**JAVA**

**Classes and Methods**

**Lab Exercise No:**14

/\*Create an object to access the addition, subtraction, multiplication and divison methods and invoke

these methods with two numbers and display the result in the corresponding methods.\*/

**package** hsbc.com.lab;

**public** **class** Calculator {

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

// **TODO** Auto-generated method stub

Calculator obj=**new** Calculator(); //creation of object

obj.add(5,4);

obj.sub(5,4);

obj.mul(5,4);

obj.div(5,4);

}

**public** **void** add(**int** a, **int** b)

{

**int** c=a+b;

System.***out***.println("Sum "+c);

}

**public** **void** sub(**int** a, **int** b)

{

**int** c=a-b;

System.***out***.println("Difference "+c);

}

**public** **void** mul(**int** a, **int** b)

{

**int** c=a\*b;

System.***out***.println("Product "+c);

}

**public** **void** div(**int** a, **int** b)

{

**double** c=a/b;

System.***out***.println("Division "+c);

}

}

**Lab Exercise No:**15

/\*program to display the no of objects created for the class or the no of times that class is instantiated\*/

**package** hsbc.com;

**public** **class** Sample {

**public** **static** **int** *count*;

Sample()//constructor

{

*count*++;//counting how many times its instantiated

}

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

// **TODO** Auto-generated method stub

Sample obj1=**new** Sample();

Sample obj2=**new** Sample();

Sample obj3=**new** Sample();

System.***out***.println(obj3.*count*);//dislaying count

}

}

**Lab Exercise No:**16

/\*Create a class called Student with the following details: RollNo, StudName, MarksInEng,

MarksInMaths and MarksInScience. Write getters and setters for the all variables. RollNo

should be automatically generatedwhenever a newstudent is added.

Create a class called Standard with 8 students’ details and write separate method for each of

the following tasks and invoke the same.

1. To display the entire roll no and the name of the students in the class in the ascending order of roll no.

2. To display the roll no and the name of the student who has got the highest percentage.

3. To display the roll no and the name of the student who scored highest mark

inmathematics.

4. To display the roll no and the name of the student in the ascending order of the total marks in mathematics and science alone.

5. To display the roll no, name, total marks, percentage and rank of all the students in the descending order of rank.

\*/

package com.hsbc.demo.example;

import java.util.ArrayList;

import java.util.Arrays;

import java.util.Collections;

import java.util.Comparator;

import java.util.List;

public class Caller6 {

public static void main(String[] args) throws ClassNotFoundException {

System.out.println("Hello World");

Class.forName("com.hsbc.demo.example.Computer");

String [] s="the quick brown fox jumps over the little lazy dog.".split("fox");

System.out.println(s[0]);

System.out.println(s[1]);

Student1 s1=new Student1("Prince",101,23);

Student1 s2=new Student1("Vikram",102,21);

Student1 s3=new Student1("Arun",103,24);

Student1 s4=new Student1("Tarun",104,21);

Student ss1=new Student("Prince",101,23);

Student ss2=new Student("Vikram",102,21);

Student ss3=new Student("Arun",103,24);

Student ss4=new Student("Tarun",104,21);

Student st[]=new Student[] {

ss1,ss2,ss3,ss4

};

List<Student1> p=new ArrayList<Student1>();

p.add(s1);

p.add(s2);

p.add(s3);

p.add(s4);

MyComparator comp=new MyComparator();

Arrays.sort(st);

Collections.sort(p, comp);

System.out.println(st.length);

for(Student1 objs:p) {

System.out.println(objs);

}

}

static {

System.out.println("Class loading....");

}

}

class MyComparator implements Comparator<Student1>{

@Override

public int compare(Student1 o1, Student1 o2) {

// TODO Auto-generated method stub

if(o1.age>o2.age)

return 1;

else if (o1.age<o2.age)

return -1;

else

return 0;

}

}

class Student1 {

public Student1() {

super();

}

public Student1(String name, int rollNo, int age) {

super();

this.name = name;

this.rollNo = rollNo;

this.age = age;

}

public String getName() {

return name;

}

public void setName(String name) {

this.name = name;

}

public int getRollNo() {

return rollNo;

}

public void setRollNo(int rollNo) {

this.rollNo = rollNo;

}

public int getAge() {

return age;

}

public void setAge(int age) {

this.age = age;

}

@Override

public String toString() {

return "Student1 [name=" + name + ", rollNo=" + rollNo + ", age=" + age + "]";

}

String name;

int rollNo;

int age;

}

class Student implements Comparable<Student>{

public Student() {

super();

}

public Student(String name, int rollNo, int age) {

super();

this.name = name;

this.rollNo = rollNo;

this.age = age;

}

public String getName() {

return name;

}

public void setName(String name) {

this.name = name;

}

public int getRollNo() {

return rollNo;

}

public void setRollNo(int rollNo) {

this.rollNo = rollNo;

}

public int getAge() {

return age;

}

public void setAge(int age) {

this.age = age;

}

@Override

public String toString() {

return "Student [name=" + name + ", rollNo=" + rollNo + ", age=" + age + "]";

}

String name;

int rollNo;

int age;

@Override

public int compareTo(Student o) {

// TODO Auto-generated method stub

if(this.age>o.age)

return -1;

else if (this.age<o.age)

return 1;

else

return 0;

}

}

class Computer{

public static Computer computer;

static {

System.out.println("Computer class loaded");

computer=new Computer();

//System.out.println(computer);

}

}

**Lab Exercise No:**17

/\*“The quick brown fox jumps over the lazy dog”.\*/

**package** hsbc.com.soln;

**public** **class** Solution17 {

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

// **TODO** Auto-generated method stub

String s="The quick brown fox jumps over the lazy dog";

System.***out***.println("Character at 12th index "+ s.charAt(11));

//checking if string contains 'is'

String word="";

**boolean** flag=**false**;

**for**(**int** i=0;i<s.length();i++)

{

**char** ch=s.charAt(i);

**if**(Character.*isLetter*(ch))

{

word=word+ch;

}

**else**

{

**if**(word.equals("is"))

{

System.***out***.println("Contains 'is'");

flag=**true**;

**break**;

}

**else**

{

word="";

}

}

}

**if** (flag==**false**)

System.***out***.println("Doesn not contain 'is'");

//adding 'and killed it' to existing string

String a=s+" and killed it";

System.***out***.println("After appending: "+a);

//checking if string ends with dogs

word="";

**for**(**int** i=s.length()-1;i<s.length();i--)

{

**char** ch=s.charAt(i);

**if**(Character.*isLetter*(ch))

{

word=ch+word;

}

**else**

{

**if**(word.equals("dog"))

{

System.***out***.println("Ends with 'dog'");

**break**;

}

**else**

{

System.***out***.println("Does not end with 'dog'");

}

}

}

// Checking whether the String is equal to “The quick brown Fox jumps over the lazy Dog”

**if**(s.compareTo("The quick brown Fox jumps over the lazy Dog")==0)

System.***out***.println("Equal");

**else**

System.***out***.println("Not Equal");

//Checking whether the String is equal to “THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG”

**if**(s.compareTo("THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG")==0)

System.***out***.println("Equal");

**else**

System.***out***.println("Not Equal");

//Finding the index position of the character a

System.***out***.println(s.indexOf("a"));

//Finding the last index position of the character “e”

System.***out***.println(s.lastIndexOf("e"));

//Finding the length of the String.

System.***out***.println(s.length());

//Checking whether the String matches to “The quick brown Fox jumps over the lazy Dog”

**if**(s.compareTo("The quick brown Fox jumps over the lazy Dog")==0)

System.***out***.println("Equal");

**else**

System.***out***.println("Not Equal");

//Replacing the word “The” with the word “A”

word="";

String t="";

**for**(**int** i=0;i<s.length();i++)

{

**char** ch=s.charAt(i);

**if**(Character.*isLetter*(ch))

{

word=word+ch;

}

**else**

{

**if**(word.equals("The")||word.equals("the"))

{

t=t+" A";

word="";

}

**else**

{

t=t+" "+word;

word="";

}

}

}

System.***out***.println("After replacing "+ t);

//Splitting the above string into two such that two animal names do not come together

String d[]=s.split(" ",s.length());

System.***out***.println("After splitting");

**for**(**int** i=0;i<d.length;i++)

{

System.***out***.println(d[i]);

}

//Printing the animal names alone separately from the above string

t=s+" ";

word="";

System.***out***.println("Animal Names");

**for**(**int** i=0;i<t.length();i++)

{

**char** ch=t.charAt(i);

**if**(Character.*isLetter*(ch))

{

word=word+ch;

}

**else**

{

**if**(word.equals("fox")||word.equals("dog"))

{

System.***out***.println(word);

word="";

}

**else**

{

word="";

}

}

}

//Printing the above string in completely lower case

System.***out***.println("String in lowercase: "+s.toLowerCase());

//Printing the above string in completely upper case

System.***out***.println("String in uppercase: "+s.toUpperCase());

}

}

**Lab Exercise No:**18

/\*Write a program to demonstrate the difference between equals and == operator with

appropriate example\*/

**package** hsbc.com.soln;

**public** **class** Solution18 {

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

// **TODO** Auto-generated method stub

String p1=**new** String("abc");

String p2=**new** String("abc");

//String p3=p2;

//String p3="xyz";

**if**(p1==p2)

System.***out***.println("references are equal");

**if**(p1.equals(p2))

System.***out***.println("Equal");

}

}

**Lab Exercise No:**19

/\*Write a program to declare an array with 8 elements and copy the 8 elements into another

array and display the same.\*/

**package** hsbc.com.soln;

**public** **class** Array {

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

// **TODO** Auto-generated method stub

**int** arr[]= {3,5,2,6,65,75,23,13};

**int** brr[]=**new** **int**[arr.length];

**for**(**int** i=0;i<arr.length;i++)

brr[i]=arr[i];

System.***out***.println("Displaying the elements");

**for**(**int** i=0;i<arr.length;i++)

System.***out***.println(brr[i]);

}

}

**Lab Exercise No:**20

/\*Write a program to display the sum and the average of elements in the array.\*/

**package** hsbc.com.soln;

**public** **class** SumAndAvg {

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

// **TODO** Auto-generated method stub

**int** arr[]= {3,5,2,6,65,75,23,13};

**int** sum =0;

**double** avg=0;

**for**(**int** i=0;i<arr.length;i++)

sum=sum+arr[i];

System.***out***.println("Sum: "+sum+" "+"Average: "+(sum/arr.length));

}

}

**Lab Exercise No:**21

/\*Write a program to construct two matrices and display the sum of those.\*/

**package** hsbc.com.soln;

**public** **class** Matrix {

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

// **TODO** Auto-generated method stub

**int** arr[][]= {{3,4,2},{56,7,24}};

**int** brr[][]= {{45,6,3},{7,5,1}};

//printing the array

System.***out***.println("array 1");

**for**(**int** i=0;i<arr.length;i++)

{

**for**(**int** j=0;j<arr.length;j++)

{

System.***out***.print(arr[i][j]+" ");

}

System.***out***.println();

}

//printing the array

System.***out***.println("array 2");

**for**(**int** i=0;i<brr.length;i++)

{

**for**(**int** j=0;j<brr.length;j++)

{

System.***out***.print(brr[i][j]+" ");

}

System.***out***.println();

}

//sum

**for**(**int** i=0;i<arr.length;i++)

{

**for**(**int** j=0;j<arr.length;j++)

{

arr[i][j]=arr[i][j]+brr[i][j];

}

}

System.***out***.println("Sum");

**for**(**int** i=0;i<arr.length;i++)

{

**for**(**int** j=0;j<arr.length;j++)

{

System.***out***.print(arr[i][j]+" ");

}

System.***out***.println();

}

}

}

**Lab Exercise No:**22

/\*Write a program to display the square of the elements of a two dimensional array.\*/

**package** hsbc.com.soln;

**import** java.io.\*;

**public** **class** Square {

**public** **static** **void** main(String[] args)**throws** IOException{

InputStreamReader read=**new** InputStreamReader(System.***in***);

BufferedReader buf=**new** BufferedReader(read);

System.***out***.println("Enter n value");

**int** n=Integer.*parseInt*(buf.readLine());

System.***out***.println("Enter values");

// **TODO** Auto-generated method stub

**int** arr[][]=**new** **int**[n][n];

**for**(**int** i=0;i<arr.length;i++)

{

**for**(**int** j=0;j<arr.length;j++)

{

arr[i][j]=Integer.*parseInt*(buf.readLine());

}

System.***out***.println();

}

**for**(**int** i=0;i<arr.length;i++)

{

**for**(**int** j=0;i<arr.length;j++)

{

arr[i][j]=arr[i][j]\*arr[i][j];

}

System.***out***.println();

}

System.***out***.println("Final array");

**for**(**int** i=0;i<arr.length;i++)

{

**for**(**int** j=0;j<arr.length;j++)

{

System.***out***.print(arr[i][j]+" ");

}

System.***out***.println();

}

}

}

**Lab Exercise No:**23

/\*Write a program to construct an array with 10 elements and to find the number of

occurrences of each element in the Array.\*/

**package** hsbc.com.soln;

**public** **class** Occurrences {

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

// **TODO** Auto-generated method stub

**int** arr[]= {4,6,2,4,3,5,7,8,5,4};

**int** f=1;

**for**(**int** i=0;i<arr.length-1;i++)

{

**for**(**int** j=i+1;j<arr.length;j++)

{

**if**(arr[i]!=-999)

{

**if**(arr[i]==arr[j] && arr[j]!=-999)

{

f++;

arr[j]=-999;

}

**else**

{

**continue**;

}

}

}

**if**(arr[i]!=-999)

{

System.***out***.println(arr[i]+" has occurred "+f+" times");

f=1;

}

}

}

}

**Lab Exercise No:**24

/\*Overload the area and perimeter method to calculate for both square and rectangle.

Create a main class and invoke the area method to calculate the area of the square and rectangle. Also invoke the perimeter method to calculate the perimeter of the square and rectangle.\*/

package hsbc.com.soln;

public class Shape {

public static void main(String[] args) {

// TODO Auto-generated method stub

Shape obj=new Shape();

obj.area(5);

obj.area(5,20);

obj.perimeter(6);

obj.perimeter(5,10);

}

public static void area(int a)

{

System.out.println("Area of square :"+a\*a);

}

public static void area(int a, int b)

{

System.out.println("Area of rectanlge :"+a\*b);

}

public static void perimeter(int x, int y)

{

System.out.println("Perimeter of rectangle :"+2\*(x+y));

}

public static void perimeter(int x)

{

System.out.println("Perimeter of square :"+x+x);

}

}

**Lab Exercise No:**25

/\*Constructor Overloading\*/

**package** hsbc.com.soln;

**public** **class** Employee {

**private** **static** String *empName*;

**private** **static** **int** *empId*;

**private** **static** **int** *empAge*;

**private** **static** String *empDesign*;

**private** **static** String *empLocation*;

**private** **static** **int** *empExpInYrs*;

Employee(String empName)

{

**this**.*empName*=empName;

*empId*=3;

*empAge*=22;

*empDesign*="TSE";

*empLocation*="Pune";

*empExpInYrs*=0;

}

Employee(String empName,**int** empId)

{

**this**.*empName*=empName;

**this**.*empId*=empId;

*empAge*=22;

*empDesign*="TSE";

*empLocation*="Pune";

*empExpInYrs*=0;

}

Employee(String empName,**int** empId,**int** empAge)

{

**this**.*empName*=empName;

**this**.*empId*=empId;

**this**.*empAge*=empAge;

*empDesign*="TSE";

*empLocation*="Pune";

*empExpInYrs*=0;

}

Employee(String empName,**int** empId,String empDesign )

{

**this**.*empName*=empName;

**this**.*empId*=empId;

**this**.*empDesign*=empDesign;

**int** empAge=22;

*empLocation*="Pune";

*empExpInYrs*=0;

}

Employee(String empName,**int** empId,**int** empAge,String empDesign )

{

**this**.*empName*=empName;

**this**.*empId*=empId;

**this**.*empAge*=empAge;

**this**.*empDesign*=empDesign;

*empLocation*="Pune";

*empExpInYrs*=0;

}

Employee(String empName,**int** empId,String empDesign,String empExpInYrs)

{

**this**.*empName*=empName;

**this**.*empId*=empId;

**this**.*empDesign*=empDesign;

**this**.*empExpInYrs*=empExpInYrs;

*empAge*=22;

*empLocation*="Pune";

}

Employee(String empName,**int** empId,String empDesign,String empLocation,String empExpInYrs)

{

**this**.*empName*=empName;

**this**.*empId*=empId;

**this**.*empDesign*=empDesign;

**this**.*empLocation*=empLocation;

**this**.*empExpInYrs*=empExpInYrs;

*empAge*=22;

}

Employee(String empName,**int** empId,**int** empAge,String empDesign,String empLocation,String empExpInYrs )

{

**this**.*empName*=empName;

**this**.*empId*=empId;

**this**.*empAge*=empAge;

**this**.*empDesign*=empDesign;

**this**.*empLocation*=empLocation;

**this**.*empExpInYrs*=empExpInYrs;

}

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

// **TODO** Auto-generated method stub

Employee obj=**new** Employee();

obj.Employee("Tanisha");

obj.Employee("Tanisha",1);

obj.Employee("Tanisha",1,22);

obj.Employee("Tanisha",1,"TSE");

obj.Employee("Tanisha",1,22,"TSE");

obj.Employee("Tanisha",1,22,"Pune");

obj.Employee("Tanisha",1,22,0);

obj.Employee("Tanisha",1,"TSE",0);

obj.Employee("Tanisha",1,"TSE","Pune",0);

obj.Employee("Tanisha",1,22,"TSE","Pune",0);

}

}

**Lab Exercise No:**26

/\*Create a class called Calculator which has 4 different methods add, diff, mul and div which

accepts two numbers as parameters. Overload the methods such that the parameters can be

of the following pattern.

1. Both are of int data type.

2. Both are of double data type.

3. First parameter is of int data type and second parameter is of double data type.

4. First parameter is of double data type and second parameter is of int data type.

Create an object to access these methods and invoke these methods with different type of

numbers and display the result in the corresponding methods.\*/

**package** hsbc.com.soln;

**public** **class** Calculator {

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

// **TODO** Auto-generated method stub

**int** a = 25;

**int** b = 50;

**double** c = 76.375;

**double** d = 150.553;

Calculator cal = **new** Calculator();

cal.add(a,b);

cal.add(c,d);

cal.add(c,a);

cal.add(b,d);

cal.diff(a,b);

cal.diff(c,d);

cal.diff(c,a);

cal.diff(b,d);

cal.mul(a,b);

cal.mul(c,d);

cal.mul(c,a);

cal.mul(b,d);

cal.div(a,b);

cal.div(c,d);

cal.div(c,a);

cal.div(b, d);

}

**public** **void** add(**int** a, **int** b) {

System.***out***.println("The sum of a and b is " + (a+b));

}

**public** **void** add(**double** a, **double** b) {

System.***out***.println("The sum of c and d is " + (a+b));

}

**public** **void** add(**double** a, **int** b) {

System.***out***.println("The sum of c and a is " + (a+(**double**)b));

}

**public** **void** add(**int** a, **double** b) {

System.***out***.println("The sum of b and d is " + (b+(**double**)a));

}

**public** **void** diff(**int** a, **int** b) {

System.***out***.println("The difference of a and b is " + (a-b));

}

**public** **void** diff(**double** a, **double** b) {

System.***out***.println("The difference of c and d is " + (a-b));

}

**public** **void** diff(**double** a, **int** b) {

System.***out***.println("The difference of c and a is " + (a-(**double**)b));

}

**public** **void** diff(**int** a, **double** b) {

System.***out***.println("The difference of b and d is " + ((**double**)a-b));

}

**public** **void** mul(**int** a, **int** b) {

System.***out***.println("The product of a and b is " + (a\*b));

}

**public** **void** mul(**double** a, **double** b) {

System.***out***.println("The product of c and d is " + (a\*b));

}

**public** **void** mul(**double** a, **int** b) {

System.***out***.println("The product of c and a is " + (a\*(**double**)b));

}

**public** **void** mul(**int** a, **double** b) {

System.***out***.println("The product of b and d is " + ((**double**)a\*b));

}

**public** **void** div(**int** a, **int** b) {

**try** {

**float** c = (**float**)a/b;

System.***out***.println("The division of a and b is " + c);

}

**catch**(ArithmeticException e)

{

System.***out***.println("Message: " + e);

}

}

**public** **void** div(**double** a, **double** b) {

**try** {

**double** c = a/b;

System.***out***.println("The division of c and d is " + c);

}

**catch**(ArithmeticException e)

{

System.***out***.println("Message: " + e);

}

}

**public** **void** div(**int** a, **double** b) {

**try** {

**double** c = (**double**)a/b;

System.***out***.println("The division of b and d is " + c);

}

**catch**(ArithmeticException e)

{

System.***out***.println("Message: " + e);

}

}

**public** **void** div(**double** a, **int** b) {

**try** {

**double** c = a/(**double**)b;

System.***out***.println("The division of c and a is " + c);

}

**catch**(ArithmeticException e)

{

System.***out***.println("Message: " + e);

}

}

}

**Lab Exercise No :27**

//static

classComputer {

static {

System.out.println("Class Loading..");

Computer c = new Computer();

}

public static void main(String[] args) {

System.out.println("Class Executing");

}

}

**Lab Exercise No:**28

/\*In the calculator (Lab exercise - 14) program, make the add and diff method to accept var-args

and demonstrate.\*/

**package** hsbc.com.soln;

**public** **class** Solution28 {

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

// **TODO** Auto-generated method stub

*var*("Tanisha",3,10);

*var*("Hello",1,20,5,7);

}

**public** **static** **void** var(String name,**int**...t)

{

System.***out***.println("Name: "+name);

System.***out***.println("Arguments: "+t.length);

**for**(**int** i=0;i<t.length;i++)

{

System.***out***.println(i+" ");

}

}

}