WT LABORATORY

LAB RECORD 2

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LAB CLASS 6

1. Write a program in Java to find the largest among 3 user entered numbers.

PROGRAM CODE :

```
import java.util.Scanner;
public class Lab61
{
   public static void main(String[] args)
   {
          int x,y,z;
          Scanner p = new Scanner(System.in);
          System.out.println("Enter the 3 numbers :");

          x=p.nextInt();
          y=p.nextInt();
          z=p.nextInt();

          if(x>y && x>z) System.out.println("Largest Number is :"+x);
          if(y>x && y>z) System.out.println("Largest Number is :"+y);
          if(z>x && z>y) System.out.println("Largest Number is :"+z);
   }
}
```

OUTPUT :

```
Enter the 3 numbers :
67
78
34
Largest Number is :78
```

2. Write a program in Java to take first name and last name from user and print both in one line as last name followed by first name.

PROGRAM CODE :

```
import java.util.Scanner;
public class Lab62
{
   public static void main(String[] args)
   {
      String first, last;
      Scanner sc=new Scanner(System.in);

      System.out.println("Enter 1st name : ");
      first=sc.next();
      System.out.println("Enter last name : ");
      last=sc.next();

      System.out.println("Name is "+last+" "+first);

   }
}
```

OUTPUT:

```
Enter 1st name :
Anirban
Enter last name :
Hazra
Name is Hazra Anirban
```

3. Write a program in Java to find the common digits of two user entered numbers .

PROGRAM CODE :

```
import java.util.*;
class Lab63{
        public static void main(String[]args)
        {
                Scanner sc = new Scanner(System.in);
                System.out.print("Enter 2 numbers :\n");
```

```
                String aaa = sc.next();
                String bbb = sc.next();
                char [] aa = aaa.toCharArray();
                char [] bb = bbb.toCharArray();
                Arrays.sort(aa);
                Arrays.sort(bb);
                String a = new String(aa);
                String b = new String(bb);
                int a1 = a.length();
                int b1 = b.length();
                System.out.println("The common digits in the numbers are : ");
                for(int i=0;i<a1;++i)
                {
                        for(int j=0; j < b1; ++j){
                                int c =  a.charAt(i) - '0';
                                int d = b.charAt(j) - '0';
                                if(c == d) System.out.print(c + " ");
                        }
                }
                System.out.println();
        }
}
```

OUTPUT:

```
Enter 2 numbers :
4576
8759
The common digits in the the numbers are :
5 7
```

4. Write a class file 'box' in Java with three data members and a method called volume. Implement this box class in another class where it's object is created with user entered dimensions and it's volume is displayed.

PROGRAM CODE:

```
import java.util.Scanner;
class Box{
   int h,b,l;
   int volume()
```

```
    {
        return h * b * l;
    }
}
public class Lab64
{
    public static void main(String[] args)
    {
        Box mybox=new Box();
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter height , breadth and length respectively : ");
        mybox.h=sc.nextInt();
        mybox.b=sc.nextInt();
        mybox.l=sc.nextInt();
        System.out.println("Volume of the box is : "+mybox.volume());

    }
}
```

OUTPUT:

```
Enter height , breadth and length respectively :
5 7 9
Volume of the box is : 315
```

5. Illustrate method overloading of 'multiplication' method with different no. of inputs and different types of input.

PROGRAM CODE :

```
import java.util.Scanner;
class Multiply
{
    void multiplication(int a,int b)
    {
        System.out.println("Product is :"+(a*b));
    }
    void multiplication(int a,int b,int c)
    {
```

```
        System.out.println("Product is :"+(a*b*c));
    }
    void multiplication(double a,int b)
    {
        System.out.println("Product is :"+(a*b));
    }
}
public class Lab65
{
    public static void main(String[] args)
    {
        Multiply m=new Multiply();;
        Scanner sc=new Scanner(System.in);
        int a ,b;
        System.out.println("Enter 2 numbers");
        a=sc.nextInt();
        b=sc.nextInt();
        m.multiplication(a,b);
        m.multiplication(a,b,6);
        m.multiplication(5.2,b);
    }
}
```

OUTPUT :

```
Enter 2 numbers
6 8
Product is :48
Product is :288
Product is :41.6
```

LAB CLASS 7

1. Write a program in Java to find the average of all user entered numbers at the command line.

PROGRAM CODE :

```
import java.util.Scanner;
public class Lab71
{
   public static void main(String[] args)
   {
      int n, count = 1;
    float  xF, averageF, sumF = 0;
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the value of n");
    n = sc.nextInt();

    while (count <= n)
          {
              System.out.println("Enter the "+count+" number?");
              xF = sc.nextInt();
              sumF += xF;
              ++count;
          }
       averageF = sumF/n;
     System.out.println("The Average is : "+averageF);
   }
}
```

OUTPUT (command line) :

```
PS C:\Users\KIIT\WEB-TECH> javac Lab71.java
PS C:\Users\KIIT\WEB-TECH> java Lab71
Enter the value of n
4
Enter the 1 number?
12
Enter the 2 number?
6
Enter the 3 number?
3
Enter the 4 number?
0
The Average is : 5.25
```

2. Write a program to find sum of two user entered matrix and print the result in matrix format.

PROGRAM CODE :

```
import java.util.Scanner;
public class Lab72
{
   public static void main(String[] args)
   {
      int m,n;

                int a[][] = new int [100][100];
                int b[][] = new int [100][100];
                int c[][] = new int [100][100];

                Scanner sc = new Scanner(System.in);
                System.out.println("Enter rowsize of matrix");
                m = sc.nextInt();

                System.out.println("Enter columnsize of matrix");
                n = sc.nextInt();

                int i,j;
                System.out.println("Enter elements for matrix 1 :");

                for(i=1;i<=m;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                a[i][j] = sc.nextInt();
                        }
                }

                System.out.println("Displaying, matrix 1 :");

                for(i=1;i<=m;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                System.out.print(a[i][j]+" ");
                        }
                        System.out.println();
```

```
                }

                System.out.println("Enter elements for matrix 2 :");
                for(i=1;i<=m;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                b[i][j] = sc.nextInt();
                        }
                }

                System.out.println("Displaying, matrix 2 :");

                for(i=1;i<=m;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                System.out.print(b[i][j]+" ");
                        }
                        System.out.println();
                }

                for(i=1;i<=m;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                c[i][j] = a[i][j] + b[i][j];
                        }
                }

                System.out.println("Displaying, sum of matrices 1 and 2 :");

                for(i=1;i<=m;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                System.out.print(c[i][j]+" ");
                        }
                        System.out.println();
                }
        }
}
```

OUTPUT :

```
Enter rowsize of matrix
3
Enter columnsize of matrix
3
Enter elements for matrix 1 :
1 2 3 3 2 1 1 2 3
Displaying, matrix 1 :
1 2 3
3 2 1
1 2 3
Enter elements for matrix 2 :
3 2 1 1 2 3 3 2 1
Displaying, matrix 2 :
3 2 1
1 2 3
3 2 1
Displaying, sum of matrices 1 and 2 :
4 4 4
4 4 4
4 4 4
```

3. Write a program in Java to find sum of each diagonal elements of an user entered 3 X 3 matrix of nos.

PROGRAM CODE :

```
import java.util.Scanner;
public class Lab73
{
   public static void main(String[] args)
   {
      Scanner sc = new Scanner(System.in);

       int i,j,row,col,sum=0;

         System.out.println("Enter the number of rows:");
         row = sc.nextInt();
         System.out.println("Enter the number of columns:");
         col = sc.nextInt();
```

```
        int[][] mat = new int[row][col];

            System.out.println("Enter the elements of the matrix") ;

            for(i=0;i<row;i++)
            {
             for(j=0;j<col;j++)
             {
                mat[i][j] = sc.nextInt();
             }
            }

            System.out.println("The elements of the matrix") ;

            for(i=0;i<row;i++)
            {
             for(j=0;j<col;j++)
             {
               System.out.print(mat[i][j]+"\t");
            }
              System.out.println("");
            }

            for(i=0;i<row;i++)
            {
             for(j=0;j<col;j++)
             {

                if(i==j)        //this condition checks for diagonal
                 {
                        sum = sum + mat[i][j];
                 }

             }

            }

       System.out.printf("SUM of DIAGONAL elements of the matrix = "+sum) ;
    }

}
```

OUTPUT :

```
Enter the number of rows:
3
Enter the number of columns:
3
Enter the elements of the matrix
1 2 3 4 5 6 7 8 9
The elements of the matrix
1       2       3
4       5       6
7       8       9
SUM of DIAGONAL elements of the matrix = 15
```

4. Write a program in Java to find no. of objects created out of a class using ‘static’ modifier.

PROGRAM CODE :

```
import java.util.Scanner;
public class Lab74{
   static int p = 0 ;
   Lab74()
   {
      p = p + 1 ;
   }
   public static void main(String[] args)
   {
      Lab74 obj1=new Lab74() ;
      Lab74 obj2=new Lab74() ;
      Lab74 obj3=new Lab74() ;
      Lab74 obj4=new Lab74() ;
      Lab74 obj5=new Lab74() ;
      System.out.println("Total number of objects created is "+p) ;
   }
}
```

OUTPUT :

```
Total number of objects created is 5
```

5. Define a class Savings-account with static data member interest-rate and a static method modify-intrate(float) to change the interest-rate. This class has three non-static members as accountno, name, balance and also a method calculate-interest() to find the interest with existing interest-rate for a given period and principal amount. Check the operation of this class by calculating interest using one object and then modifying the interest-rate and again calculating interest using another object for the same period and principal amount.

PROGRAM CODE :

```
import java.util.Scanner;
class SavingsAccount
{
	static float roi;
	int acc_no;
	String name;
	float balance;

	static void modifyIntrate(float t)
	{
		roi = t;
	}

	float calculateInterest(int t, int p)
	{
		return (p*t*roi)/100;
	}
}

public class Lab75
{
   public static void main(String[] args)
   {
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter the initial rate of interest: ");
		float rt = sc.nextFloat();

		SavingsAccount acc1 = new SavingsAccount();
		SavingsAccount acc2 = new SavingsAccount();

		SavingsAccount.modifyIntrate(rt);
```

```
            System.out.print("Enter time and principal ammount: ");
            int p = sc.nextInt(), t = sc.nextInt();

            float res = acc1.calculateInterest(p, t);
            System.out.println("interest is " + res);

            System.out.print("Enter the modified rate of interest: ");
            rt = sc.nextFloat();

            SavingsAccount.modifyIntrate(rt);

            System.out.print("Enter time and principal ammount: ");
            p = sc.nextInt(); t = sc.nextInt();

            res = acc2.calculateInterest(p, t);
            System.out.println("interest is " + res);
    }
}
```

OUTPUT :

```
Enter the initial rate of interest: 12
Enter time and principal ammount: 5 50000
interest is 30000.0
Enter the modified rate of interest: 7
Enter time and principal ammount: 7 80000
interest is 39200.0
```

LAB CLASS 8

1. Write a Student class in Java with data members as Rollno Course and a method as register for enrolling to a course. Write another class Kiitian derived from Student having a method hostel- request to request for hostel accommodation. Write the complete program to check the inheritance of Kiitian object.

PROGRAM CODE :

```
import java.util.*;
class Student
{
	int Rollno;
	String Course;

	Student(int rollno)
	{
		Rollno = rollno;
	}

	void register(String Course)
	{
		this.Course = Course;
	}
}

class Kiitian extends Student
{
	Scanner sc = new Scanner(System.in);
	String is_required;

	Kiitian(int roll)
	{
		super(roll);
	}
	void hostelRequest()
	{
		System.out.print("IS HOSTEL REQUIRED:- ");
		is_required = sc.next();
	}
}
```

```
public class Lab81
{
	public static void main(String[]args)
	{
		Scanner sc = new Scanner(System.in);
		System.out.print("Give Roll no:- ");
		int roll = sc.nextInt();

		Kiitian stu1 = new Kiitian(roll);
		System.out.print("Enter the Course selected:- ");
		String str = sc.next();

		stu1.register(str);
		stu1.hostelRequest();

	System.out.println("The roll of the student is :- " + stu1.Rollno);
	System.out.println("The Course of the student is :- " + stu1.Course);
	System.out.println("Is hostel :- " + stu1.is_required);

	}
}
```

OUTPUT :

```
Give Roll no:- 2005643
Enter the Course selected:- CSE
IS HOSTEL REQUIRED:- Yes
The roll of the student is :- 2005643
The Course of the student is :- CSE
Is hostel :- Yes
```

2. A plastic manufacturer sells plastic in different shapes like 2D sheet and 3D box. The cost of sheet is Rs 40/ per square ft. and the cost of box is Rs 60/ per cubic ft. Implement it in Java to calculate the cost of plastic as per the dimensions given b the user where 3D inherits from 20.

PROGRAM CODE :

```
import java.util.Scanner;
class dim2
{
	Scanner sc = new Scanner(System.in);
```

```
        int length, breadth;
        int price;
        void getDim2D()
        {
                System.out.print("Enter length and breadth of the sheet:- ");
                length = sc.nextInt();
                breadth = sc.nextInt();
        }

        void price()
        {
                price = 40 * length * breadth;
                System.out.println("The price of 2d sheet is $" + price);
        }
}
class dim3 extends dim2
{
        int height;
        void getHeight()
        {
                System.out.print("Enter height of the sheet:- ");
                height = sc.nextInt();
        }

        void price3d()
        {
                price = 60 * length * breadth * height;
                System.out.println("The price of 3d is $" + price);
        }
}
public class Lab82
{
   public static void main(String[] args)
   {
      dim3 ob = new dim3();

                ob.getDim2D();
                ob.price();

                ob.getHeight();
                ob.price3d();
   }
}
```

OUTPUT :

```
Enter length and breadth of the sheet:- 5 8
The price of 2d sheet is $1600
Enter height of the sheet:- 6
The price of 3d is $14400
```

3. In an organization there are three types of employees — Manager, Worker and others. Each has corresponding department ID and unique employeeID . The organization has provided the leave encashment facility as per the following guidelines —
i>A worker will get Rs 300/- per day.
ii> manager will get Rs 200/- per half day.
iii> Other employees will get Rs 200/ per day.
Automate this system in Java to find the leave encashment amount for the user entered no. of days using inheritance concept.

PROGRAM CODE :

```
import java.util.*;
class emp
{
	int emp_id, dept_id,n;
	float le_amt;
	void get_data()
	{
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter Employee-ID - ");
		emp_id = sc.nextInt();
		System.out.print("Enter Department ID - ");
		dept_id = sc.nextInt();
		System.out.print("Enter number of half-days - ");
		n = sc.nextInt();
	}
}
class manager extends emp
{
	void show_data()
	{
		System.out.println("----------Manager Details----------");
		get_data();
		le_amt = 200 * n;
```

```
                System.out.println("Employee-ID - "+emp_id);
                System.out.println("Department-ID - "+dept_id);
                System.out.println("No. of half-days - "+n);
        System.out.println("Leave Encashment Amount = Rs."+le_amt);
        }
}
class worker extends emp
{
        void show_data()
        {
                System.out.println("--------------Worker Details--------------");
                get_data();
                le_amt = 300 * (2*n);
                System.out.println("Employee-ID - "+emp_id);
                System.out.println("Department-ID - "+dept_id);
                System.out.println("No. of days - "+(n/2));
        System.out.println("Leave Encashment Amount = Rs."+le_amt);
        }
}
class others extends emp
{
        void show_data()
        {
                System.out.println("------------Other Emp Details------------");
                get_data();
                le_amt = 200 * (2*n);
                System.out.println("Employee-ID - "+emp_id);
                System.out.println("Department-ID - "+dept_id);
                System.out.println("No. of days - "+(n/2));
        System.out.println("Leave Encashment Amount = Rs."+le_amt);
        }
}
public class Lab83{
        public static void main(String args[])
        {
                manager m = new manager();
                worker w = new worker();
                others o = new others();
                m.show_data();
                w.show_data();
                o.show_data();
        }
}
```

OUTPUT :

```
---------------Manager Details----------------
Enter Employee-ID - 5643
Enter Department ID - 1200
Enter number of half-days - 6
Employee-ID - 5643
Department-ID - 1200
No. of half-days - 6
Leave Encashment Amount = Rs.1200.0
---------------Worker Details----------------
Enter Employee-ID - 7890
Enter Department ID - 3452
Enter number of half-days - 8
Employee-ID - 7890
Department-ID - 3452
No. of days - 4
Leave Encashment Amount = Rs.4800.0
---------------Other Emp Details----------------
Enter Employee-ID - 9012
Enter Department ID - 3443
Enter number of half-days - 12
Employee-ID - 9012
Department-ID - 3443
No. of days - 6
Leave Encashment Amount = Rs.4800.0
```

LAB CLASS 9

1. Write a Java Program to define a class Employee with data members as empid, basic ,DA which are taken from user and a method as salary which adds basic with DA and prints total along with empid . Derive a class Manager with a data member tallowance which is calculated as 10% of basic. And also override the method salary which adds basic, DA, tallowance and prints total along with empid. Write the complete program to check method overriding.

PROGRAM CODE :

```
import java.util.*;
class Employee
{
	int emp_id;
	float basic,DA,total;
	void get_data()
	{
		Scanner sc = new Scanner(System.in);
		System.out.print("\nEnter Employee-ID - ");
		emp_id = sc.nextInt();
		System.out.print("Enter Basic Pay - ");
		basic = sc.nextFloat();
		System.out.print("Enter DA - ");
		DA = sc.nextFloat();
	}
	void salary()
	{
		get_data();
		System.out.println("------------Employee Details-------------");
		System.out.println("Employee-ID - "+emp_id);
		System.out.println("Basic pay - Rs. "+basic);
		System.out.println("DA - Rs. "+DA);
		total = basic + DA;
		System.out.println("Total Salary - Rs. "+total);
	}
}
class manager extends Employee
{
	void salary()
	{
```

```
                float TA;
                System.out.println("-------------Manager Details--------------");
                System.out.println("Employee-ID - "+emp_id);
                System.out.println("Basic pay - Rs. "+basic);
                System.out.println("DA - Rs. "+DA);
                TA = 0.1f*basic;
                total = basic + DA + TA;
                System.out.println("Total Salary - Rs. "+total);
                super.salary();
        }
}
public class Lab91
{
        public static void main(String args[])
        {
                manager m = new manager();
                m.get_data();
                m.salary();
        }
}
```

OUTPUT :

```
Enter Employee-ID - 6789
Enter Basic Pay - 89000
Enter DA - 67000
---------------Manager Details----------------
Employee-ID - 6789
Basic pay - Rs. 89000.0
DA - Rs. 67000.0
Total Salary - Rs. 164900.0

Enter Employee-ID - 7880
Enter Basic Pay - 45000
Enter DA - 56000
---------------Employee Details----------------
Employee-ID - 7880
Basic pay - Rs. 45000.0
DA - Rs. 56000.0
Total Salary - Rs. 101000.0
```

2. Write a program in java to create a class Bank having ROI (Rate of Interest) data member and member function. Derive two classes HDFC, ICICI with function . The ROI of HDFC bank is calculated as ROI = (Last year annual profit / 1.5 crore) where the annual profit is an user entered value. The ROI of ICICI bank is calculated as ROI = Fund supported by RBI in crores / 1.5 Crore where Fund supported by RBI is an user entered value. So find the rate of interest of all the Banks using dynamic method dispatch technique.

PROGRAM CODE :

```
import java.util.*;
class Bank
{
	double roi,temp=1.5;
	void find_ROI()
	{
		System.out.println("\n-------------Bank Class---------------\n");
		System.out.println("To find rate of interest");
	}
}

class HDFC extends Bank
{
	void find_ROI()
	{
		System.out.println("\n-------------HDFC Class---------------\n");
		double AP;
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter last year annual profit(in crores) - ");
		AP = sc.nextDouble();
		roi = AP/temp;
		System.out.printf("Rate of Interest in HDFC - %.2f",roi);
	}
}

class ICICI extends Bank
{
	void find_ROI()
	{
		System.out.println("\n-------------ICICI Class---------------\n");
		double fund;
		Scanner sc = new Scanner(System.in);
```

```
            System.out.print("Enter fund supported by RBI (in crores) - ");
              fund = sc.nextDouble();
              roi = fund/temp;
              System.out.printf("Rate of Interest in ICICI - %.2f\n",roi);
        }
}

public class Lab92
{
        public static void main(String args[])
        {
              Bank ob1 = new Bank();
              HDFC ob2 = new HDFC();
              ICICI ob3 = new ICICI();
              Bank ob4;

              ob4 = ob1;
              ob1.find_ROI();
              ob4 = ob2;
              ob4.find_ROI();
              ob4 = ob3;
              ob4.find_ROI();
        }
}
```

OUTPUT :

```
---------------Bank Class----------------

To find rate of interest

---------------HDFC Class----------------

Enter last year annual profit(in crores) - 450
Rate of Interest in HDFC - 300.00
---------------ICICI Class----------------

Enter fund supported by RBI (in crores) - 345
Rate of Interest in ICICI - 230.00
```

LAB CLASS 10

1. Illustrate the usage of abstract class with following Java classes –
   i) An abstract class "student" with data members as roll no, regno and an abstract method course()
   ii) A subclass "kiitian" with course() method implementation.

PROGRAM CODE :

```
import java.util.Scanner;
abstract class Student1
{
   int rollno, regno ;
   abstract void course();
}
class Kiitian extends Student1
{
   Kiitian(int a , int b)
   {
      rollno = a;
      regno = b;
   }
   void course()
   {
    System.out.println("Roll no : "+rollno);
    System.out.println("Regn no : "+regno);
   }
}
public class Lab101{
   public static void main(String[] args)
   {
      Scanner sc=new Scanner(System.in);
      System.out.println("Enter roll and registration number : ");
      int a , b;
      a=sc.nextInt();
      b=sc.nextInt();
      Student1 s= new Kiitian(a,b);
      s.course();
   }
}
```

OUTPUT :

```
Enter roll and registration number :
2005643
643
Roll no : 2005643
Regn no : 643
```

2. Define an interface Motor with a data member –capacity and two methods such as run() and consume(). Define a Java class 'Washing machine' which implements this interface and write the code to check the value of the interface data member through an object of the class.

PROGRAM CODE :

```
import java.util.Scanner;
interface Motor
{
   int capacity=100;
   void run();
   void consume();
}
class Washing_machine implements Motor
{
   public void run()
   {
      System.out.println("Run Method is printed\n");
   }
   public void consume()
   {
      System.out.println("Consume Method is printed\n");
   }
}

public class Lab102
{
        public static void main(String args[])
        {
                Motor m1 = new Washing_machine();
            System.out.println("Value of the interface variable: " + m1.capacity);
                m1.run();
                m1.consume();
        }
}
```

OUTPUT :

```
Value of the interface variable: 100
Run Method is printed

Consume Method is printed
```

3. Define an interface with three methods – earnings(),deductions() and bonus() and define a Java class 'Manager' which uses this interface without implementing bonus() method. Also define another Java class 'Substaff' which extends from 'Manager' class and implements bonus() method. Write the complete program to find out earnings, deduction and bonus of a substaff with basic salary amount entered by the user as per the following guidelines –

earnings ⟶ basic + DA (80% of basic) + HRA (15% of basic)
deduction PF ⟶ 12% of basic
bonus ⟶ 50% of basic

PROGRAM CODE :

```
import java.util.Scanner;
interface Salary
{
        double earnings();
        double deductions();
        double bonus();
}

abstract class Manager implements Salary
{
        int basic;
        Manager(int a)
        {
                basic = a;
        }
        public double earnings()
        {
                return basic + (0.8 * basic) + (0.15 * basic);
        }
        public double deductions()
        {
                return 0.12 * basic;
        }
}

class Substaff extends Manager implements Salary
{
```

```
    Substaff(int a)
    {
        super(a);
    }

    public double bonus()
    {
        return 0.5 * basic;
    }

}

public class Lab103
{
    public static void main(String args[])
    {

        int basic_salary;
      System.out.println("Enter Basic Salary : ");
      Scanner sc=new Scanner(System.in);
      basic_salary=sc.nextInt();
        Salary s1 = new Substaff(basic_salary);
        System.out.println("Salary details of the substaff");
        s1.earnings();
        s1.deductions();
        s1.bonus();
        System.out.println("Basic Salary: " + basic_salary);
        System.out.println("Earning of the substaff: "+s1.earnings());
        System.out.println("Deduction of the substaff: "+s1.deductions());
        System.out.println("Bonus of the substaff: " + s1.bonus());
    }
}
```

OUTPUT :

```
Enter Basic Salary :
34500
Salary details of the substaff
Basic Salary: 34500
Earning of the substaff: 67275.0
Deduction of the substaff: 4140.0
Bonus of the substaff: 17250.0
```

LAB CLASS 11

1. Define two packages as — General and Marketing. In General package define a class "employee" with data members as empid(protected), ename (private) and a public method as earnings() which calculate total earnings as follows :
Eamings —> basic + DA (80% of basic) + HRA (15% of basic)

In Marketing package define a class “sales” which is extending frorn “employee" class and has a method tallowance() which calculates Travelling Allowance as 5% of total earning. Write the programs to find out earning and tallowance of a sales person for the given basic salary amount and print along with the empid.

PROGRAM CODE :

```
//code for general package

package General;

public abstract class Employee {
    protected int empId;
    protected String ename;

    abstract public void earnings();

}

//code for marketing package

package Marketing;

import General.*;
import java.util.*;

class sales extends Employee {
    int sal;

    public void earnings() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter emp name: ");
        ename = sc.next();
```

```
        System.out.println("Enter empId: ");
        empId = sc.nextInt();
        System.out.println("Enter emp salary: ");
        sal = sc.nextInt();
        double res = sal + (0.08 * sal) + (0.15 * sal);

        sc.close();
        System.out.println("Emp name: " + ename);
        System.out.println("Emp Id: " + empId);
        System.out.println("Emp basic salary: " + sal);
        System.out.println("Emp total earnings: " + res);

    }

    public void tallowance() {
        double tres = (0.05 * sal);
        System.out.println("Emp travelling allowance: " + tres);

    }

    public static void main(String[] args) {
        sales s = new sales();
        s.earnings();
        s.tallowance();
    }
}
```

OUTPUT :

```
Enter emp name:
Anirban
Enter empId:
5643
Enter emp salary:
90000
Emp name: Anirban
Emp Id: 5643
Emp basic salary: 90000
Emp total earnings: 110700.0
Emp travelling allowance: 4500.0
```

2. Write a Java prog. to generate anArraylndexOutofBoundsException and handle it using catch statement.

PROGRAM CODE :

```
public class Lab112
{

   public static void main(String[] args)
   {

      int a[]={3,4,6,1};

            try
            {
               System.out.println(a[5]);
            }

            catch(ArrayIndexOutOfBoundsException e)
            {
               System.out.println(e);
            }

   }

}
```

OUTPUT :

```
java.lang.ArrayIndexOutOfBoundsException: Index 5 out of bounds for length 4
```

LAB CLASS 12

1. Write a Java program to divide two user entered numbers using try..catch..finally block. The catch block should handle ArithmaticException. In the finally block take user option to retry till user says "No" .

PROGRAM CODE :

```
import java.util.Scanner;
class Lab121
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in) ;
    String str;
    do{
    try{
      int num1, num2;
      System.out.println ("Enter 2 numbers : ");

      num1=sc.nextInt();
      num2=sc.nextInt();
      int output=num1/num2;
      System.out.println ("Result: "+output);
    }

    catch(ArithmeticException e)
    {
      System.out.println ("You Shouldn't divide a number by zero");
    }

    finally
    {

          System.out.println("Do you want to retry?");
          str=sc.next();
    }
    }while(!str.equals("No"));
  }

}
```

OUTPUT :

```
Enter 2 numbers :
9 0
You Shouldn't divide a number by zero
Do you want to retry?
No
```

2. Write a Java class containing a data member and a method called ProcessInput(). This method checks the number entered by the user. If the entered number is negative then throw an user defined exception called NegativeNumberException, otherwise it displays the double value of the entered number.

PROGRAM CODE :

```
import java.util.Scanner;

class NegativeNumberException extends Exception
{
   private static final long serialVersionUID = 1L;
   NegativeNumberException(String s)
   {
   super(s);
   }
}

public class Lab122
{
   static void processInput(int num) throws NegativeNumberException
   {
   if(num<0)
   throw new NegativeNumberException("Number Entered is a Negative Number");
   else
   System.out.println("The Number "+(double)num+" is Positive");
   }

   public static void main(String[] args)
   {
      System.out.print("Enter a number: ");
      Scanner sc = new Scanner(System.in);
         try
         {
```

```
            int input = sc.nextInt();
            sc.close();
            processInput(input);
            }

            catch(NegativeNumberException e)
            {
            System.out.println("Exception Occured "+e);
            }

    }

}
```

OUTPUT :

```
Enter a number: -234
Exception Occured NegativeNumberException: Number Entered is a Negative Number
```

3. Write a program in Java to take two time values - start time, end time from user in hours & minutes. If end time is lesser than the start time then throw an exception as InvalidTime and give another chance to the user. Otherwise find the difference between the two times in terms of minutes.

PROGRAM CODE :

```
import java.util.Scanner;

class InvalidTimeException extends Exception
{
    public String toString()
    {
        return "Invalid Time";
    }
}
class Time
{
    int calculate(int hr,int min)
    {
        return hr*60+min;
    }
}
```

```
public class Lab123
{
   public static void main(String[] args)
   {
      Scanner s = new Scanner(System.in);
      Time t=new Time();
       String str;
      do
      {
         System.out.println("------------start_time-------------");
         System.out.println("enter start_hour:");
         int start_hr = s.nextInt();

         System.out.println("enter start_minute:");
         int start_min = s.nextInt();

         System.out.println("------------end_time-------------");
         System.out.println("enter end_hour:");
         int end_hr = s.nextInt();

         System.out.println("enter end_minute:");
         int end_min = s.nextInt();

      try
      {
         if(t.calculate(start_hr, start_min)>t.calculate(end_hr,end_min))
         throw new InvalidTimeException();
         System.out.println("Time difference in minutes is:
            "+(t.calculate(end_hr, end_min)-t.calculate(start_hr,start_min)));
      }
      catch (InvalidTimeException e)
      {
         System.out.println(e);
      }

      finally
      {
            System.out.println("Do you want to retry?");
            str=s.next();
      }
      }while(str.equals("yes"));
   }
}
```

OUTPUT :

```
------------start_time-------------
enter start_hour:
7
enter start_minute:
56
------------end_time-------------
enter end_hour:
4
enter end_minute:
23
Invalid Time
Do you want to retry?
No
```

THANK YOU