S.No: 29	Exp. Name: ***Create multiple threads to access the contents of a stack***	Date:2023-12-25

Aim:

Create multiple threads to access the contents of a stack. Synchronize thread to prevent simultaneous access to push and pop operations.

Note: Please don't change the package name.

Source Code:

q29795/StackThreads.java

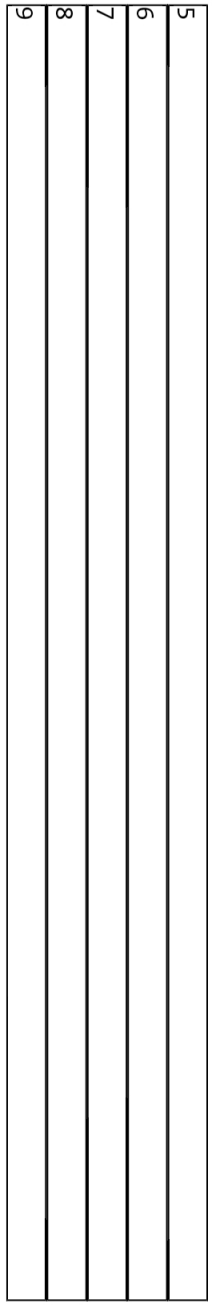
```
package q29795;
import java.util.*;
class Stack {
   int tos;
   int stck[];
   int size;
   Stack(int size) {
      this.size=size;
      tos=-1;
      stck=new int[this.size];
   }
   synchronized void push(int item) {
      if(tos==stck.length-1) {
         //use length member
         System.out.println("Stack is full");
      }else{
         stck[++tos]=item;
      }
   }
   //pop an item from the stack
   synchronized int pop() {
      if(tos<0) {
         System.out.println("Stack underflow");
         return 0;
      }else
         return stck[tos--];
      }
   }
   class PushThread extends Thread {
      Stack s;
      PushThread(Stack s) {
         this.s=s;
      }
      public void run() {
         for(int i=1;i<=s.size;i++) {
            s.push(i);
            try{
               Thread.sleep(100);
            }
            catch(Exception e) {
               System.out.println(e);
```

```
            }
         }
      }
   }
   class PopThread extends Thread {
      Stack s;
      PopThread(Stack s) {
         this.s=s;
      }
      public void run() {
         for(int i=1;i<=s.size;i++) {
            System.out.println(s.pop());
            try{
               Thread.sleep(100);
            }
            catch(Exception e) {
               System.out.println(e);
            }
         }
      }
   }
   public class StackThreads {
      public static void main(String args[]) {
         int size;
         Scanner sc = new Scanner(System.in);
         System.out.println("Enter the size of the stack");
         size = sc.nextInt();
         Stack s = new Stack(size);//only one Object
         PushThread t1=new PushThread(s);
         PopThread t2=new PopThread(s);
         t1.start();
         t2.start();
         t2.setPriority(9);
      }
   }
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter the size of the stack 4
1
2
3
4

Test Case - 2
User Output
Enter the size of the stack 9
1
2
3
4


9
8
7
6
5