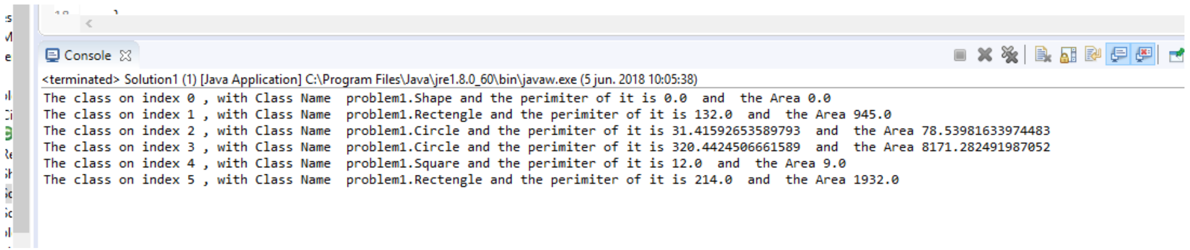
Problem1

```
package problem1;

public class Circle  extends Shape{

double radius;

public Circle(String color, double radius) {
       super(color);
       this.radius = radius;
}

@Override
double calcualteArea()  {

       return Math.PI*this.radius * this.radius ;
}


@Override
double calculatePerimeter() {
       return 2*Math.PI*this.radius ;

}


}
package problem1;

public class Rectengle extends Shape {

       double  width;
       double height;



       public Rectengle(double width, double height,String color ) {
              super(color);
              this.width = width;
              this.height = height;
       }
       @Override
       double calcualteArea()  {
              return this.width * this.height;
       }
       @Override
       double calculatePerimeter() {
              return 2*this.width + 2* this.height;

       }

}
package problem1;
```

```java
public class Shape {

	String color;

	Shape(String color)
	{
		this.color=color;
	}

	double calcualteArea()  {
		return 0.0 ;
	}
	double calculatePerimeter() {
		return 0.0 ;

	}



}
package problem1;

public class Square extends Rectengle {

	public Square(double side, String color) {
		super(side, side, color);
		// TODO Auto-generated constructor stub
	}

	@Override
	double calcualteArea()  {
		return this.width * this.height;
	}
	@Override
	double calculatePerimeter() {
		return 4*this.width ;

	}


}
package problem1;

public class Solution1 {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Shape[]  database = {
				new Shape("Red"),
				new Rectengle(45,21,"gray"),
				new Circle("Black",5),
				new Circle("Brown",51),
				new Square(3,"Blue"),
				new Rectengle(84,23,"Yellow"),
		};
```

```
        printTotal(database);


    }

    public static void printTotal(Shape[] shapes)
     {
        int index = 0;
        for (Shape shape : shapes)
        {
            String className = shape.getClass().getName();
            System.out.printf("The class on index %s , with Class Name 
%s and the perimiter of it is %s  and  the Area %s \n",index,className , 
shape.calculatePerimeter() , shape.calcualteArea());
            index=index+1;
        }
     }

}
```



```
Console
<terminated> Solution1 (1) [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe (5 jun. 2018 10:05:38)
The class on index 0 , with Class Name  problem1.Shape and the perimiter of it is 0.0  and  the Area 0.0
The class on index 1 , with Class Name  problem1.Rectengle and the perimiter of it is 132.0  and  the Area 945.0
The class on index 2 , with Class Name  problem1.Circle and the perimiter of it is 31.41592653589793  and  the Area 78.53981633974483
The class on index 3 , with Class Name  problem1.Circle and the perimiter of it is 320.4424506661589  and  the Area 8171.282491987052
The class on index 4 , with Class Name  problem1.Square and the perimiter of it is 12.0  and  the Area 9.0
The class on index 5 , with Class Name  problem1.Rectengle and the perimiter of it is 214.0  and  the Area 1932.0
```

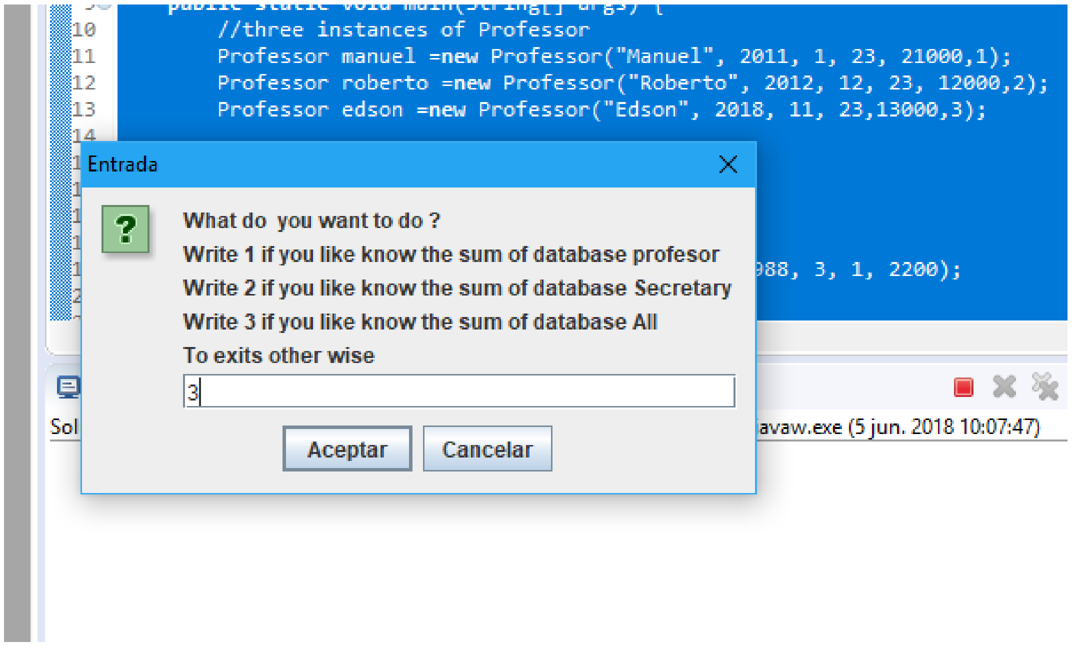
Problem2

```
package problem2;

import java.time.LocalDate;

public class DeptEmployee {
    String name ;
    LocalDate hireDate;
    double salary ;

    public DeptEmployee(String name, int yearOfHire, int monthOfHire, int 
dayOfHire,double salary)
    {

        this.name = name;
        this.hireDate =  LocalDate.of(yearOfHire, monthOfHire, dayOfHire);
        this.salary=salary;
    }

    public double computeSalary()
    {
        return this.salary;

    }
```

```
}
package problem2;

public class Professor extends DeptEmployee  {
	int numberOfPublications;





	public Professor(String name, int yearOfHire, int monthOfHire, int 
dayOfHire, double salary,
			int numberOfPublications)
	{
		super(name, yearOfHire, monthOfHire, dayOfHire, salary);
		this.numberOfPublications = numberOfPublications;
	}

	public int getNumberOfPublications() {
		return numberOfPublications;
	}

	public void setNumberOfPublications(int numberOfPublications) {
		this.numberOfPublications = numberOfPublications;
	}

}
package problem2;

public class Secretary extends DeptEmployee {



	double overtimeHours;






	public Secretary(String name, int yearOfHire, int monthOfHire, int 
dayOfHire, double salary) {
		super(name, yearOfHire, monthOfHire, dayOfHire, salary);
		this.overtimeHours = 0;
	}

	public double getOvertimeHours() {
		return overtimeHours;
	}

	public void setOvertimeHours(double overtimeHours)
	{
		this.overtimeHours = overtimeHours;
	}
	@Override
	public double computeSalary()
	{
		return this.salary + 12*this.overtimeHours;

	}


}
package problem2;


import java.util.Arrays;

import java.util.stream.Collectors;


import javax.swing.JOptionPane;


public class SolutionProblem2 {

	public static void main(String[] args) {

		//three instances of Professor

		Professor manuel =new Professor("Manuel", 2011, 1, 23, 21000,1);

		Professor roberto =new Professor("Roberto", 2012, 12, 23, 12000,2);

		Professor edson =new Professor("Edson", 2018, 11, 23,13000,3);




		// two   instances of Secretary




		Secretary sarita =new Secretary("Sarita", 1988, 3, 1, 2200);

		sarita.setOvertimeHours(23);


		Secretary rosita =new Secretary("Rosita", 2021, 5, 1, 3200);

		rosita.setOvertimeHours(12);
```

```
			DeptEmployee[] department = new DeptEmployee[5];

			department[0]=manuel;

			department[1]=roberto;

			department[2]=edson;


			department[3]=sarita;

			department[4]=rosita;





			double profesors = Arrays.stream(department).filter(o-
>o.getClass().getSimpleName().equals("Professor")).mapToDouble(o->o.computeSalary()).sum();

			double secretaries = Arrays.stream(department).filter(o-
>o.getClass().getSimpleName().equals("Secretary")).mapToDouble(o->o.computeSalary()).sum();

			double all = Arrays.stream(department).mapToDouble(o-
>o.computeSalary()).sum();


			String option = JOptionPane.showInputDialog("What do  you want to do ?
\nWrite 1 if you like know the sum of database profesor\n"

					+ "Write 2 if you like know the sum of database Secretary \n"

					+ "Write 3 if you like know the sum of database All\nTo exits other
wise");


			if (option != null )

			{

				switch (option)

				{
```

```
                        case "1":
                                JOptionPane.showMessageDialog(null, "The result to all profesors
" + String.valueOf(profesors), "",1);
                                break;
                        case "2":
                                JOptionPane.showMessageDialog(null, "The result to all
secreataries  " + String.valueOf(secretaries), "",1);
                                break;
                        case "3":
                                JOptionPane.showMessageDialog(null, "The result to all profesors
" + String.valueOf(all), "",1);
                                break;
                        default:
                                JOptionPane.showMessageDialog(null, "Exits without options " ,
"",1);
                                break;
                        }



                }
                else {
                        JOptionPane.showMessageDialog(null, "Exits without options " , "",1);
                }


        }
}
```

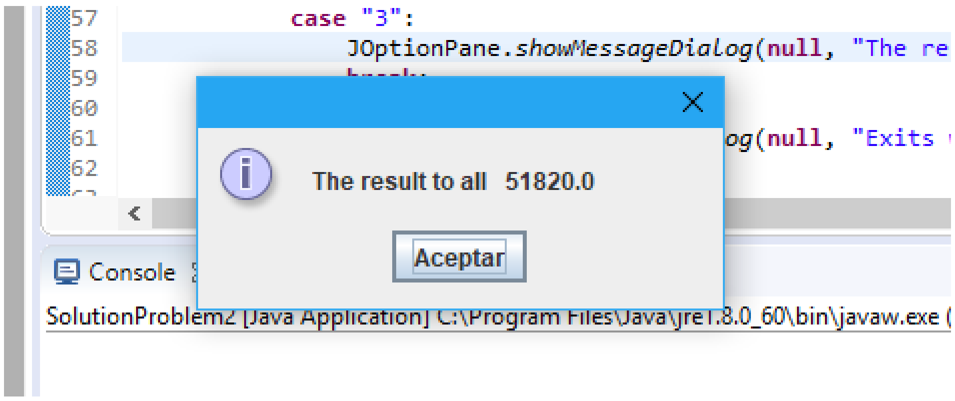


```
        //three instances of Professor
        Professor manuel =new Professor("Manuel", 2011, 1, 23, 21000,1);
        Professor roberto =new Professor("Roberto", 2012, 12, 23, 12000,2);
        Professor edson =new Professor("Edson", 2018, 11, 23,13000,3);
```

Entrada

What do you want to do ?
Write 1 if you like know the sum of database profesor
Write 2 if you like know the sum of database Secretary
Write 3 if you like know the sum of database All
To exits other wise

3



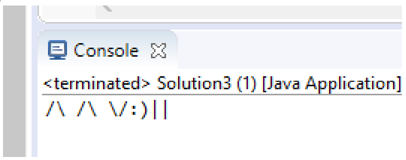
```
                case "3":
                    JOptionPane.showMessageDialog(null, "The re
```

The result to all   51820.0

SolutionProblem2 [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe (

Problem3

```
package Problem3;

public interface Figure {

	public void getFigure();
}
package Problem3;

public class DownwardHat implements Figure {

	@Override
	public void getFigure() {

		System.out.print("\\/");

	}
}
package Problem3;
```

```java
public class FaceMaker implements Figure {

	@Override
	public void getFigure() {

		System.out.print(":)");

	}

}
package Problem3;

public class UpwardHat implements Figure {

	@Override
	public void getFigure() {
		// TODO Auto-generated method stub
		System.out.print("/\\");

	}

}
package Problem3;

public class Vertical implements Figure {

	@Override
	public void getFigure() {
		// TODO Auto-generated method stub
		System.out.print("||");

	}

}
package Problem3;

public class Solution3 {

	public static void main(String[] args) {
		Figure[] database = { new UpwardHat(), new UpwardHat(), new
DownwardHat(), new FaceMaker(), new Vertical(),

		};

		for (Figure figure : database) {
			figure.getFigure();
		}
	}

}
```

Console

```
<terminated> Solution3 (1) [Java Application]
/\ /\ \/:)||
```

Problem4

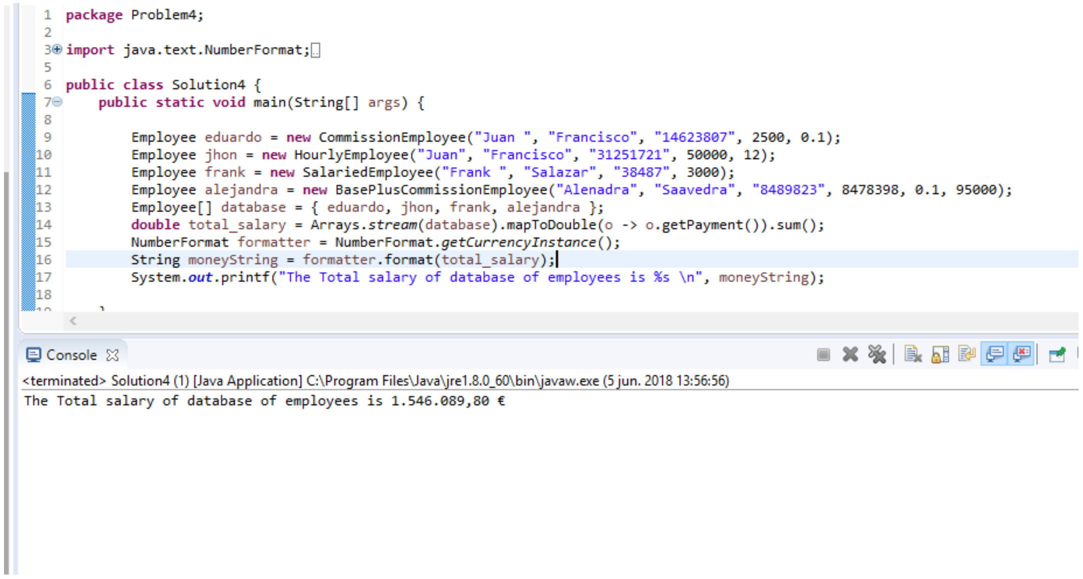
```
package Problem4;

public class BasePlusCommissionEmployee extends CommissionEmployee {
	double baseSalary;

	public BasePlusCommissionEmployee(String firtsName, String lastName,
String socialSecurityNumber, double grossSales,
			double commissionRate, double baseSalary) {
		super(firtsName, lastName, socialSecurityNumber, grossSales,
commissionRate);
		this.baseSalary = baseSalary;

	}

	@Override
	public String toString() {
		return "BasePlusCommissionEmployee [baseSalary=" + baseSalary + ",
grossSales=" + grossSales
				+ ", commissionRate=" + commissionRate + ",
firtsName=" + firtsName + ", lastName=" + lastName
				+ ", socialSecurityNumber=" + socialSecurityNumber +
"]";
	}

	@Override
	public double getPayment() {

		return this.baseSalary + (this.grossSales * this.commissionRate);
	}

}


package Problem4;

public class CommissionEmployee extends Employee {

	double grossSales;
	double commissionRate;

	public CommissionEmployee(String firtsName, String lastName, String
socialSecurityNumber, double grossSales,
			double commissionRate) {
		super(firtsName, lastName, socialSecurityNumber);
		this.grossSales = grossSales;
		this.commissionRate = commissionRate;
	}

	@Override
	public String toString() {
		return "CommissionEmployee --->grossSales=" + grossSales + ",
commissionRate=" + commissionRate + ", firtsName="
```

```
                                + firtsName + ", lastName=" + lastName + ",
socialSecurityNumber=" + socialSecurityNumber + "<----";
        }

        @Override
        public double getPayment() {
                // TODO Auto-generated method stub
                return this.grossSales * this.commissionRate;
        }

}
package Problem4;

public class Computer {
        String manufacturer;
        String processor;
        int ramSize;
        double processorSpeed;

        @Override
        public int hashCode() {
                final int prime = 31;
                int result = 1;
                result = prime * result + ((processor == null) ? 0 :
processor.hashCode());
                long temp;
                temp = Double.doubleToLongBits(processorSpeed);
                result = prime * result + (int) (temp ^ (temp >>> 32));
                result = prime * result + ramSize;
                return result;
        }

        @Override
        public boolean equals(Object obj) {
                if (this == obj) {
                        return true;
                }

                if (obj == null) {
                        return false;
                }

                if (getClass() != obj.getClass()) {
                        return false;
                }

                Computer other = (Computer) obj;

                if (processor == null) {
                        if (other.processor != null)

                        {
                                return false;

                        }
```

```
		} else if (!processor.equals(other.processor)) {
			return false;
		}
		if (Double.doubleToLongBits(processorSpeed) !=
Double.doubleToLongBits(other.processorSpeed)) {
			return false;
		}
		if (ramSize != other.ramSize) {
			return false;
		}
		return true;
	}

	@Override
	public String toString() {
		return "Current Status of Computer --->manufacturer=" +
manufacturer + ", processor=" + processor + ", ramSize="
				+ ramSize + ", processorSpeed=" + processorSpeed + "<-
---";
	}

	public double computePower() {
		// return ramSize multiplied by processorSpeed
		return this.ramSize * this.processorSpeed;

	}

	public double getProcessorSpeed() {
		return processorSpeed;
	}

	public int getRamSize() {
		return ramSize;
	}

	public Computer(String manufacturer, String processor, int ramSize,
double processorSpeed) {

		this.manufacturer = manufacturer;
		this.processor = processor;
		this.ramSize = ramSize;
		this.processorSpeed = processorSpeed;
	}

}
package Problem4;

public abstract class Employee {
	String firtsName;
	String lastName;
	String socialSecurityNumber;

	public abstract double getPayment();
	public Employee(String firtsName, String lastName, String
socialSecurityNumber) {
		super();
		this.firtsName = firtsName;
		this.lastName = lastName;
		this.socialSecurityNumber = socialSecurityNumber;
	}

}
package Problem4;

public class HourlyEmployee extends Employee {
	double wage;
	double hours;

	@Override
	public String toString() {
		return "HourlyEmployee -->wage=" + wage + ", hours=" + hours + ",
firtsName=" + firtsName + ", lastName="
				+ lastName + ", socialSecurityNumber=" +
socialSecurityNumber + "<----";
	}

	public HourlyEmployee(String firtsName, String lastName, String
socialSecurityNumber, double wage, double hours) {
		super(firtsName, lastName, socialSecurityNumber);
		this.wage = wage;
		this.hours = hours;
	}

	@Override
	public double getPayment() {
		// TODO Auto-generated method stub
		return this.wage * this.hours;
	}

}
package Problem4;

public class SalariedEmployee extends Employee {
	double weeklySalary;

	public SalariedEmployee(String firtsName, String lastName, String
socialSecurityNumber, double weeklySalary) {
		super(firtsName, lastName, socialSecurityNumber);
		this.weeklySalary = weeklySalary;
	}

	@Override
	public double getPayment() {

		return this.weeklySalary;
	}

}
```

```
package Problem4;


import java.text.NumberFormat;

import java.util.Arrays;


public class Solution4 {

        public static void main(String[] args) {


                Employee eduardo = new CommissionEmployee("Juan ", "Francisco", "14623807",
2500, 0.1);

                // System.out.println(eduardo);

                Employee jhon = new HourlyEmployee("Juan", "Francisco", "31251721", 50000,
12);

                // System.out.println(jhon);

                Employee frank = new SalariedEmployee("Frank ", "Salazar", "38487", 3000);

                // System.out.println(frank );

                Employee alejandra = new BasePlusCommissionEmployee("Alenadra", "Saavedra",
"8489823", 8478398, 0.1, 95000);

                // System.out.println(alejandra );


                Employee[] database = { eduardo, jhon, frank, alejandra };


                double total_salary = Arrays.stream(database).mapToDouble(o ->
o.getPayment()).sum();


                NumberFormat formatter = NumberFormat.getCurrencyInstance();

                String moneyString = formatter.format(total_salary);


                System.out.printf("The Total salary of database of employees is %s \n",
moneyString);
```

```
        }

}
```



```
package Problem4;

import java.text.NumberFormat;

public class Solution4 {
    public static void main(String[] args) {

        Employee eduardo = new CommissionEmployee("Juan ", "Francisco", "14623807", 2500, 0.1);
        Employee jhon = new HourlyEmployee("Juan", "Francisco", "31251721", 50000, 12);
        Employee frank = new SalariedEmployee("Frank ", "Salazar", "38487", 3000);
        Employee alejandra = new BasePlusCommissionEmployee("Alenadra", "Saavedra", "8489823", 8478398, 0.1, 95000);
        Employee[] database = { eduardo, jhon, frank, alejandra };
        double total_salary = Arrays.stream(database).mapToDouble(o -> o.getPayment()).sum();
        NumberFormat formatter = NumberFormat.getCurrencyInstance();
        String moneyString = formatter.format(total_salary);
        System.out.printf("The Total salary of database of employees is %s \n", moneyString);

```

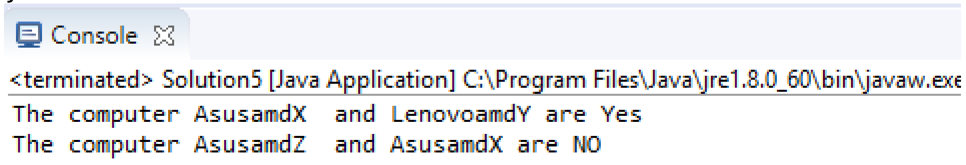
```
<terminated> Solution4 (1) [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe (5 jun. 2018 13:56:56)
The Total salary of database of employees is 1.546.089,80 €
```

Problem 5

```
package Problem5;

import java.util.Objects;

public class Computer {
        String manufacturer;
        String processor;
        int ramSize;
        double processorSpeed;

        @Override
        public int hashCode() {

                int hash = 547;
                hash += Double.doubleToLongBits(this.processorSpeed);
                hash += Double.doubleToLongBits(this.ramSize);

                return hash;

        }

        @Override
        public boolean equals(Object obj) {
                if (this == obj) {
                        return true;
                }

                if (obj == null) {
```

```
			return false;
		}

		if (this.getClass() != obj.getClass()) {
			return false;
		}

		Computer other = (Computer) obj;

		if (processor == null) {
			if (other.processor != null)

			{
				return false;

			}

		}

		return processor.equals(other.processor) && this.processorSpeed ==
other.processorSpeed
				&& ramSize == other.ramSize;

	}

	@Override
	public String toString() {
		return "Current Status of Computer <<<manufacturer=" + manufacturer
+ ", processor=" + processor + ", ramSize="
				+ ramSize + ", processorSpeed=" + processorSpeed +
">>";
	}

	public double computePower() {
		// return ramSize multiplied by processorSpeed
		return this.ramSize * this.processorSpeed;

	}

	public double getProcessorSpeed() {
		return processorSpeed;
	}

	public int getRamSize() {
		return ramSize;
	}

	public Computer(String manufacturer, String processor, int ramSize,
double processorSpeed) {

		this.manufacturer = manufacturer;
		this.processor = processor;
		this.ramSize = ramSize;
		this.processorSpeed = processorSpeed;
	}
```

```
}
package Problem5;

public class Solution5 {
	public static void main(String[] args) {
		Computer AsusamdX = new Computer("Asus", "x348", 1024, 3200);
		Computer LenovoamdY = new Computer("Lenovo", "x348", 1024, 3200);

		System.out.printf("The computer AsusamdX  and LenovoamdY are %s 
\n",
					(AsusamdX.equals(LenovoamdY) ? "Yes" : "NO"));

		Computer AsusamdZ = new Computer("Asus", "x348", 2024, 3200);

		System.out.printf("The computer AsusamdZ  and AsusamdX are %s \n ", 
(AsusamdX.equals(AsusamdZ) ? "Yes" : "NO"));

	}
}
```

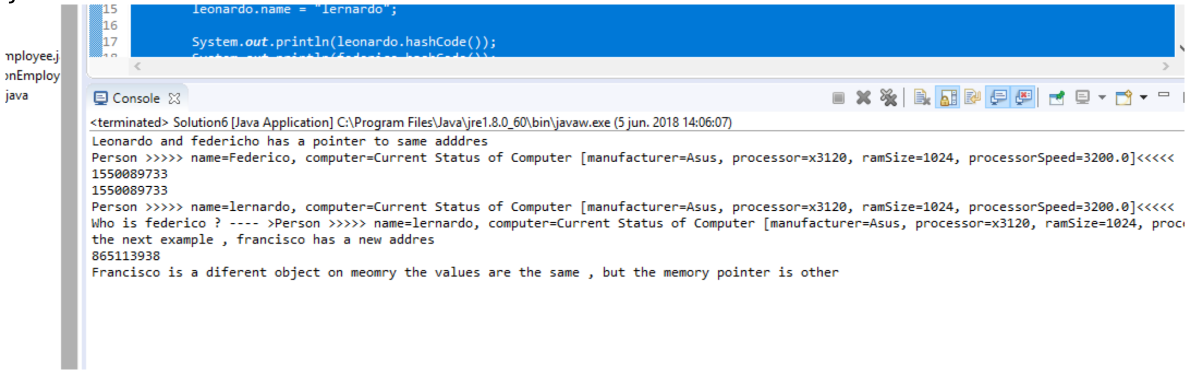

Console

```
<terminated> Solution5 [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe
The computer AsusamdX  and LenovoamdY are Yes
The computer AsusamdZ  and AsusamdX are NO
```

Problem 6.

```
package Problem6;

public class Computer {
	String manufacturer;
	String processor;
	int ramSize;
	double processorSpeed;

	@Override
	public int hashCode() {
		final int prime = 31;
		int result = 1;
		result = prime * result + ((processor == null) ? 0 : 
processor.hashCode());
		long temp;
		temp = Double.doubleToLongBits(processorSpeed);
		result = prime * result + (int) (temp ^ (temp >>> 32));
		result = prime * result + ramSize;
		return result;
	}

	@Override
	public boolean equals(Object obj) {
		if (this == obj) {
			return true;
		}

		if (obj == null) {
			return false;
		}

		if (getClass() != obj.getClass()) {
			return false;
		}

		Computer other = (Computer) obj;

		if (processor == null) {
			if (other.processor != null)

			{
				return false;

			}

		} else if (!processor.equals(other.processor)) {
			return false;
		}
		if (Double.doubleToLongBits(processorSpeed) != 
Double.doubleToLongBits(other.processorSpeed)) {
			return false;
		}
		if (ramSize != other.ramSize) {
			return false;
		}
		return true;
	}

	@Override
	public String toString() {
		return "Current Status of Computer [manufacturer=" + manufacturer + 
", processor=" + processor + ", ramSize="
				+ ramSize + ", processorSpeed=" + processorSpeed + 
"]";
	}

	public double computePower() {
		// return ramSize multiplied by processorSpeed
		return this.ramSize * this.processorSpeed;

	}

	public double getProcessorSpeed() {
		return processorSpeed;
	}

	public int getRamSize() {
		return ramSize;
	}

	public Computer(String manufacturer, String processor, int ramSize,
double processorSpeed) {

		this.manufacturer = manufacturer;
		this.processor = processor;
		this.ramSize = ramSize;
		this.processorSpeed = processorSpeed;
	}

}
package Problem6;

class Person implements Cloneable {
	String name;
	Computer computer;

	public Person(String name, Computer computer) {
		super();
		this.name = name;
		this.computer = computer;
	}

	public Object clone() {

		try {
			Person obj = (Person) super.clone();
			return obj;
		} catch (CloneNotSupportedException ex) {
			System.out.println("Fail on cloning");
		}
		return null;
	}

}

package Problem6;

public class Solution6 {
	public static void main(String[] args) {

		Computer computer = new Computer("Asus", "x3120", 1024, 3200);
		Person federico = new Person("Federico", computer);

		Person leonardo = federico;

		Person francisco = (Person) federico.clone();
		//// the same addres on memory
		System.out.println("Leonardo and federicho has a pointer to same
adddres ");
		System.out.println(leonardo);
		leonardo.name = "lernardo";

		System.out.println(leonardo.hashCode());
```

```
                System.out.println(federico.hashCode());

                System.out.println(leonardo);
                System.out.print("Who is federico ? ---- >");
                System.out.println(federico);

                System.out.println("the next example , francisco has a new addres
");
                ///
                System.out.println(francisco.hashCode());
                System.out.println("Francisco is a diferent object on meomry the
values are the same , but the memory pointer is other");
        }

}
```



```
        leonardo.name = "lernardo";

        System.out.println(leonardo.hashCode());
```

```
<terminated> Solution6 [Java Application] C:\Program Files\Java\jre1.8.0_60\bin\javaw.exe (5 jun. 2018 14:06:07)
Leonardo and federicho has a pointer to same adddres
Person >>>>> name=Federico, computer=Current Status of Computer [manufacturer=Asus, processor=x3120, ramSize=1024, processorSpeed=3200.0]<<<<<
1550089733
1550089733
Person >>>>> name=lernardo, computer=Current Status of Computer [manufacturer=Asus, processor=x3120, ramSize=1024, processorSpeed=3200.0]<<<<<
Who is federico ? ---- >Person >>>>> name=lernardo, computer=Current Status of Computer [manufacturer=Asus, processor=x3120, ramSize=1024, proc
the next example , francisco has a new addres
865113938
Francisco is a diferent object on meomry the values are the same , but the memory pointer is other
```