BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
WORK INTEGRATED LEARNING PROGRAMMES
Assignment 1

Course Title	Data Structures and Algorithms Design
Course No(s)	SS ZG519 / SE ZG519
Course Author	Jay Dave
Last Date for Submission	10/09/2023
Total Marks	16 Marks

Professor Forget has been teaching the course "Data structure and Algorithm" for many years. He forgot everything except stack and queue data structure.
He has a queue consisting of the students' names and a stack consisting of the marks of these students. Write the complete algorithm "findhighestscorer" to find the highest scorer using push, pop, enqueue, and dequeue operations only. You can use an extra queue if required. No other data structure can be used.
Note: Assume that none of the students scored equal marks in the course.

```
Algorithm push(s, o):
        if top = N then
                indicate that a stack-full error has occurred
        top ← top+1
        s[top] ← o
Algorithm pop(q):
        if top = 0  then
                indicate that a stack-empty error has occurred
        e ← S[top]
        s[top] ← NULL
        top ← top - 1
        return e
Algorithm enqueue(q, o):
        if rear = N then
                indicate that a queue-full error has occurred
                return
        rear ← rear+1
        q[rear] ← o
        if front = 0 then
                front = 1
Algorithm dequeue(q):
        if front = 0 then
                indicate that a queue-empty error has occurred
                return NULL
        e ← q[front]
        q[front] ← NULL
        if front = rear then
                front ←  0
                rear ← 0
```

```
        else
                front ← front +1
        return e
Algorithm findhighestscorer(N, Names, Marks):
        for i = 1 to N do
            push(s,Marks[i]) //s is a stack
            enqueue(q1,Names[i]) //q1 is a queue
         //Complete this algorithm using push, pop, enqueue, dequeue operations only…
        //You are free to use only an extra queue if required. No other data structures can be used…
```

Marking scheme:

- 5 Marks for correct algorithmic notions + 11 Marks for the correct algorithm.
- Submissions with plagiarism/copied submissions will not be evaluated.

Submissions instruction:

- Students are instructed to submit their work in a single word file consisting of text only (not images).

Sample input 1:

Queue:

Rahul	Sehwag	Sachin

Stack:

80	*TOP of Stack*
40	
50	

Sample output 1: Sachin

Explanation: Rahul's marks = 50, Sehwag's marks = 40, Sachin's marks = 80. So, Sachin is the highest scorer.

Sample input 2:

Queue:

Ricky	Surya	Steve	Akram

Stack:

12	*TOP of Stack*
13	
14	
11	

Sample output 2: Surya

Explanation: Ricky's marks = 11, Surya's marks = 14, Steve's marks = 13, Akram's marks = 12. So, Surya is the highest scorer.