CSE1007
Java Programming
Lab Assignment-2

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Question :

Write a program(s) in Java that illustrates the following concepts. The concepts can be applied to any practical scenario such as student administration system or software which maintains various information about students and provides various services to the users. The other scenarios may include retail business management software, banking systems, railway reservation system, online shopping applications, environmental monitoring system etc.

- Classes and Objects
- Constructors and constructor overloading
- Method overloading
- Garbage collection and this reference
- Inheritance
- Interfaces
- Packages and sub packages

Solution:

PROGRAM 1:

In a real life scenario, let's say people are forming a queue to get their chance to make a modification in their aadhar card. For this process everyone is supposed to make a booking in advance to do so. In this process

during entering they are given priorities. As if a high priority guy (Lower the number the higher the priority) comes in, they should be allowed to get their turn . Hence, Write a program to implement multiple inheritance to insert an element to a sorted array and print the final sorted array after any people join the queue.

Concepts used:

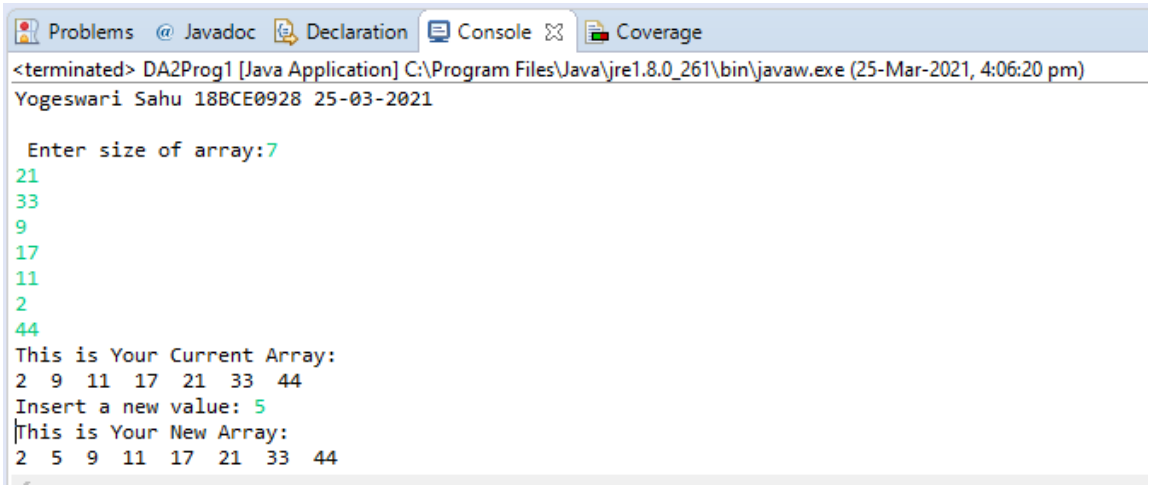
- Classes and Objects
- Method overloading
- Inheritance
- Interfaces
- Packages

Code:

```
package JavaDA2;

import java.util.Scanner;

//using interfaces
interface Sorting{
    public int[] sort(int[] array,int n);
}
interface Insert{
    public int[] insert(int[] array);
}
//using inheritance in interfaces
interface SortedArray extends Sorting,Insert {
    public void result(int[] array,int n);
 }

public class DA2Prog1 {
    public static void main(String[] args){
      System.out.println("Yogeswari Sahu 18BCE0928 25-03-2021");
         Scanner sc = new Scanner(System.in);
         System.out.print("\n Enter size of array:");
         int n = sc.nextInt();
         int[] array = new int[n+1];
         for(int i=0; i<n; i++)
             {
             array[i]=sc.nextInt();
             }
         SortedArray s = new SortedArray(){
```

```
        //defining sort function
         public int[] sort(int[] array,int n){

             int temp = 0;
             for(int i=0; i < n; i++){
                 for(int j=1; j < (n-i); j++){
                      if(array[j-1] > array[j]){

                              temp = array[j-1];
                              array[j-1] = array[j];
                              array[j] = temp;
                         }
                 }
             }
             return array;
         }
        //defining insert function

         public int[] insert(int[] array){
             System.out.print("\nInsert a new value: ");
             int newnumber = sc.nextInt();
             int len = array.length;
             array[len-1]=newnumber;
             return array;
         }
        //defining result function

         public void result(int[] array,int n){
             for(int i=0; i<n; i++)
                 {
                     System.out.print(array[i]+ "  ");
                 }
         }
    };
        //calling all the functions

    s.sort(array,n);
        //printing the array

    System.out.println("This is Your Current Array:");
    s.result(array,n);
    s.insert(array);
    s.sort(array,n+1);
        //printing the array after inserting element
    System.out.println("This is Your New Array:");
    s.result(array,n+1);
 }
}
```

Output:



PROGRAM 2:

In a bank ,assuming the bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should maintain a minimum balance and if the balance falls below this level, service charge is imposed.

Write a Program that Creates a class account that stores customer name, account number and type of account. Using concept of inheritance derive the classes current and saving to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

-Accept deposit from a customer and update the balance.

-Display the balance

-Compute and deposit interest.

-Permit withdrawal and update the balance.

-Check for the minimum balance, impose penalty necessary, and update the balance.

Concepts used:

- Classes and Objects
- Method overloading
- Inheritance
- Packages

Code:

```
package JavaDA2;

import java.util.*;
//defining account class
class account{
	protected String cname;
	protected int accno;
	protected String type;
	protected int bal;
	Scanner s=new Scanner(System.in);
		//defining input method

	void input(){
		System.out.println("Enter customer name");
		cname=s.nextLine();
		System.out.println("Enter account number");
		accno=s.nextInt();
		System.out.println("Enter type of account c for current and s
for savings)");
		type=s.next();
		System.out.println("Enter balance");
		bal=s.nextInt();
	}
	//defining display method

	void display(){
		System.out.println("Customer name:"+cname);
		System.out.println("Account number:"+accno);
		System.out.println("Type of account:"+type);
		System.out.println("Enter balance:"+bal);
	}
	//defining deposit method

	void deposit(){
```

```
            int amt;
            System.out.println("Enter the amount to deposit");
            amt=s.nextInt();
            bal=bal+amt;
      }
}

//defining account saving and using inheritance
class saving extends account{
      private double i;

      //defining comp_int() function
      int comp_int(){
            int t,r;
            r=10;
            System.out.println("Enter time");
            t=s.nextInt();
            i=bal*(Math.pow(1+r/100.0,t))-bal;
            return (int) i;
      }

      //defining update_bal() function
      void update_bal(){
            bal=bal+comp_int();
      }

      //defining withdrawal function
      void withdrawal(){
            int amt;
            System.out.println("Enter amount to withdrawn");
            amt=s.nextInt();
            if(bal>=amt){
                  bal=bal-amt;
            }
            else{
                  System.out.println("The amount cannot be withdrawn");
            }
      }
}

//defining account current and using inheritance
class current extends account{
      private int chq_bk;
      private int penal;
      //defining min_bal() function

      int min_bal(){
            int ret1=1;
            if(bal<=500){
```

```
                penal=50;
                bal=bal-penal;
                ret1=0;
            }
            else{
                System.out.println("No penality imposed");
            }
            return ret1;
        }
        //defining withdrawal function

        void withdrawal(){
            int amt;
            System.out.println("Enter the amount to withdrawn");
            amt=s.nextInt();
            int k=min_bal();
            if(k==1){
                if(bal>=amt)
                bal=bal-amt;
            }
            else{
                System.out.println("The amount cannot be withdrawn");
            }
        }
};
public class DA2Prog2{
public static void main(String[]args) {
        System.out.println("Yogeswari Sahu 18BCE0928 25-03-2021");

        //initializing all the objects of classes
        current c1 = new current();
        saving s1 = new saving();

        //calling all the functions

        c1.input();
        c1.display();
        c1.deposit();
        c1.display();
        c1.withdrawal();
        c1.display();
        s1.input();
        s1.display();
        s1.deposit();
        s1.display();
        s1.withdrawal();
        s1.display();
}
}
```

Output:


```
<terminated> DA2Prog2 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (25-Mar-2021, 4:42:00 pm)
Yogeswari Sahu 18BCE0928 25-03-2021

 Enter customer name
Yogeswari Sahu
Enter account number
123400928
Enter type of account c for current and s for savings)
c
Enter balance
15000
Customer name:Yogeswari Sahu
Account number:123400928
Type of account:c
Enter balance:15000
Enter the amount to deposit
1500
Customer name:Yogeswari Sahu
Account number:123400928
Type of account:c
Enter balance:16500
Enter the amount to withdrawn
2300
No penality imposed
Customer name:Yogeswari Sahu
Account number:123400928
Type of account:c
Enter balance:14200

 Enter customer name
Yogeswari Sahu
Enter account number
123400928
Enter type of account c for current and s for savings)
s
Enter balance
30000
Customer name:Yogeswari Sahu
Account number:123400928
Type of account:s
Enter balance:30000
Enter the amount to deposit
1500
Customer name:Yogeswari Sahu
Account number:123400928
Type of account:s
Enter balance:31500
Enter amount to withdrawn
15000
Customer name:Yogeswari Sahu
Account number:123400928
Type of account:s
Enter balance:16500
```

PROGRAM 3:

Write a program and use packages and sub-packages for designing a Billing system for a hotel, which will sum up all the costs of the services used till the end of stay.

Concepts used:

- Classes and Objects
- Constructors and constructor overloading
- Garbage collection and this reference
- Inheritance
- Packages and sub packages

Code:

P1.java (Inside the package DA2Prog3Pack)

```
package DA2Prog3Pack;

class bill1{
      public int b,l,d;
      bill1(int b,int l,int d){
            this.b=b;
            this.d=d;
            this.l=l;
      }
      bill1(int b,int l){
            this.b=b;
            this.l=l;
      }
      bill1(int b){
            this.b=b;

      }
    public void breakfast(){
        System.out.println("Bill for Breakfast:"+b);
    }
    public void lunch(){
        System.out.println("Bill for Lunch: "+l);
    }
    public void dinner(){
        System.out.println("Bill for Dinner: "+d);
    }
}
```

```
public class P1 extends bill1{
    public P1(int b, int l, int d) {
          super(b, l, d);
     }

     public P1(int b, int l) {
          super(b, l);
     }

     public P1(int b) {
          super(b);
     }

     public static void main(String[] args) {

    }

}
```

P2.java (Inside the package DA2Prog3Pack)

```
package DA2Prog3Pack;

class bill2{
     public int shopbill,spabill;
     bill2(int sh, int sp){
          this.shopbill=sh;
          this.spabill=sp;
     }
     bill2(int sh){
          this.shopbill=sh;

     }
    public void shopping(){
        System.out.println("Shopping Bill:"+shopbill);
    }
    public void spa(){
        System.out.println("Spa Bill: "+spabill);
    }

}
public class P2 extends bill2{
    public P2(int sh, int sp) {
          super(sh, sp);
     }

     public P2(int sh) {
          super(sh);
     }
```

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

    }

}
```

newpack.java (Inside the sub-package DA2Prog3Subpack)

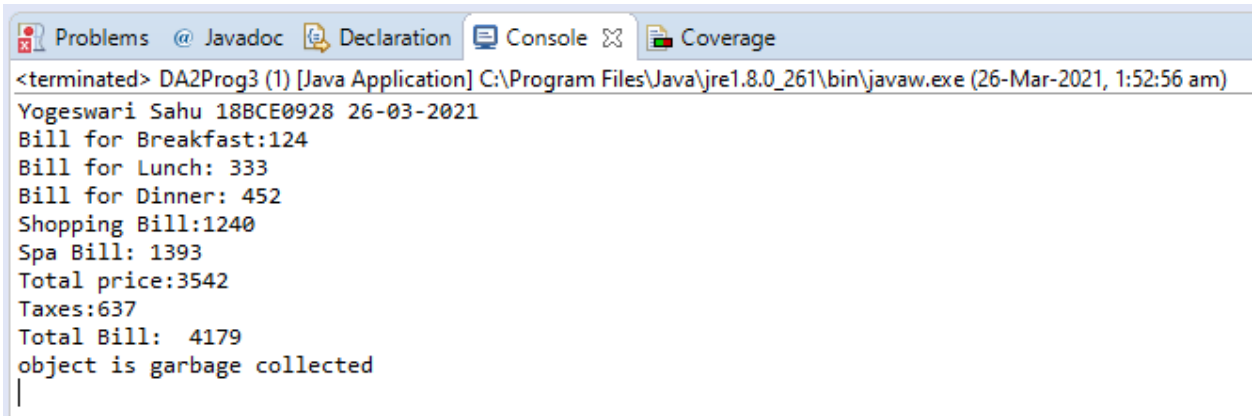
```
package DA2Prog3Pack.DA2Prog3Subpack;

class bill3{
      int total,b,l,d,shopbill,spabill;
      bill3(P1 b1,P2 b2){
            this.b=b1.b;
            this.l=b1.l;
            this.d=b1.d;
            this.shopbill=b2.shopbill;
            this.spabill=b2.spabill;
      }
       public int price() {
             int totalprice=b+l+d+shopbill+spabill;

             return totalprice;
       }
    public int taxes(){
      int tax=(int) (price()*0.18);
      System.out.println("Total price:"+price());
         System.out.println("Taxes:"+tax);
         return tax;
    }



}
public class newpack extends bill3{
      public void finalize(){System.out.println("object is garbage
collected");}
      public newpack(P1 b1, P2 b2) {
            super(b1, b2);

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

         P1 b1= new P1(124,333,452);
         b1.breakfast();
         b1.lunch();
         b1.dinner();
```

```
        P2 b2=new P2(1240,1393);
        b2.shopping();
        b2.spa();
        newpack obj=new newpack(b1,b2);
        int np=obj.price();
        int nt=obj.taxes();
        int tot=np+nt;
        System.out.println("Total Bill:  "+ tot);
       //Doing Garbage collection
        obj=null;
        System.gc();
    }


}
```

DA2Prog3.java

```
package JavaDA2;
import DA2Prog3Pack.*;
import DA2Prog3Pack.DA2Prog3Subpack.newpack;
public class DA2Prog3 {

      public static void main(String[] args) {
            System.out.println("Yogeswari Sahu 18BCE0928 26-03-2021");
            P1.main(args);
            P2.main(args);
            newpack.main(args);

      }

}
```

Output:



PROGRAM 4:

In hospitals, a very preliminary need is to take the temperature of any person and convert it to the temperature required to understand the temperature and symptoms better. Hence, write a java program for the conversion of temperature in Celsius and Fahrenheit to Fahrenheit and Celsius respectively using different parameters by making use of method overloading.

Concepts used:

- Classes and Objects
- Constructors
- Method overloading
- Garbage collection and this reference
- Inheritance
- Packages

Code:

```
package JavaDA2;
import java.util.Scanner;

class degreecelfar{
	public void finalize(){
		System.out.println("object is garbage collected");
	}
	double celtemp;double fartemp;
	 degreecelfar(double cel,double far){
		 this.celtemp=cel;
		 this.fartemp=far;
	 }
	}

class cel {
	public void finalize(){
		System.out.println("object is garbage collected");
	}
	double deg;
	 cel(double deg){
		 this.deg=deg;
	 }
	 public static double input() {
```

```
            Scanner sc = new Scanner(System.in);
            System.out.print("Enter the degree in celsius to be converted
to farhenheit:");
            double t = sc.nextDouble();
            return t;
      }
}

class far{
      public void finalize(){
            System.out.println("object is garbage collected");
      }
      double deg;
       far(double deg){
            this.deg=deg;
       }
       public static double input() {
            Scanner sc = new Scanner(System.in);
            System.out.print("Enter the degree in farhenheit to be
converted to celsius:");
            double t = sc.nextDouble();
            return t;
       }
}

class conv{
       double deg,deg1,deg2;
       conv(cel obj){
            deg= (obj.deg * 9/5) + 32;
       }
       conv(far obj){
            deg=(obj.deg-32) * 5/9;
       }
       conv(degreecelfar obj){
            deg1=(obj.celtemp* 9/5) + 32;
            deg2=(obj.fartemp-32) * 5/9;
       }


}

public class DA2Prog4{

      public static void main (String args[]){
            System.out.println("Yogeswari Sahu 18BCE0928 26-03-2021");
            //Using cel class
            double t1=cel.input();
            cel c=new cel(t1);
```

```
            //using far class
            double t2=far.input();
            far f=new far(t2);

            //Using degreecelfar class
            degreecelfar t=new degreecelfar(t1,t2);
            System.out.println();
            System.out.println("USING cel CLASS:");
            System.out.println("Convertion of celsius to
farhenheit:"+String.format("%.2f",(new conv(c).deg)));
            System.out.println();
            System.out.println("USING far CLASS:");
            System.out.println("Convertion of farhenheit to
celsius:"+String.format("%.2f",(new conv(f).deg)));
            System.out.println();
            System.out.println("USING degreecelfar CLASS:");
            System.out.println("Convertion of celsius to
farhenheit:"+String.format("%.2f",(new conv(t).deg1))+"\n"+"Convertion of
farhenheit to celsius:"+String.format("%.2f",(new conv(t).deg2)));

            //Doing Garbage collection
            c=null;
            f=null;
            t=null;
            System.gc();
      }
}
```

Output:

```
Problems  Javadoc  Declaration  Console  Coverage
<terminated> DA2Prog4 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (26-Mar-2021, 1:46:13 pm)
Yogeswari Sahu 18BCE0928 26-03-2021
Enter the degree in celsius to be converted to farhenheit:37.5
Enter the degree in farhenheit to be converted to celsius:97

USING cel CLASS:
Convertion of celsius to farhenheit:99.50

USING far CLASS:
Convertion of farhenheit to celsius:36.11

USING degreecelfar CLASS:
Convertion of celsius to farhenheit:99.50
Convertion of farhenheit to celsius:36.11
object is garbage collected
object is garbage collected
object is garbage collected
```