ITU Computer Engineering Department
BLG 223E Data Structures, Spring 2022
Recitation #3

Problem Definition

In this recitation, you mainly implement a Stack like data structure using one queue. You complete push and pop functions in SQueue data structure. QStack data structure consists of main queue, push, pop and printStack functions as below:

Code Listing 1: QStack Class

```
#include <queue>

using namespace std;

class QStack
{
    private:
        queue<int> main;

    public:
        void push(int);
        void pop();
        void printStack();
};
```

You should complete 'push' and 'pop' functions in the code file. You should do following transformation in these functions.

- void push(int x):
  - Let the size of queue main before enqueueing be s
  - Enqueue x to queue main
  - s times in the for loop, enqueue front element of queue main and dequeue queue main.
- void pop():
  - If queue main is empty, print(cout) "Stack is empty"
  - Dequeue an item from queue main(x) and print "x is popped"

Note: Please don't change QStack.h and main.cpp file. However, you can add local variables in push and pop functions. These local variables can only be 'int'.

An example scenario is shown on the next page.

1 Example

Terminal Screen

```
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:A
Pushed element:1
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:A
Pushed element:3
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:A
Pushed element:5
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:D
5 is popped
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
```

E: Exit

Enter a choice A,D,P,E:P

3 1

Choose an operation

A: Push an element to the stack

D: Delete an element from the stack

P: Print the stack

E: Exit

Enter a choice A,D,P,E:A

Pushed element:3

Choose an operation

A: Push an element to the stack

D: Delete an element from the stack

P: Print the stack

E: Exit

Enter a choice A,D,P,E:P

3 3 1

Choose an operation

A: Push an element to the stack

D: Delete an element from the stack

P: Print the stack

E: Exit

Enter a choice A,D,P,E:D

3 is popped

Choose an operation

A: Push an element to the stack

D: Delete an element from the stack

P: Print the stack

E: Exit

Enter a choice A,D,P,E:D

3 is popped

Choose an operation

A: Push an element to the stack

D: Delete an element from the stack

```
P: Print the stack
E: Exit
Enter a choice A,D,P,E:D
1 is popped
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:D
Stack is empty
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:A
Pushed element:1
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:A
Pushed element:2
Choose an operation
A: Push an element to the stack
D: Delete an element from the stack
P: Print the stack
E: Exit
Enter a choice A,D,P,E:P
2 1
Choose an operation
A: Push an element to the stack
```

D: Delete an element from the stack

P: Print the stack

E: Exit

Enter a choice A,D,P,E:

Submission Rules

- Make sure you write your name and number in all of the files of your project, in the following format:

  /* @Author

  Student Name: <student_name>

  Student ID : <student_id>

  Date: <date> */

- Use comments wherever necessary in your code to explain what you did.
- Your program will be checked by using **Calico(https://bitbucket.org/uyar/calico)** automatic checker.
- Do not share any code or text that can be submitted as a part of an assignment (discussing ideas is okay).
- Only electronic submissions through Ninova will be accepted no later than deadline.
- You may discuss the problems at an abstract level with your classmates, but you should not **share or copy code** from your classmates or from the Internet. You should submit your **own, individual** homework.
- Academic dishonesty, including cheating, plagiarism, and direct copying, is unacceptable.
- If you have any question about the recitation, you cand send e-mail to Yunus Emre Cebeci(cebeci16@itu.edu.tr).
- Note that **YOUR CODES WILL BE CHECKED WITH THE PLAGIARISM TOOLS!**