Name: Vaibhav Bhapkar -- 0013

Write a Java program to

a. Perform Binary search operation

```java
public class BinarySearch{
 public static void binarySearch(int arr[], int first, int last, int key){
   int mid = (first + last)/2;
   while( first <= last ){
      if ( arr[mid] < key ){
        first = mid + 1;
      }else if ( arr[mid] == key ){
        System.out.println("Element is found at index: " + mid);
        break;
      }else{
         last = mid - 1;
       }
      mid = (first + last)/2;
     }
   if ( first > last ){
      System.out.println("Element is not found!");
     }
   }
 public static void main(String args[]){
        int arr[] = {100,200,300,400,500};
        int key = 500;
        int last=arr.length-1;
        binarySearch(arr,0,last,key);
   }
}
```

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
public class StackCustom {
    int size;
    int arr[];
    int top;

    StackCustom(int size) {
        this.size = size;
        this.arr = new int[size];
        this.top = -1;
    }

    public void push(int pushedElement) {
        if (!isFull()) {
            top++;
            arr[top] = pushedElement;
            System.out.println("Pushed element:" + pushedElement);
        } else {
            System.out.println("Stack is full !");
        }
    }

    public int pop() {
        if (!isEmpty()) {
            int returnedTop = top;
            top--;
            System.out.println("Popped element :" +
arr[returnedTop]);
            return arr[returnedTop];

        } else {
            System.out.println("Stack is empty !");
            return -1;
        }
    }

    public int peek() {
        if(!this.isEmpty())
                        return arr[top];
                else
                {
                        System.out.println("Stack is Empty");
                        return -1;
                }
    }

    public boolean isEmpty() {
        return (top == -1);
    }

    public boolean isFull() {
        return (size - 1 == top);
    }

    public static void main(String[] args) {
        StackCustom StackCustom = new StackCustom(10);
        StackCustom.pop();
        System.out.println("================");
        StackCustom.push(21);
        StackCustom.push(22);
        StackCustom.push(23);
        StackCustom.push(24);
        System.out.println("================");
        StackCustom.pop();
        StackCustom.pop();
        StackCustom.pop();
        System.out.println("================");
    }
}
```

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OUTPUT:

```
[Running] cd "c:\Users\vaibh\OneDrive\Desktop\" && javac StackCustom.java && java StackCustom
Stack is empty !
=================
Pushed element:21
Pushed element:22
Pushed element:23
Pushed element:24
=================
Popped element :24
Popped element :23
Popped element :22
=================

[Done] exited with code=0 in 0.799 seconds
```