**Lab Exercise No:**14

**Exercise Objective(s):***Construction of an object*

/\*\*

\* @version 1.0

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

*accepts two numbers as parameters. Create an object to access these methods and invoke*

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

\* @since 2020-09-16

\*

\*/

**package** hsbc.pack.day2;

//class definition

**public** **class** Calculator

{

**public** **void** add(**int** num1,**int** num2) //addition of 2 number

{

**int** num3 = num1 + num2;

System.***out***.println("Addition of 2 numbers is "+ num3);

}

**public** **void** sub(**int** num1,**int** num2) //subtraction of 2 number

{

**int** num3 = num1 - num2;

System.***out***.println("Subtraction of 2 numbers is "+ num3);

}

**public** **void** mul(**int** num1,**int** num2) //multiplication of 2 number

{

**int** num3 = num1 \* num2;

System.***out***.println("Multiplication of 2 numbers is "+ num3);

}

**public** **void** div(**int** num1,**int** num2) //division of 2 number

{

**int** num3 = num1 / num2;

System.***out***.println("Division of 2 numbers is "+ num3);

}

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

{

Calculator calc=**new** Calculator(); //Object Created

calc.add(1,2);

calc.sub(21,10);

calc.mul(9,6);

calc.div(4,2);

}

}

**Lab Exercise No:**15

**Exercise Objective(s):***Construction of an object, constructors*

/\*\*

\* @version 1.0

\* *Create a class called Sample. Write a program to display the no of objects created for that*

*class or the no of times that class is instantiated.*

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

//class definition

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

**static** **int** *counter* = 0; //initial count is 0 and will be incremented as object gets created

**public** Sample() {

*counter*++;

}

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

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

Sample s1 = **new** Sample(); // object creation

Sample s2 = **new** Sample(); // object creation

Sample s3 = **new** Sample(); // object creation

Sample s4 = **new** Sample(); // object creation

Sample s5 = **new** Sample(); // object creation

Sample s6 = **new** Sample(); // object creation

Sample s7 = **new** Sample(); // object creation

System.***out***.println("Total object created : "+ *counter*);

}

}

**Lab Exercise No:**16

**Exercise Objective(s):***Construction of an object, this keyword, accessors(getters) and mutators(setters),*

*public and private access specifiers, instance and class member variables*

*/\*\**

*\* @version 1.0*

*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.*

1. *To display the roll no and the name of the student in the ascending order of the total marks in mathematics and science alone.*
2. *To display the roll no, name, total marks, percentage and rank of all the students in the descending order of rank.*

*\* @since 2020-09-15*

*\**

*\*/*

//THIS IS A STUDENT CLASS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | package hsbc.pack.day2;    public class Student {  //Member variables of the class static int baseRollNumber=1000; private int rollNumber=0;    private String studentName; private int marksInEnglish; private int marksInMaths; private int marksInScience;    public int getRollNumber() {  return rollNumber; }   public void setRollNumber() { rollNumber = ++baseRollNumber; } /\*public void calcRollNo(int baseRollNumber) { rollNumber=++baseRollNumber;  }\*/  public String getStudentName() { return studentName; }   public void setStudentName(String studentName) { this.studentName = studentName; }   public int getMarksInEnglish() { return marksInEnglish; }   public void setMarksInEnglish(int marksInEnglish) { this.marksInEnglish = marksInEnglish; }   public int getMarksInMaths() { return marksInMaths; }   public void setMarksInMaths(int marksInMaths) { this.marksInMaths = marksInMaths; }   public int getMarksInScience() { return marksInScience; }   public void setMarksInScience(int marksInScience) { this.marksInScience = marksInScience; }   }   |  |  | | --- | --- | |  |  | |  |

/\*This is a standard class. It contains main method and it invokes other data manipulation

methods too\*/

package pack.hsbc.day2;  
import java.util.Scanner;  
public class Standard {  
  
//METHOD 1  
public static void task1(Student[] s) {  
int l;  
  
  
for(l=0;l<1;l++) {  
System.out.println(s[l].getRollNumber() + "The Name is" + s[l].getStudentName());  
}  
  
}  
//METHOD 2  
public static void task2(Student[] s) {  
int j, maxPcnt=0,roll=0;String name="";  
  
for(j=0;j<1;j++) {  
if(maxPcnt>(s[j].getMarksInEnglish()+s[j].getMarksInMaths()+s[j].getMarksInScience())/100) {  
maxPcnt=(s[j].getMarksInEnglish()+s[j].getMarksInMaths()+s[j].getMarksInScience())/100;  
name=s[j].getStudentName();  
roll=s[j].getRollNumber();  
}  
  
  
}  
  
System.out.println("The highest scorer is " + name + roll );  
  
  
}  
  
  
public static void main(String args[])  
{  
Scanner scan =new Scanner(System.in);  
Student s[]=new Student[1];  
String name;  
int M,S,E;  
  
  
for(int i=0;i<1;i++)  
{  
  
s[i]=new Student();  
System.out.println("Enter the details. of " + i + "th student i.e.  Name, Marks in Math, Science, English");  
name=scan.nextLine();  
M=scan.nextInt();  
S=scan.nextInt();  
E=scan.nextInt();  
  
s[i].setRollNumber();  
  
s[i].setStudentName(name);  
s[i].setMarksInEnglish(English);  
s[i].setMarksInScience(Science);  
s[i].setMarksInMaths(Math);  
}  
/\*for(int i=0;i<1;i++) {  
System.out.println(s[i].getRollNumber());  
}\*/  
//Standard sd =new Standard();  
task1(s);  
task2(s);  
  
  
  
}  
  
  
  
}

**Lab Exercise No:**18

**Exercise Objective(s):***String class, String immutability*

/\*\*

\* @version 1.0

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

*appropriate example*

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

//class definition

**public** **class** StringDemo {

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

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

String s1 = **new** String("String");

String s2 = **new** String("String");

**if**(s1 == s2) //since two string was generated via new it has different address

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

**else**

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

**if**(s1.equals(s2)) // it checks only strings

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

**else**

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

}

}

**Lab Exercise No:**19

**Exercise Objective(s):***Arrays*

*/\*\**

*\* @version 1.0*

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

*array and display the same.*

*\* @since 2020-09-15*

*\**

*\*/*

**package** hsbc.pack.day2;  
//Class Definition

**public** **class** Solution19 {

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

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

**int**[] numbers = {1,2,3,4,5,6,7,8};

**int**[] newArray = numbers.clone(); //create a copy of array. change in one won't reflect in other due to .clone()

**for**(**int** num : newArray) {

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

}

}

}

**Lab Exercise No:**20

**Exercise Objective(s):***Arrays*

/\*\*

\* @version 1.0

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

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;  
//Class Definition

**public** **class** Solution20 {

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

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

**double**[] numbers = {10, 20.5, 30, 40.15};

**double** sum = 0;

**for**(**double** num : numbers)

{

sum += num;

}

System.***out***.println("Sum of all numbers is " + sum);

System.***out***.println("Average of all numbers is "+ sum/numbers.length); // sum / total numbers will give average

}

}

**Lab Exercise No:**21

**Exercise Objective(s):***Arrays*

/\*\*

\* @version 1.0

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

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

**import** java.util.Scanner;

//Class Definition

**public** **class** Solution21

{

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

**int** row, column;

Scanner scnr = **new** Scanner(System.***in***);

System.***out***.println("Enter the no. of rows and cols of matrix");

row = scnr.nextInt();

column = scnr.nextInt();

**int** first[][] = **new** **int**[row][column]; //matrix

**int** second[][] = **new** **int**[row][column]; //matrix

System.***out***.println("Enter the elements of first matrix");  
 //values of fields in matrix

**for** (**int** i = 0; i < row; i++)

{

**for** (**int** j = 0; j < column; j++)

{

first[i][j] = scnr.nextInt();

}

}

System.***out***.println("Enter the elements of second matrix"); //values of fields in matrix

**for** (**int** i = 0; i < row; i++)

{

**for** (**int** j = 0; j < column; j++)

{

second[i][j] = scnr.nextInt();

}

}

System.***out***.println("Sum of the 2 matrix:");

**for** (**int** i = 0; i < row; i++)

{

**for** (**int** j = 0; j < column; j++)

{

System.***out***.println((first[i][j] + second[i][j]) + " ");

}

System.***out***.println("\n");

}

}

}

**Lab Exercise No:**22

**Exercise Objective(s):***Arrays*

/\*\*

\* @version 1.0

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

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

**import** java.util.Scanner;

//Class Definition

**public** **class** Solution22 {

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

**int** row, column;

Scanner scnr = **new** Scanner(System.***in***);

System.***out***.println("Enter the no. of rows and cols of matrix");

row = scnr.nextInt();

column = scnr.nextInt();

**int** first[][] = **new** **int**[row][column]; //matrix

System.***out***.println("Enter the elements of first matrix"); //values of fields in matrix

**for** (**int** i = 0; i < row; i++)

{

**for** (**int** j = 0; j < column; j++)

{

first[i][j] = scnr.nextInt();

}

}

System.***out***.println("Square of each element in the matrix:");

**for** (**int** i = 0; i < row; i++)

{

**for** (**int** j = 0; j < column; j++)

{

System.***out***.println((first[i][j]\* first[i][j]) + " "); //multiplication of itself will give square

}

System.***out***.println("\n");

}

}

}

**Lab Exercise No:**23

**Exercise Objective(s):***Arrays*

/\*\*

\* @version 1.0

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

*occurrences of each element in the Array.*

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

**import** java.util.Scanner;  
//Class Definition

**public** **class** Solution23

{

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

{

Scanner scnr = **new** Scanner(System.***in***);

**int**[] arr = **new** **int**[10];

**int**[] freq = **new** **int**[10];

**int** size=10, i, j, count;

System.***out***.println("Enter elements in array: ");

**for**(i=0; i<size; i++)

{

arr[i] = scnr.nextInt(); //Array values

freq[i] = -1;

}

**for**(i=0; i<size; i++)

{

count = 1;

**for**(j=i+1; j<size; j++)

{

**if**(arr[i]==arr[j]) //finding duplicate element

{

count++;

freq[j] = 0;

}

}

**if**(freq[i] != 0)

{

freq[i] = count;

}

}

System.***out***.println("nFrequency of all elements of array : n");

**for**(i=0; i<size; i++)

{

**if**(freq[i] != 0)

{

System.***out***.println(arr[i] + " occurs " + freq[i] + " times" + "n");

}

}

}

}

**Lab Exercise No:**24

**Exercise Objective(s):***Overloading*

/\*\*

\* @version 1.0

\* *Create a class called shape with the following methods*

1. *area*
2. *perimeter*

*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.*

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

//Class Definition

**public** **class** Solution24 {

**public** **static** **void** area(**int** height) // for square - area

{

**int** area=height\*height;

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

}

**public** **static** **void** area(**int** height,**int** length) // for rectangle - area

{

**int** area=length\*height;

System.***out***.println("Area of rectangle:"+area);

}

**public** **static** **void** perimeter(**int** height) // for square - perimeter

{

**int** perimeter=4\*height;

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

}

**public** **static** **void** perimeter(**int** height,**int** length) // for rectangle - perimeter

{

**int** perimeter=2\*(length+height);

System.***out***.println("Perimeter of rectangle:"+perimeter);

}

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

**int** val1 = 7, val2 = 12;

*area*(val1);

*area*(val1,val2);

*perimeter*(val1);

*perimeter*(val1,val2);

}

}

**Lab Exercise No:**28

**Exercise Objective(s):***Var-args*

/\*\*

\* @version 1.0

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

*and demonstrate.*

\* @since 2020-09-15

\*

\*/

**package** hsbc.pack.day2;

//Class Definition

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

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

*add*(2, 3, 5, 11, 27, 13);

*sub*(100, 20, 50, 10, 33);

}

// ...num will make this function with unlimited arguments.

**public** **static** **void** add(**int** ...num) //addition of 2 number

{

**int** sum = 0;

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

{

sum += num[i];

}

System.***out***.println("Addition of numbers is "+ sum);

}

**public** **static** **void** sub(**int** ...num) //subtraction of number

{

**int** sub = num[0]; //first input to be taken as positive and rest numbers will be deducted from that.

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

{

sub -= num[i];

}

System.***out***.println("Subtraction of numbers is "+ sub);

}

}