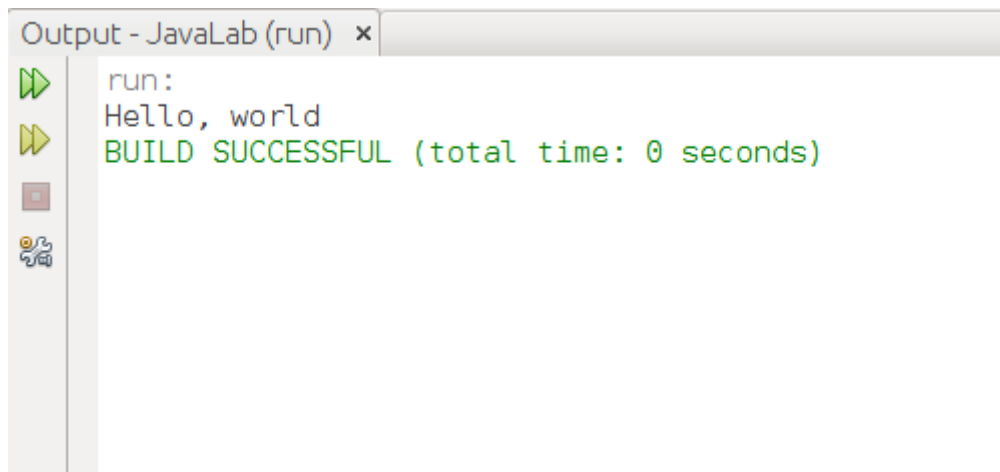


Experiment 1.1- WAP to display "Hello, World"

```
public class ExplA {  
    public static void main(String[] args) {  
        System.out.println("Hello, world");  
    }  
}
```

OUTPUT



Experiment 1.2 – WAP to evaluate the following expressions:

1. $(a/c)z/a$

2. $c++ + b/x - y$

```
package javalab;

public class Exp1B {

    public static void main(String[] args) {

        int a=6,b=2,c=2,x=6,y=4,z=12;

        int sol;

        sol=(a/c)*z/a;

        System.out.println("(a/c)z/a :"+sol);

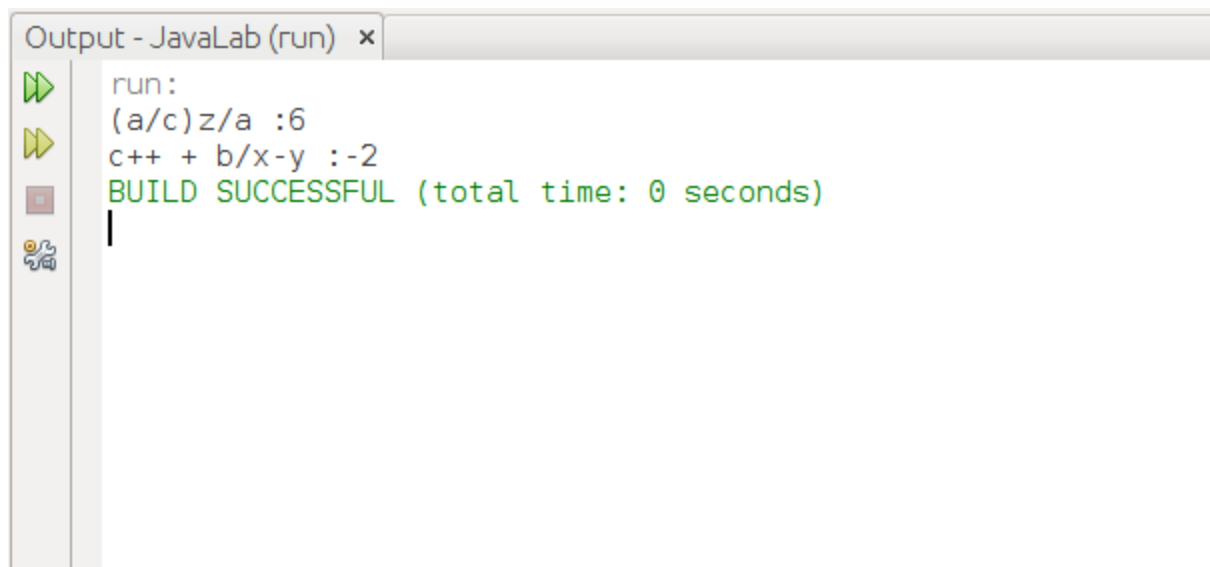
        sol=c++ + b/x-y;

        System.out.println("c++ + b/x-y :"+sol);

    }

}
```

OUTPUT



The screenshot shows a window titled "Output - JavaLab (run) x". On the left side of the window, there is a vertical toolbar with four icons: a green double arrow (run), a yellow double arrow (debug), a red square (stop), and a magnifying glass (search). The main area of the window displays the following text:

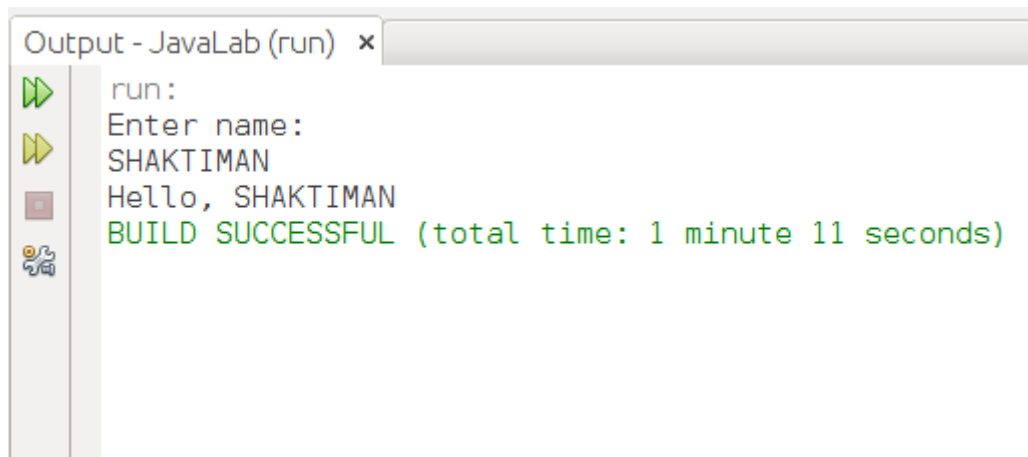
```
run:
(a/c)z/a :6
c++ + b/x-y :-2
BUILD SUCCESSFUL (total time: 0 seconds)
|
```

Experiment 1.3–WAP to display the values by taking input from console using Scanner class.

```
import java.util.Scanner;

public class Exp1C {
    public static void main(String[] args) {
        Scanner input=new Scanner(System.in);
        System.out.println("Enter name:");
        String name=input.next();
        System.out.println("Hello, "+name);
    }
}
```

OUTPUT



Experiment 1.4- WAP to display "diamond" pattern

```
public class ExplD {  
    public static void main(String[] args) {  
        for (int i = 0; i < 4; i++) {  
            for (int j = 4; j > i; j--) {  
                System.out.print(" ");  
            }  
        }  
    }  
}
```

```

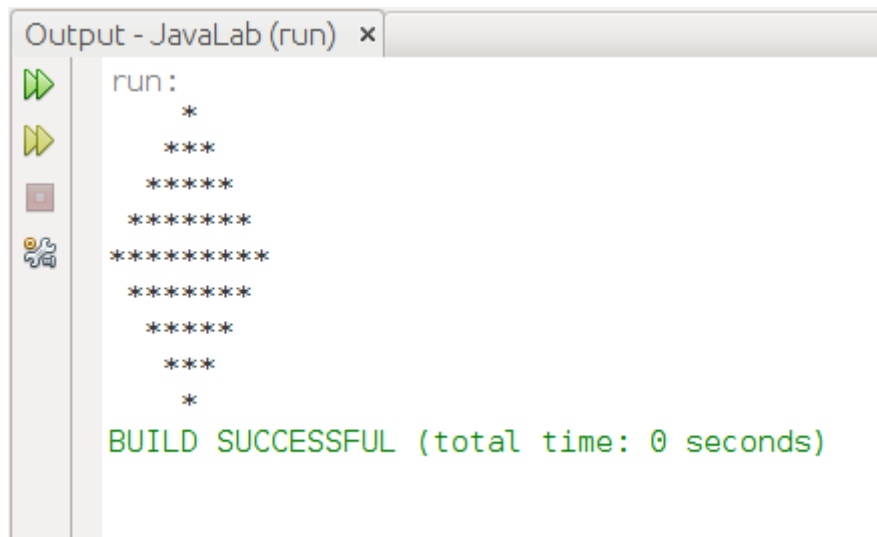
        for (int k = 0; k < (i * 2 + 1); k++) {
            System.out.print("*");
        }
        System.out.println();
    }
    for (int i = 0; i < 9; i++) {
        System.out.print("*");
    }
    System.out.println();
    for (int i = 4; i > 0; i--) {
        for (int j = 4; j >= i; j--) {
            System.out.print(" ");
        }
        for (int k = (2 * (i - 1) + 1); k > 0; k--) {
            System.out.print("*");
        }

        System.out.println();
    }

}
}

```

OUTPUT



The screenshot shows an IDE's Output window titled "Output - JavaLab (run)". On the left is a vertical toolbar with icons for running (green play), stepping through (yellow play), stopping (red square), and debugging (bug). The output text is as follows:

```
run :
    *
   ***
  *****
 *****
*****
*****
 *****
  *****
   ***
    *
```

BUILD SUCCESSFUL (total time: 0 seconds)

Experiment 2.1—Find the largest and smallest element in an array after getting values from the console.

```
import java.util.Scanner;

public class Exp2A {

    public static void main(String[] args) {
```



```

        Scanner input = new Scanner(System.in);
        int size = input.nextInt();
        int arr[] = new int[size];
        for (int i = 0; i < size; i++) {
            System.out.print("arr[" + i + "]:");
            arr[i] = input.nextInt();
        }

        int large = largest(arr, size);
        int small = smallest(arr, size);
        System.out.println("Largest:" + large + "\nSmallest:"
+ small);
    }

    private static int largest(int[] arr, int size) {

        int temp = arr[0];
        for (int i = 0; i < size; i++) {
            if (temp < arr[i]) {
                temp = arr[i];
            }
        }
        return temp;
    }

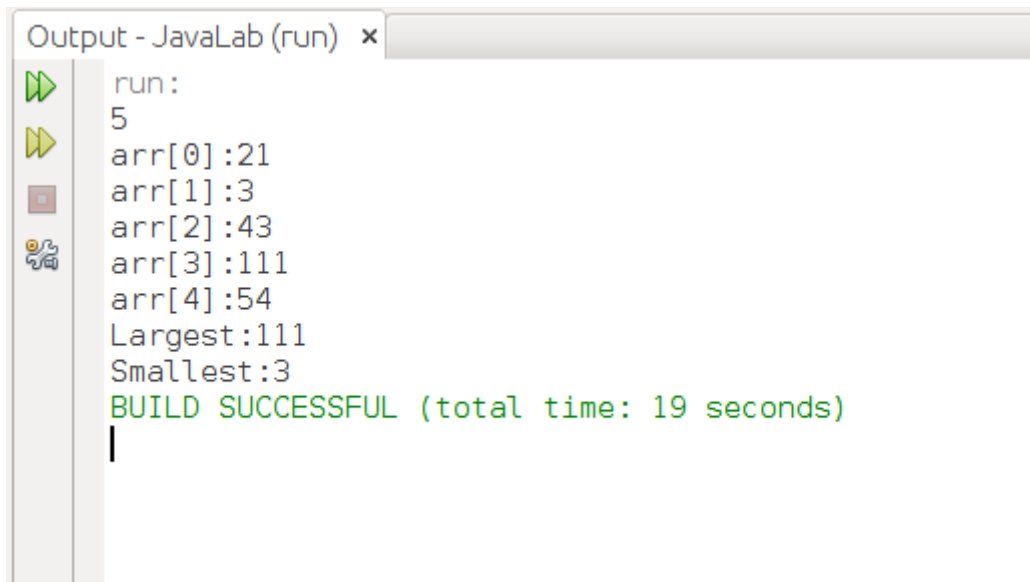
    private static int smallest(int[] arr, int size) {

        int temp = arr[0];
        for (int i = 0; i < size; i++) {
            if (temp > arr[i]) {
                temp = arr[i];
            }
        }
    }

```

```
        }  
        return temp;  
    }  
}
```

OUTPUT



```
Output - JavaLab (run) x
run:
5
arr[0]:21
arr[1]:3
arr[2]:43
arr[3]:111
arr[4]:54
Largest:111
Smallest:3
BUILD SUCCESSFUL (total time: 19 seconds)
```

Experiment 2.2 – Write a menu driven program to implement String and StringBuffer operations.

```
public class Exp2B {

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
```

```

System.out.print("Enter String:");
String str = input.nextLine();
do {
    initMenu();
    System.out.println("Enter the choice:");
    int choice = input.nextInt();
    switch (choice) {
        case 1:
            System.out.println("Length:" +
str.length());
            break;
        case 2:
            str = str.toLowerCase();
            System.out.println("ToLowerCase:" + str);
            break;
        case 3:
            str = str.toUpperCase();
            System.out.println("ToUpperCase:" + str);
            break;
        case 4:
            System.out.print("Enter String:");
            String two = input.nextLine();
            str = str + two;
            //using stringBuilder
            System.out.println("Concatinated string:"
+ str);
            break;
        case 5:
            str = str.trim();
            System.out.println("Trim:" + str);
            break;
        case 6:

```

```

        System.out.println("Enter beg and end
index");

        int beg = input.nextInt();
        int end = input.nextInt();

        System.out.println("Substring(" + beg +
", " + end + "):" + str.substring(beg, end));

        break;
    case 7:
        System.out.println("Enter Index:");
        int index = input.nextInt();
        System.out.println("char At:" +
str.charAt(index));
        break;
    case 8:
        System.out.println("Enter String:");

    case 9:
        System.exit(0);
    default:
        System.out.println("wrong choice!!\nTry
Again!");

    }
} while (true);

}

private static void initMenu() {
    System.out.println("1.Length");
    System.out.println("2.ToLowerCase");
    System.out.println("3.ToUpperCase");
    System.out.println("4.Concatination");
    System.out.println("5.Trim");
}

```

```
        System.out.println("6.SubString");  
        System.out.println("7.CharAt");  
        System.out.println("8.Change String");  
        System.out.println("9.exit");  
        System.out.println();  
    }  
}
```

OUTPUT

```
Output - JavaLab (run) x
run:
Enter String:valar moghulis
1.Length
2.ToLowerCase
3.ToUpperCase
4.Concatination
5.Trim
6.SubString
7.CharAt
8.Change String
9.exit
|
Enter the choice:
1
. . . . .

Enter the choice:
5
Trim:valar moghulis
. . . . .

Enter the choice:
6
Enter beg and end index
0
5
Substring(0,5):valar
. . . . .

Enter the choice:
2
ToLowerCase:valar moghulis
. . . . .

Enter the choice:
3
ToUpperCase:VALAR MOGHULIS
. . . . .

Enter the choice:
7
Enter Index:
3
char At:A
```

Experiment 2.3- Imlement Stack and Queue operations using ArrayList and Iterator class

STACK

```
import java.util.ArrayList;
import java.util.Scanner;
import java.util.Iterator;
import java.util.ListIterator;

public class Exp2C {
    public static void main(String[] args) {
        Scanner input=new Scanner(System.in);
        Stack stack=new Stack();

        do{

            System.out.println("1.push");
            System.out.println("2.pop");
            System.out.println("3.exit");
            System.out.println("Enter choice:");
            int choice=input.nextInt();
            switch(choice){
                case 1: System.out.println("Enter value:");
                    int value=input.nextInt();
                    stack.push(value);
                    break;
                case 2:int pop=stack.pop();
                    System.out.println("Popped
element:"+pop);
                    break;
                case 3:System.exit(0);
                default: System.out.println("wrong choice!!");
            }
        }while(true);
    }
}
```



```
}
```

```
public class Stack {
```

```
    private ArrayList<Integer> stack=new ArrayList<>();
```

```
    private int top=-1;
```

```
    private static final int SIZE=10;
```

```
    public void push(int value){
```

```
        if(top==SIZE){
```

```
            System.out.println("OVERFLOW --->>");
```

```
        }else{
```

```
            top++;
```

```
            stack.add(value);
```

```
            System.out.println("PUSHED --->>");
```

```
            show();
```

```
        }
```

```
    }
```

```
    public int pop() {
```

```
        int value=-1;
```

```
        if(top==0){
```

```
            System.out.println("UNDERFLOW --->>");
```

```
        }else{
```

```
            value=stack.get(top);
```

```
            stack.remove(top);
```

```
            top--;
```

```
            System.out.println("POPPED--->>");
```

```
            show();
```

```
        }
```

```
        return value;
```

```
    }
```

```
    public void show(){
```

```
        ListIterator itr=stack.listIterator(stack.size());
```

```
        while(itr.hasPrevious()){  
            System.out.println("--->" + itr.previous());  
        }  
    }  
  
}
```

OUTPUT

```
Output - JavaLab (run) #2 x
run:
1.push
2.pop
3.exit
Enter choice:
1
Enter value:
21
PUSHED --->>
--->>21
1.push
2.pop
3.exit
Enter choice:
1
Enter value:
45
PUSHED --->>
--->>45
--->>21
1.push
2.pop
3.exit
Enter choice:
2
POPPED--->>
--->>21
Popped element:45
1.push
2.pop
3.exit
Enter choice:
2
POPPED--->>
Popped element:21
1.push
2.pop
3.exit
Enter choice:
2
UNDERFLOW --->>
```

QUEUE

```
import java.util.Scanner;
```

```

import java.util.ArrayList;
import java.util.Iterator;
import java.util.ListIterator;

public class Exp2CB {
    public static void main(String[] args) {
        Scanner input=new Scanner(System.in);
        Queue queue=new Queue();

        do{

            System.out.println("1.Insert");
            System.out.println("2.Remove");
            System.out.println("3.exit");
            System.out.println("Enter choice:");
            int choice=input.nextInt();
            switch(choice){
                case 1: System.out.println("Enter value:");
                    int value=input.nextInt();
                    queue.insert(value);
                    break;
                case 2:int pop=queue.remove();
                    if(pop!=-1)
                        System.out.println("Popped
element:"+pop);
                    break;
                case 3:System.exit(0);
                default: System.out.println("wrong choice!!");
            }
        }while(true);
    }
}

public class Queue {

```

```
private static final int SIZE = 10;
private ArrayList<Integer> queue = new ArrayList<>(SIZE);
private int rear = -1, front = -1;

public void insert(int value) {

    if ((rear + 1) == SIZE) {
        System.out.println("OVERFLOW --->>");
    } else if (rear == -1) {
        front = 0;
        rear = 0;
        queue.add(value);
        System.out.println("INSERTED --->>");
        show();

    } else {
        rear++;
        queue.add(value);
        System.out.println("INSERTED --->>");
        show();
    }
}

public int remove() {
    int value = -1;
    if (front == -1) {
        System.out.println("UNDERFLOW --->>");
    } else if (front == rear) {
        front = -1;
        rear = -1;
        queue.remove(0);
        System.out.println("QUEUE IS EMPTY!!");
    } else {

        value = queue.get(0);
```

```
        queue.remove(0);
        front++;
        System.out.println("REMOVED--->>");
        show();
    }
    return value;
}

public void show() {

    Iterator itr = queue.iterator();
    while (itr.hasNext()) {
        System.out.println("-->>" + itr.next());
    }
}

}
```

OUTPUT

```
Output x
JavaLab (run) #2 x JavaLab (run) #3 x
run:
1.Insert
2.Remove
3.exit
Enter choice:
1
Enter value:
21
INSERTED --->>
-->>21
1.Insert
2.Remove
3.exit
Enter choice:
1
Enter value:
34
INSERTED --->>
-->>21
-->>34
1.Insert
2.Remove
3.exit
Enter choice:
2
REMOVED--->>
-->>34
Popped element:21
1.Insert
2.Remove
3.exit
Enter choice:
2
QUEUE IS EMPTY!!
1.Insert
2.Remove
3.exit
Enter choice:
```

Experiment 3- (a) Calculate Volume of a box using classes.

(b)-Modify Part (a) by adding constructors and "this" reference.

(c)- Add the member function to the existing class to show the demo of passing objects as a value and returning objects from class.

(d)- Add member function to give a demo of varargs (variable arguments).

```
import java.util.Scanner;
```

```
public class Exp3A {
```

```
    public static void main(String[] args) {
```

```
        Scanner input=new Scanner(System.in);
```

```
        Box box1=new Box();
```

```
        System.out.println("Enter dimensions of Box1");
```

```
        System.out.print("Length:");
```

```
        box1.setLength(input.nextFloat());
```

```
        System.out.print("Breadth:");
```

```
        box1.setBreadth(input.nextFloat());
```

```
        System.out.print("Height:");
```

```
        box1.setHeight(input.nextFloat());
```

```
        System.out.println("Volume:"+box1.volume());
```

```
        System.out.println("Enter dimensions of Box2");
```

```
        System.out.print("Length:");
```

```
        float l=input.nextFloat();
```

```
        System.out.print("Breadth:");
```

```
        float b=input.nextFloat();
```

```
        System.out.print("Height:");
```

```
        float h=input.nextFloat();
```

```
        Box box2=new Box(l,b,h);
```



```

        System.out.println("Adding box 1 to Box 2");
        Box box3=box1.addBox(box2);
        System.out.println(box3.toString());
        System.out.println("Display all boxes");

        Box.displayBoxes(box1,box2);
    }

}

class Box{
    float length,breadth,height;

    public Box() {
    }

    //using constructor with this reference PART (B)

    public Box(float length, float breadth, float height) {
        this.length = length;
        this.breadth = breadth;
        this.height = height;
    }

    public float getLength() {
        return length;
    }

    public void setLength(float length) {
        this.length = length;
    }

    public float getBreadth() {
        return breadth;
    }
}

```

```

    public void setBreadth(float breadth) {
        this.breadth = breadth;
    }

    public float getHeight() {
        return height;
    }

    public void setHeight(float height) {
        this.height = height;
    }

    public float volume(){
        return length*breadth*height;
    }

    //method to take and return arguments as objects PART (C)
    public Box addBox(Box box2){

        float len=box2.getLength()+this.length;
        float bre=box2.getBreadth()+this.breadth;
        float hei=box2.getHeight()+this.height;

        return new Box(len,bre,hei);
    }

    @Override
    public String toString() {
        return "Length:"+length+" Breadth:"+breadth
            + " Height:"+height; //To change body of
generated methods, choose Tools | Templates.
    }

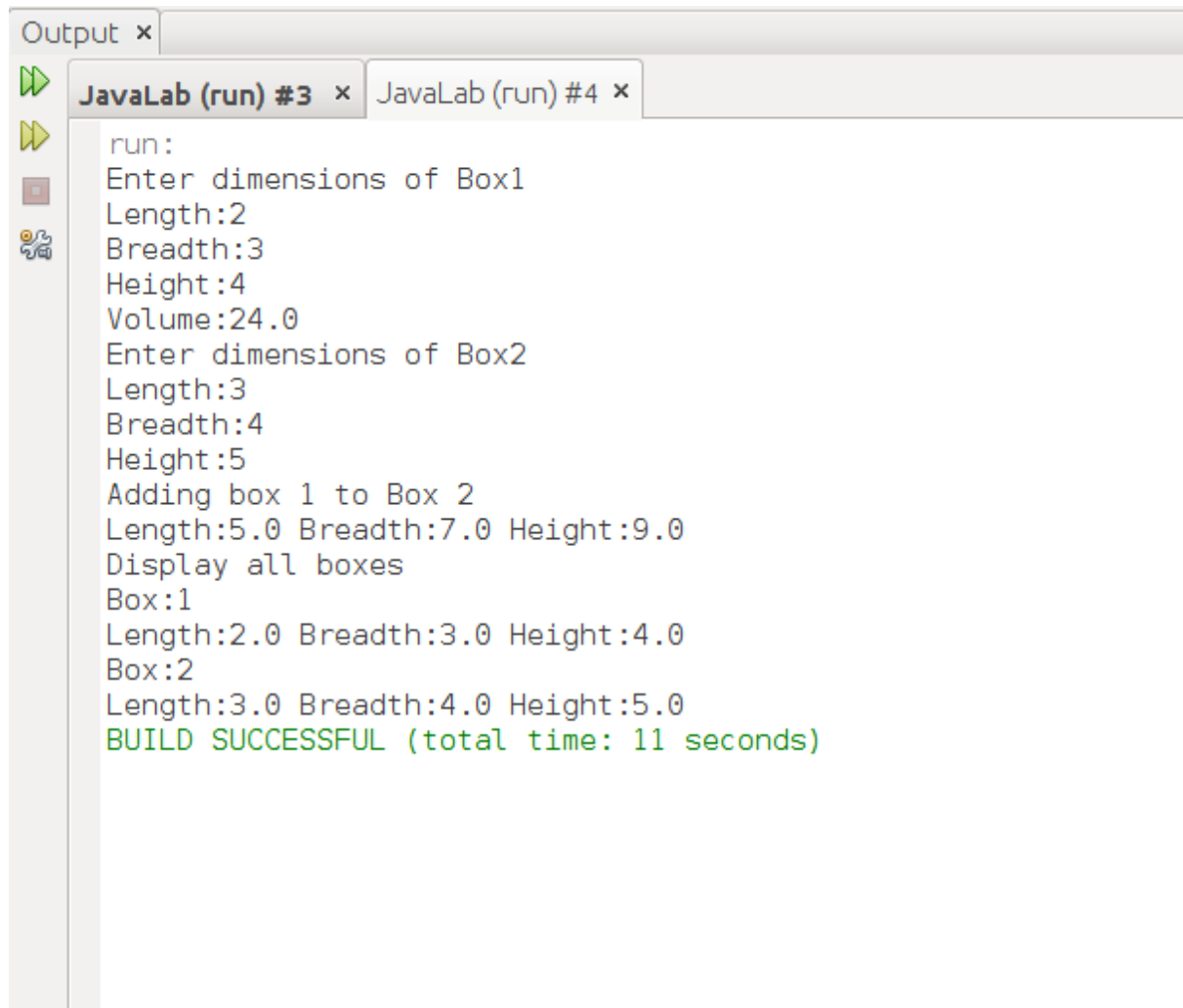
    // method to demonstrate varargs
    public static void displayBoxes(Box...arg){
        int i=1;

```

```
        for(Box box:arg){
            System.out.println("Box:"+i);
            System.out.println(box.toString());
            i++;
        }
    }

}
```

OUTPUT



The screenshot shows an IDE's output window with a tab labeled "Output x". Below the tab bar, there are two tabs: "JavaLab (run) #3 x" and "JavaLab (run) #4 x". The "JavaLab (run) #3 x" tab is active, displaying the following text:

```
run:
Enter dimensions of Box1
Length:2
Breadth:3
Height:4
Volume:24.0
Enter dimensions of Box2
Length:3
Breadth:4
Height:5
Adding box 1 to Box 2
Length:5.0 Breadth:7.0 Height:9.0
Display all boxes
Box:1
Length:2.0 Breadth:3.0 Height:4.0
Box:2
Length:3.0 Breadth:4.0 Height:5.0
BUILD SUCCESSFUL (total time: 11 seconds)
```

Experiment 4-(a) Write a program to give the demo of 'static' and 'final' variable using Nested class concept.

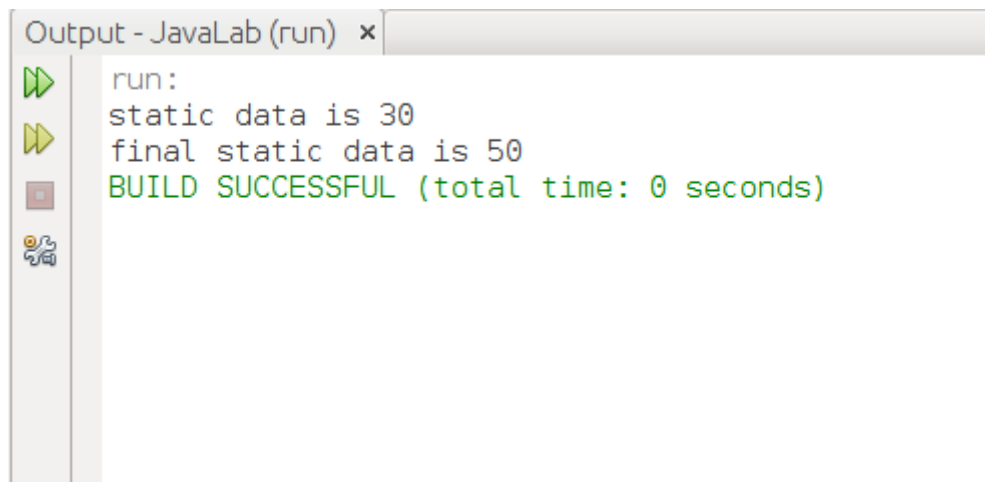
```
package javalab;

public class Exp4A {
    public static void main(String args[]){
        TestOuter1.Inner obj=new TestOuter1.Inner();
        obj.msg();
        obj.msg2();
    }
}

class TestOuter1{
    static int data=30;
    static final int data2=50;

    static class Inner{
        void msg(){
            System.out.println("static data is "+data);
        }
        void msg2(){
            System.out.println("final static data is "+ data2 );
        }
    }
}
```

Output



```
Output - JavaLab (run) x
run:
static data is 30
final static data is 50
BUILD SUCCESSFUL (total time: 0 seconds)
```

Experiment 4-(b) Write a program to input command line arguments.

```
package javalab;

public class Exp4C {

    public static void main(String[] args) {

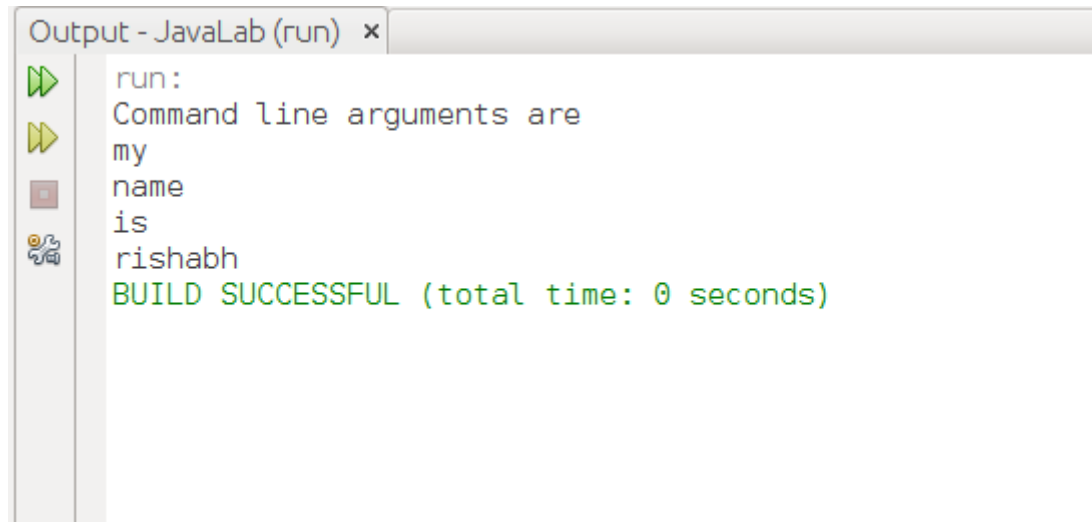
        if (args == null) {
            System.out.println("enter arguments at command
line");

        } else {

            System.out.println("Command line arguments are");

            for (String str : args) {
                System.out.println(str);
            }
        }
    }
}
```

Output



```
run:
Command line arguments are
my
name
is
rishabh
BUILD SUCCESSFUL (total time: 0 seconds)
```