStack class (5pt) and the following methods:

a. int pop() to remove the top element from the stack and returns the removed element. (10pt)

b. void push(Integer element) to insert an element at the top of the stack. (10pt)

c. int size() to return number of elements in the stack. (5pt)

d. Boolean isEmpty() to check if the stack is empty or not. (5pt)

e. printStack() to print the elements in the stack. (10pt)

f. Test all your functions in the main. (5pt)

**Example:**

push(10)

push(20)

push(30)

push(40)

printStack()

10 20 30 40 //prints the result

pop()

printStack()

10 20 30 //prints the result

size()

3 //returns the number of elements

isEmpty()

false

**Submit ArrayQueue.java to Canvas.**

2. Implement Queue abstract data structure from an array.

Implement String ArrayQueue (5pt) and the following methods:

a. void enqueue(String S) to insert element S at the end of the queue. (10pt)

b. String dequeue() to remove the element at the front of the queue. (10pt)

c. int size() to return number of elements in the queue. (5pt)

d. boolean isEmpty() to check if the queue is empty or not. (5pt)

e. printQueue() to print the elements in the queue. (10pt)

f. Test all your functions in the main. (5pt)

**Example:**

enqueue (10)

enqueue (20)

enqueue (30)

enqueue (40)

printQueue()

10 20 30 40 //prints the result

pop()

printQueue()

20 30 40 //prints the result

size()

3 //returns the number of elements

isEmpty()

false