Topic 1[java Programming Basics]

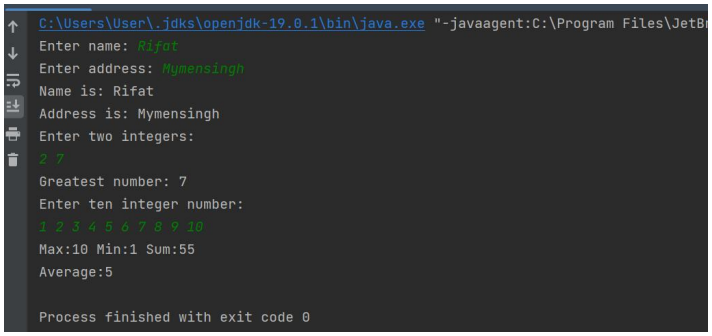
Problem Statement: Write java programs to do the following
i) Display your name and address in two lines
ii) Take two integers as inputs and prints the bigger one
iii) Input a series of 10 numbers into an array ax[] and finds the largest, smallest and average of these numbers.

Theory : Java is a programming language and computing platform first released by Sun Microsystems in 1995. It has evolved from humble beginnings to power a large share of today's digital world, by providing the reliable platform upon which many services and applications are built. New, innovative products and digital services designed for the future continue to rely on Java, as well.

Code:

```
import java.util.Scanner;
public class Main{
   public static void main(String[] args) {
      Scanner sc= new Scanner(System.in);
      System.out.print("Enter name: ");
      String name=sc.next();
      System.out.print("Enter address: ");
      String add=sc.next();
      System.out.println("Name is: "+name);
      System.out.println("Address is: "+add);
      int a,b;
      System.out.println("Enter two integers: ");
      a=sc.nextInt();
      b=sc.nextInt();
      if(a>b)
         System.out.println("Greatest number: "+a);
      else
         System.out.println("Greatest number: "+b);
      int [] ax=new int[10];
      int max=Integer.MIN_VALUE;
      int min=Integer.MAX_VALUE;
      int sum=0;
      System.out.println("Enter ten integer number: ");
      for(int i=0;i<10;i++)
      {
         ax[i]=sc.nextInt();
         sum=sum+ax[i];
         if(ax[i]>max)
            max=ax[i];
         if(ax[i]<min)
            min=ax[i];
      }
      System.out.println("Max:"+max+" Min:"+min+" Sum:"+sum);
      System.out.println("Average:"+sum/10);
   }
}
```

Output:



Topic 2[java Programming Access Modifier]

Problem Statement:

Verify the following access modifier using the appropriate coding :

Access modifier	Within class	Within package	Outside package by subclass only	Outside package
private	Y	N	N	N
default	Y	Y	N	N
protected	Y	Y	Y	N
public	Y	Y	Y	Y

Code:

Within Class:

```
    package labmod6;
import java.util.Scanner;
public class Topic2InClass {
  public static void main(String[] args)
  {
    int x,y;
    Scanner in=new Scanner(System.in);
    System.out.println("Enter two numbers:");
    x=in.nextInt();
    y=in.nextInt();
    System.out.println("Summation within class:"+sum(x,y));
  }
  public static int sum(int a,int b)
  {
    return a+b; } }
```

Within Package:

```
    package labmod6;
    import java.util.Scanner;
public class Topic2InPackage {
  public static void main(String[] args) {
    int x,y;
    Scanner in=new Scanner(System.in);
    System.out.println("Enter two numbers:");
    x=in.nextInt();
    y=in.nextInt();
    System.out.println(new Topic2InClass().sum(x,y));
  }
}
//Outside Package
package OutsidePackage;
    import labmod6.*;
```

```
    import java.util.Scanner;
public class Topic2OutPackage {
  public static void main(String[] args)
  {
    int x,y;
    Scanner in=new Scanner(System.in);
    System.out.println("Enter two numbers:");
    x=in.nextInt();
    y=in.nextInt();
    System.out.println("Summation from outside package: "+new
        Topic2InClass().sum(x,y)); }
```

Output :

```
Enter two numbers:
6 7
Summation within class:13

Process finished with exit code 0
```

Topic 3[java Programming private method]

Problem Statement:

Verify that private methods can be used only inside the class but it can not be used from outside the class.

Code:

```
public class Main{
  public static void main(String[] args) {
    SubClass obj= new SubClass();
    obj.func();
   // obj.private_func();
  }
}
class SubClass{
  public void func()
  {
    System.out.println("This is a public function outside main class");
  }
  private void private_func()
  {
    System.out.println("This is a private function outside main class");
  }
}
```

Output:

```
Main
C:\Users\User\.jdks\openjdk-19.0.1\bin\java.exe "-
This is a public function outside main class

Process finished with exit code 0
```

Topic 4[java Programming static method/member]

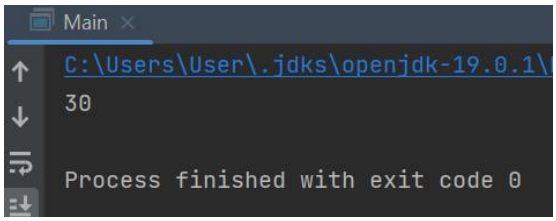
Problem Statement:

Verify that static methods can access static method/member but can not access to non-static method/member.

Code:

```
public class Main{
   public static void main(String[] args) {
      Static obj=new Static();
      System.out.println(obj.getxandy());
   }
}
class Static{
   int x=20;
   static int y=30;
   static int getxandy()
   {
      //return x; //cannot return a non-static member
      return y;
   }
}
```

Output:



Topic 5[java Programming string class]

Problem Statement:

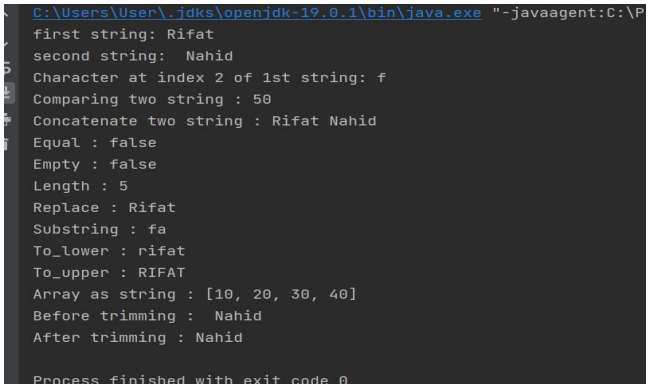
Verify the following methods of string class :
charAt() compareTo() concat() equals()
isEmpty() length () replace() substring()
toLowerCase() toUpperCase() toString() trim()

Code:

```
import java.util.Arrays;
public class Main {
   public static void main(String[] args){
      String s1="Rifat";
      String s2=" Nahid ";
      System.out.println("first string: "+s1);
      System.out.println("second string: "+s2);
      System.out.println("Character at index 2 of 1st string: "+
            s1.charAt(2));
      System.out.println("Comparing two string : "+s1.compareTo(s2));
      System.out.println("Concatenate two string : "+s1.concat(s2));
      System.out.println("Equal : "+s1.equals(s2));
```

```
        System.out.println("Empty : "+s1.isEmpty());
        System.out.println("Length : "+ s1.length());
        System.out.println("Replace : "+s1.replace("dhaka","rajshahi"));
        System.out.println("Substring : "+ s1.substring(2, 4));
        System.out.println("To_lower : "+ s1.toLowerCase());
        System.out.println("To_upper : "+ s1.toUpperCase());
        int[] arr = new int[4];
        arr[0]=10; arr[1]=20; arr[2]=30; arr[3]=40;
        System.out.println("Array as string : "+ Arrays.toString(arr));
        System.out.println("Before trimming : "+s2);
        System.out.println("After trimming : "+ s2.trim());
    }
}
```

Output:



Topic 6[java Programming anonymous object]

Problem Statement: Write a program to do the following using array

i. write a method InitiaArray() that returns the initial array as anonymous object.

ii. write a method SortArray() that returns the sorted array as anonymous object.

iii. write a method PrintArray() that prints the array

Code:

```
import java.util.Arrays;
public class Main{
    public static void main(String[] args) {
        int [] num =InitiaArray();
        System.out.println("Intial array: ");
        print(num);
        SortArray(num);
        System.out.println("Sorted array: ");
        print(num);
    }
    public static void print(int [] num)
    {
        for(int i=0;i<num.length;i++)
            System.out.print(num[i]+" ");
        System.out.println();
```

```
    }
    public static int[] SortArray(int [] num)
    {
        Arrays.sort(num);
        return num;
    }
    public static int [] InitiaArray()
    {
        return new int[] {9,2,7,4,5,6};
    }
}
```

Output :

Topic 7[java Programming toString() & (...)]

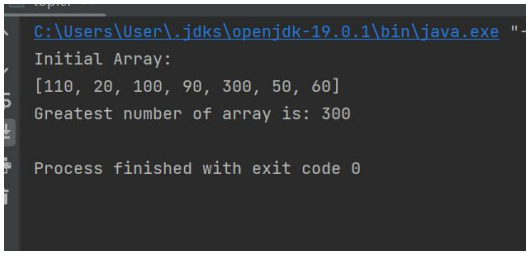
Problem Statement:

Write a program to do the following using array
i. display the array elements using toString() method
ii. write a method FindBig() that returns the largest of first four numbers of the array using (...) variable length parameter.

Code:

```
import java.util.Arrays;
public class topic7{
    public static void main(String[] args) {
        int[] arr= {110, 20, 100, 90, 300, 50,60};
        System.out.println("Initial Array:");
        System.out.println(Arrays.toString(arr));
        System.out.println("Greatest number of array is: "+ FindGreat(arr));
    }
    public static int FindGreat(int ... arr){
        int x=arr[0];
        for(int i=0; i<5; i++){
            if(arr[i]>x)
                x=arr[i];
        }
        return x;
    }
}
```

Output :



Topic 8[java Programming ArrayList class]

Problem Statement: Write a program to create an array ax using AarryList class of integers. Then for the array ax i. add 4 elements 10, 50, 70 and 30 using add() method
ii. insert 60 at index 1
iii. print element at index 2
iv. delete element of index 3
v. delete element 10
vi. sort and prints the elements using for-each loop
vii. delete all the elements of the array

Code:

```
import java.util.ArrayList;
public class topic8 {
   public static void main(String[] args) {
      ArrayList<Integer>ax=new ArrayList<Integer>();
      ax.add(10);
      ax.add(50);
      ax.add(70);
      ax.add(30);
      System.out.println("After Adding 10,50,70,30: ");
      System.out.println(ax);
      System.out.println("After adding 60 at index 1: ");
      ax.add(1, 60);
      System.out.println(ax);
      System.out.println("Element at index 2: ");
      System.out.println(ax.get(2));
      System.out.println("After deleting element at index 3: ");
      ax.remove(3);
      System.out.println(ax);
      System.out.println("After deleting element 10:");
      ax.removeIf(n->(n==10));
      System.out.println(ax);
      System.out.println("After sorting printing the elements:");
      ax.sort(null);
      for (int n: ax) {
         System.out.print(n+" ");
      }
      System.out.println("\nAfter deleting all the elements of the array: ");
            ax.clear();
      System.out.println(ax);
   }
}
```

Output :

```
C:\Users\User\.jdks\openjdk-19.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBra
After Adding 10,50,70,30:
[10, 50, 70, 30]
After adding 60 at index 1:
[10, 60, 50, 70, 30]
Element at index 2:
50
After deleting element at index 3:
[10, 60, 50, 30]
After deleting element 10:
[60, 50, 30]
After sorting printing the elements:
30 50 60
After deleting all the elements of the array:
[]
```