Name: Vaibhav Bhapkar -- 0013

Write a Java program to

a. Perform Binary search operation

```java
1   public class BinarySearch{
2    public static void binarySearch(int arr[], int first, int last, int key){
3      int mid = (first + last)/2;
4      while( first <= last ){
5         if ( arr[mid] < key ){
6            first = mid + 1;
7         }else if ( arr[mid] == key ){
8            System.out.println("Element is found at index: " + mid);
9            break;
10        }else{
11            last = mid - 1;
12         }
13         mid = (first + last)/2;
14      }
15      if ( first > last ){
16         System.out.println("Element is not found!");
17      }
18    }
19    public static void main(String args[]){
20         int arr[] = {100,200,300,400,500};
21         int key = 500;
22         int last=arr.length-1;
23         binarySearch(arr,0,last,key);
24    }
25  }
```

Output:

```
PROBLEMS  2    OUTPUT    DEBUG CONSOLE    TERMINAL

[Running] cd "c:\Users\vaibh\OneDrive\Desktop\" && javac BinarySearch.java && java BinarySearch
Element is found at index: 4

[Done] exited with code=0 in 0.818 seconds
```

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```java
1   public class StackCustom {
2       int size;
3       int arr[];
4       int top;
5
6       StackCustom(int size) {
7           this.size = size;
8           this.arr = new int[size];
9           this.top = -1;
10      }
11
12      public void push(int pushedElement) {
13          if (!isFull()) {
14              top++;
15              arr[top] = pushedElement;
16              System.out.println("Pushed element:" + pushedElement);
17          } else {
18              System.out.println("Stack is full !");
19          }
20      }
21
22      public int pop() {
23          if (!isEmpty()) {
24              int returnedTop = top;
25              top--;
26              System.out.println("Popped element :" +
27  arr[returnedTop]);return arr[returnedTop];
28
29          } else {
30              System.out.println("Stack is empty !");
31              return -1;
32          }
33      }
34
35      public int peek() {
36          if(!this.isEmpty())
37                      return arr[top];
38              else
39              {
40                      System.out.println("Stack is Empty");
41                      return -1;
42              }
43      }
44
45      public boolean isEmpty() {
46          return (top == -1);
47      }
48
49      public boolean isFull() {
50          return (size - 1 == top);
51      }
52
53      public static void main(String[] args) {
54          StackCustom StackCustom = new StackCustom(10);
55          StackCustom.pop();
56          System.out.println("=================");
57          StackCustom.push(10);
58          StackCustom.push(30);
59          StackCustom.push(50);
60          StackCustom.push(40);
61          System.out.println("=================");
62          StackCustom.pop();
63          StackCustom.pop();
64          StackCustom.pop();
65          System.out.println("=================");
66      }
67  }
68
69
```

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OUTPUT:

```
[Running] cd "c:\Users\vaibh\OneDrive\Desktop\" && javac StackCustom.java && java StackCustom
Stack is empty !
=================
Pushed element:10
Pushed element:30
Pushed element:50
Pushed element:40
=================
Popped element :40
Popped element :50
Popped element :30
=================

[Done] exited with code=0 in 0.825 seconds
```