

## **ASSIGNMENT –TWO**

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**GROUP 1**

### **MODULE : DATA STRUCTURES AND ALGORITHM**

#### **Exercise –II**

##### **Part I –stack**

##### **A . Basics**

**Q 1.** In making MTN Transactions, it shows how LIFO in stack works because the last detail you entered (like amount or PIN ) is the first one removed when you press back.

That is exactly Last in , First out.

**Q2.** UR Canvas is like “back popping” because every time you move forward , a new step is “pushed”. Going back undoes the last step pushed , just like pop in stack.

##### **B. APPLICATION**

**Q3.** Stack enable UNDO in BK Mobile :

Every transaction is pushed on top of the stack . if you make amistake , popping removes the most recent action and brings you back to the previous state.

**Q4.** Stacks ensure balanced forms in IREMBO:

When you are going to make an online form from irembo websites through [www.irembo.gov](http://www.irembo.gov),

The stack data structure is also applied because you reach a form as long as the stack is empty.

For every opening service to apply, push is to the stack.

Example : Open tab → registration formt→fill names→fill number→+.....save form.

This shows how the stacks work through applying irembo services. When you want to go next to the next details you go on the top (fill number) and when you are popping ,you cancel by the last step(fill number) and when stacks is empty at the end, the form is balanced. You don't have anything to push/take in to the stack. There's no more next. Example “ you are successfully saved your form”.

### **C. LOGICAL**

**Q5.** After Pop(), Debate is removed. New top is “**group assignment**”.

**CBE NOTES** →MATH REVISION→DEBATE(Popped) →**Group Assignment**.

**Q6.** If the student undoes 3 recent actions,

The last 3 answers might be popped, only the previous actions/answers that was not undone will remain in the stack.

### **D. ADVANCED THINKING :**

**Q7.** Back tracking in RWANDA AIR Booking,

Snap this out, imagine the going back of the passenger will makes the pop removes the last step and replace his book as last stepped will be given to the new passenger. Retracing one by one.

**Q8.** Push words and pop it again,

UMWANA NI UMUTWARE.

→ Push each word : umwana+ni+umutware

→Pop each word : umutware is popped firstly, ni at the second and Umwana will be lastly popped.

Reversed popped word :UMUTWARE NI UMWANA.

**Q9.** Since all the books are similar students will not struggle pick the bottom book in the library. They will get the one at the top of the book arrangement.

So, stack is better in Kigali library because DFS requires going deep into one branch before backtracking. A stack naturally supports this by popping the last path.

Q10. BK Transaction navigation,

When you are making Banking transaction, what we call back to previous transaction button uses pop/remove to return to earlier transaction records.

## **PART II. –QUEUE**

### **A.Basics**

#### **Q1.**

→ Absolutely restaurant is a good example for queue where the first customer is the one to be served at the first and so on.... This follows the principle of FIRST IN FIRST OUT.

The new client will remain at the rear of queue waiting for all who arrived first to be served and the after the first client is served, she will be exited from the front.

Q2. Because through the Youtube, the first video in the list is played the first and the next,

Deque means that element is deleted from the front. After playing the first video you move to the next(that is exactly dequeuer).

### **B. APPLICATION**

Q3. RRA TAX payment is a real-life queue :

→ people who registered their business earlier will pay before and those who registered after will pay after. Such that,

People line up and are served in exact order they arrived.

Q4. In MTN CENTERS OR AIRTEL CENTERS, by applying services like sim replacement,

The queue is being respected to ensure the fairness in giving the services to all clients in order to prevent unsatisfied services or to respect the time and sacrifices of the clients by serving them based on how they arrived. Who arrived first must be served first to ensure the fairness, security in giving services.

### **C. LOGICAL**

Q5. Since the dequeue started when Chantal is enqueued and the dequeuer appear at the front, now alice was dequeued and **ERIC is in the front now.**

**Q6.** Fairness In RSSB throughout queue,

Applications are processed strictly by arrival order as like the above in the centers of public services, so no one can jump ahead.

### **ADVANCED THINKING**

**Q7.** → real Rwandan life,

→Wedding buffet line : this is a straight line , served in order. The standing of people who are awaiting for meals are standing straightly and get the food in order.

→Circular queue :buses looping at nyabugogo (after last stop, bus returns to first). It is a circular queue, Bus is moving from nyabugogo to remera, so remera is the place for bus to stop(Rear of the queue) and nyabugogo is the front of the queue.

→Deque : passengers boarding from front or back doors of a bus.

**Q8.** Kigali restaurant food orders :

Customers enqueue their orders, when ready,

Dequeuer serves them in the same sequence.

**Q9.** CHUK Emergencies is priority queue.

Because patients who need fast treatment to be rescued jump ahead those normal patients who are awaiting. Urgent emergencies matters the most. For example, accidents cases at the hospital.

**Q10.** MOTO/e-bike taxi app.

Riders are enqueued waiting for passengers; passengers are enqueued waiting for drivers. The app dequeues from both queues and matches them fairly.

END.

