CS 3358: Data Structures and Algorithms

Spring 2025: Assignment 1

Submission Deadline: 02/27/2025 - 11:59 PM

Full Points: 40

(15) Q1. Stack Operation: Fill the following table that shows the actions for stack operations for the following stream of input.

1 5 8 2 3 7 4 0 6 9

Provide the return value for all the functions. Draw the stack (showing top and bottom) when you **Push()** and **Pop()**.

Function	Return Value, Action & Draw the stack
Empty()	
Size()	
Push()	
Push()	
Push()	
Top()	
Push()	
Pop()	
Empty()	
Push()	
Size()	
Push()	
Pop()	
Push()	
Size()	

(15) Q2. Queue Operation: Fill the following table that shows the actions for queue operations for the following stream of input.

1 5 8 2 3 7 4 0 6 9

Provide the return value for all the functions. Draw the queue (showing front and back) when you **Push()** and **Pop()**.

Function	Return Value, Action & Draw the queue
Empty()	
Size()	
Push()	
Push()	
Push()	
Front()	
Push()	
Pop()	
Empty()	
Push()	
Size()	
Push()	
Pop()	
Push()	
Size()	

(10) Q3. The following function finds the minimum value in an `int` array.

```
int array_min(int data[], int n) {
     int i;
     int ans;
     ans = data[0];
     for (i = 1; i < n; i++)
          if (data[i] < ans)
            ans = data[i];
     return ans;
}
```

Fill the following five blanks (indicated by underlines) to make it a template function that finds the minimum value in an array of various data types, such as `int, float, double,` etc.

```
template<class T>
_____ array_min( _____ data[], _____ n) {
       _____ i;
       _____ ans;
       ans = data[0];
       for (i = 1; i < n; i++)
            if (data[i] < ans)
              ans = data[i];
       return ans;
}
```