NAME- Harshita Totala ROLL NO- SEITA14 DIV- IT A
SUBJECT- Object Oriented Programming

ASSIGNMENT NO: 3

Problem Statement: -

Design and develop inheritance for a given case study, identify objects and relationships and implement inheritance wherever applicable. Employee class with Emp_name, Emp_id, Address, Mail_id, and Mobile_no as members. Inherit the classes, Programmer, Team Lead, Assistant Project Manager and Project Manager from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.

Objectives:

1) To Study Inheritance and its types
2) To implement inheritance using OOP language

Theory:- Inheritance:

Different kinds of objects often have a certain amount in common with each other. Mountain bikes, road bikes, and tandem bikes, for example, all share the characteristics of bicycles (current speed, current pedal cadence, current gear). Yet each also defines additional features that make them different: tandem bicycles have two seats and two sets of handlebars; road bikes have drop handlebars; some mountain bikes have an additional chain ring, giving them a lower gear ratio.

Object-oriented programming allows classes to inherit commonly used state and behavior from other classes. In this example, Bicycle now becomes the superclass of MountainBike, RoadBike, and TandemBike. In the Java programming language, each class is allowed to have one direct superclass, and each superclass has the potential for an unlimited number of subclasses:

The syntax for creating a subclass is simple. At the beginning of your class declaration, use the extends keyword, followed by the name of the class to inherit from:

```
class MountainBike extends Bicycle {

// new fields and methods defining

// a mountain bike would go here

}
```

This gives MountainBike all the same fields and methods as Bicycle, yet allows its code to focus exclusively on the features that make it unique. This makes code for your subclasses easy to read. However, you must take care to properly document the state and behavior that each superclass defines, since that code will not appear in the source file of each subclass.

❖ **Single Inheritance:** When a class extends another one class only then we call it a single inheritance. The below flow diagram shows that class B extends only one class which is A. Here A is a parent class of B and B would be a child class of A.

❖ Multiple Inheritance: It refers to the concept of one class extending (Or inherits) more than one base class. The inheritance we learnt earlier had the concept of one base class or parent. The problem with “multiple inheritance” is that the derived class will have to manage the dependency on two base classes.

❖ Multilevel Inheritance: Multilevel inheritance refers to a mechanism in OO technology where one can inherit from a derived class, thereby making this derived class the base class for the new class. As you can see in below flow diagram C is subclass or child class of B and B is a child class of A.

❖ Hierarchical Inheritance: In such kind of inheritance one class is inherited by many sub classes. In below example class B,C and D inherits the same class A. A is parent class (or base class) of B,C & D.

❖ Hybrid Inheritance :In simple terms you can say that Hybrid inheritance is a combination of Single and Multiple inheritance. A typical flow diagram would look like below. A hybrid inheritance can be achieved in the java in a same way as multiple inheritance can be!! Using interfaces. yes you heard it right. By using interfaces you can have multiple as well as hybrid inheritance in Java.

Steps :

1. Start
2. Create the class Employee with name, Empid, address, mailid, mobileno as data members.
3. Inherit the classes Programmer, Team Lead, Assistant Project Manager and Project Manager from employee class.
4. Add Basic Pay (BP) as the member of all the inherited classes.
5. Calculate DA as 97% of BP, HRA as 10% of BP, PF as 12% of BP, Staff club fund as 0.1% of BP.
6. Calculate gross salary and net salary.
7. Generate payslip for all categories of employees.
8. Create the objects for the inherited classes and invoke the necessary methods to display the Payslip
9. Stop

Input:

Empid, address, mailid, mobileno, Basic Pay (BP) **Output:**

gross and net salary slip

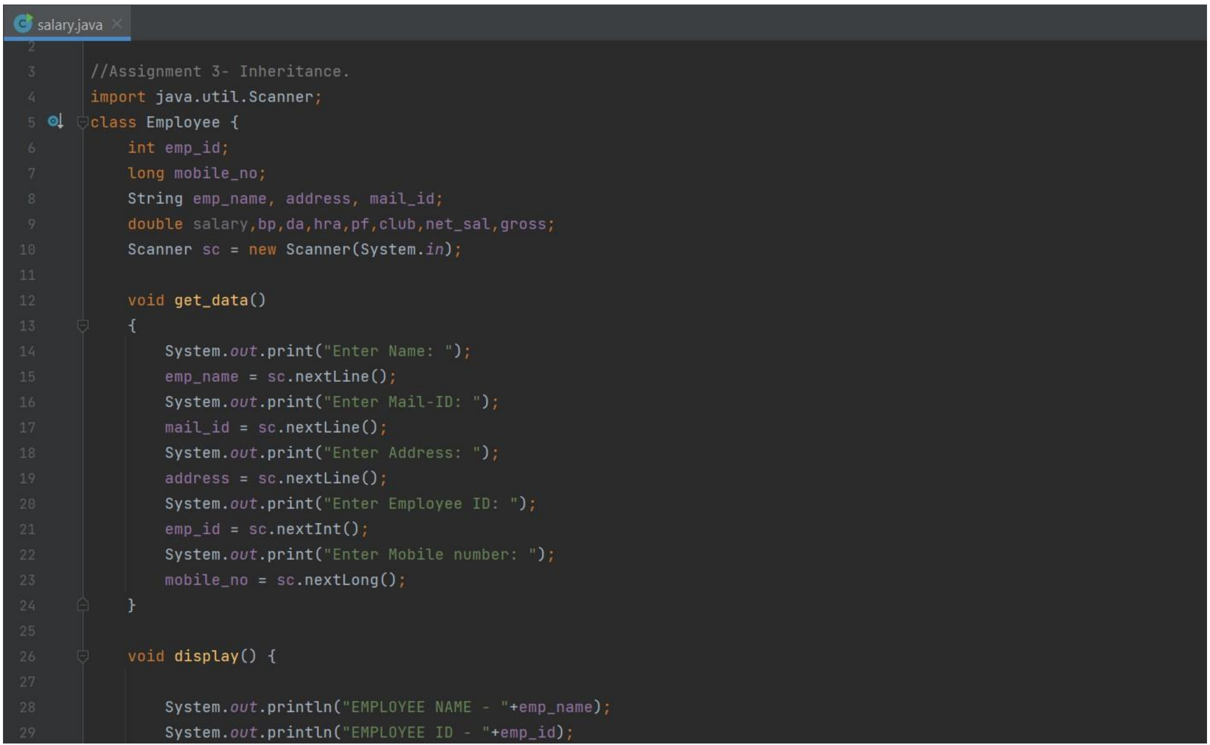
Implementation: -

```
class Employee {
```

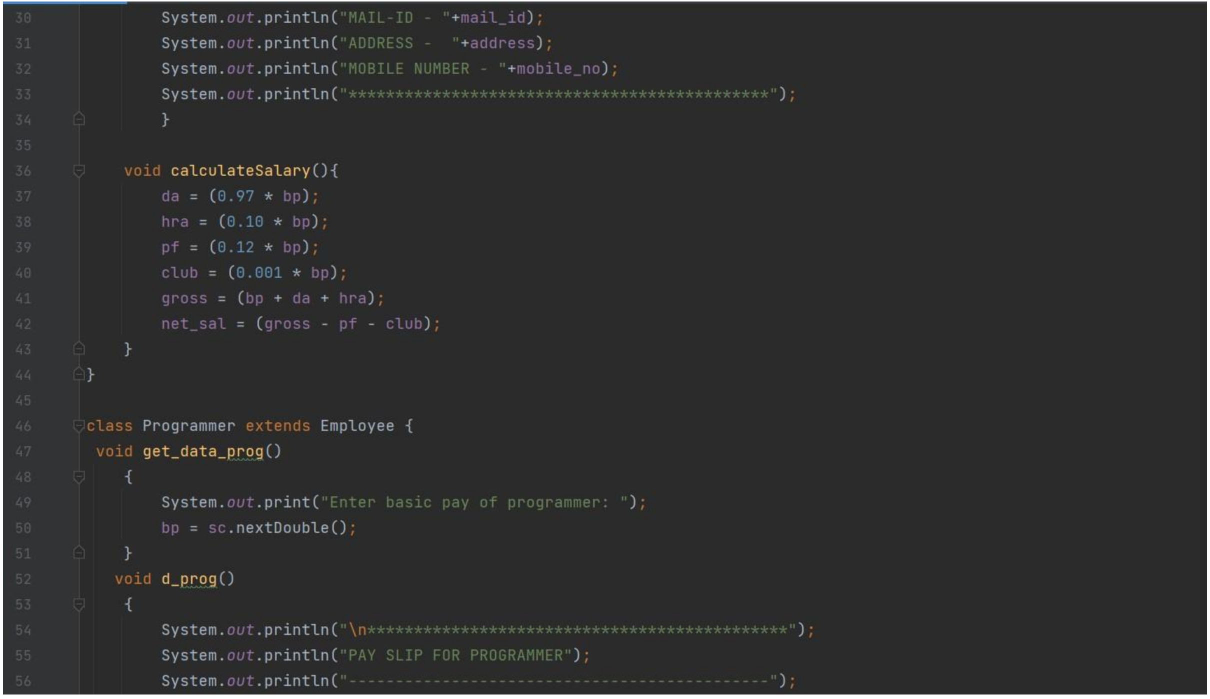
```
int empid;  long
mobile;
String name, address, mailid;
void getdata() { ----}  void
display() { -----}
}
class Programmer extends Employee {
double salary,bp,da,hra,pf,club,net,gross;
void getasst() { ---}  void calculateasst() {
---}
}
class TeamLead extends Employee {
---
}
class AssistantProjectManager extends Employee {
---
}
class Project Manager extends Employee {
---
}
class Salary {  public static void
main(String args[]) { ----}}
```

Program

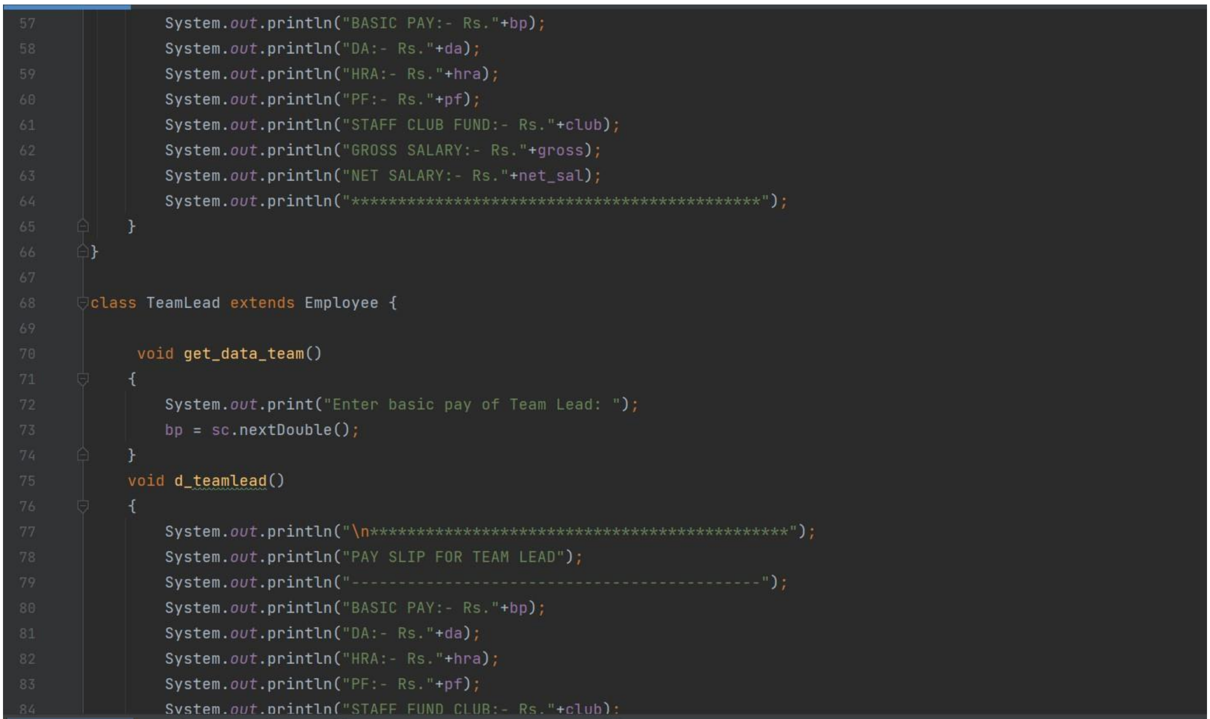
```
import java.util.Scanner;
class Employee {     int
emp_id;     long
mobile_no;
   String emp_name, address, mail_id;
double salary,bp,da,hra,pf,club,net_sal,gross;
   Scanner sc = new Scanner(System.in);

   void get_data()
   {
      System.out.print("Enter Name: ");
emp_name = sc.nextLine();
System.out.print("Enter Mail-ID: ");        mail_id
= sc.nextLine();
        System.out.print("Enter Address: ");
address = sc.nextLine();
        System.out.print("Enter Employee ID: ");
emp_id = sc.nextInt();
        System.out.print("Enter Mobile number: ");
mobile_no = sc.nextLong();
    }

    void display() {

        System.out.println("EMPLOYEE NAME - "+emp_name);
        System.out.println("EMPLOYEE ID - "+emp_id);
        System.out.println("MAIL-ID - "+mail_id);
        System.out.println("ADDRESS -  "+address);
        System.out.println("MOBILE NUMBER - "+mobile_no);
        System.out.println("*******************************************");
        }

    void calculateSalary(){
da = (0.97 * bp);        hra =
(0.10 * bp);        pf = (0.12 * bp);
club = (0.001 * bp);        gross =
(bp + da + hra);        net_sal =
(gross - pf - club);
    }
}

class Programmer extends Employee {
 void get_data_prog()
    {
        System.out.print("Enter basic pay of programmer: ");
bp = sc.nextDouble();
    }
   void d_prog()
    {
        System.out.println("\n*******************************************");
        System.out.println("PAY SLIP FOR PROGRAMMER");
        System.out.println("-------------------------------------------");
System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF CLUB FUND:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("******************************************");
    }
}

class TeamLead extends Employee {
     void get_data_team()
    {
        System.out.print("Enter basic pay of Team Lead: ");
bp = sc.nextDouble();
    }
    void d_teamlead()
    {
        System.out.println("\n*********************************************");
        System.out.println("PAY SLIP FOR TEAM LEAD");
        System.out.println("--------------------------------------------");
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF FUND CLUB:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("*******************************************");
    }
}

class Assistant_ProjectManager extends Employee {
 void get_data_asst()
    {
        System.out.print("Enter basic pay of Assistant Project Manager: ");
bp = sc.nextDouble();
    }
    void d_asst()
    {
        System.out.println("\n*********************************************");
        System.out.println("PAY SLIP FOR ASSISTANT PROJECT MANAGER");
        System.out.println("----------------------------------------------");
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF FUND CLUB:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("***********************************************");
    }

}

class Project_Manager extends Employee {

   void get_data_project()
    {
        System.out.print("Enter basic pay of project manager: ");
bp = sc.nextDouble();
    }
    void d_project()
    {
        System.out.println("\n*******************************************");
        System.out.println("PAY SLIP FOR PROJECT MANAGER");
        System.out.println("-------------------------------------------");
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF FUND CLUB:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("*******************************************");

    }
}


public class salary {     public static void
main(String[] args) {         Scanner sc = new
Scanner(System.in);         int choice;
        do {
            System.out.println("\n--PAYROLL--");
            System.out.println(" 1) PROGRAMMER\n 2) TEAMLEAD\n 3) ASSISTANT
PROJECT MANAGER\n 4) PROJECT MANAGER\n 5) EXIT\n");
            System.out.print("Enter your choice: ");
            choice = sc.nextInt();

            switch (choice) {
                case
1:
                    Programmer p = new Programmer();
p.get_data();
                    p.get_data_prog();
                    p.calculateSalary();
                    p.d_prog();
                    p.display();
break;
                case
2:
                    TeamLead t = new TeamLead();
t.get_data();
                    t.get_data_team();
                    t.calculateSalary();
                    t.d_teamlead();
                    t.display();
break;
                case
3:
                    Assistant_ProjectManager apm = new Assistant_ProjectManager();
apm.get_data();                    apm.get_data_asst();
apm.calculateSalary();                    apm.d_asst();                     apm.display();
break;
            case
4:
              Project_Manager pm = new Project_Manager();
pm.get_data();                  pm.get_data_project();
pm.calculateSalary();                  pm.d_project();
pm.display();                  break;
            case
5:
              System.out.println("\nPROGRAM EXITED !");
break;

default:
              System.out.println("\nPlease Enter a valid choice !!");
        }

     }while (choice != 5) ;

   }
}
```



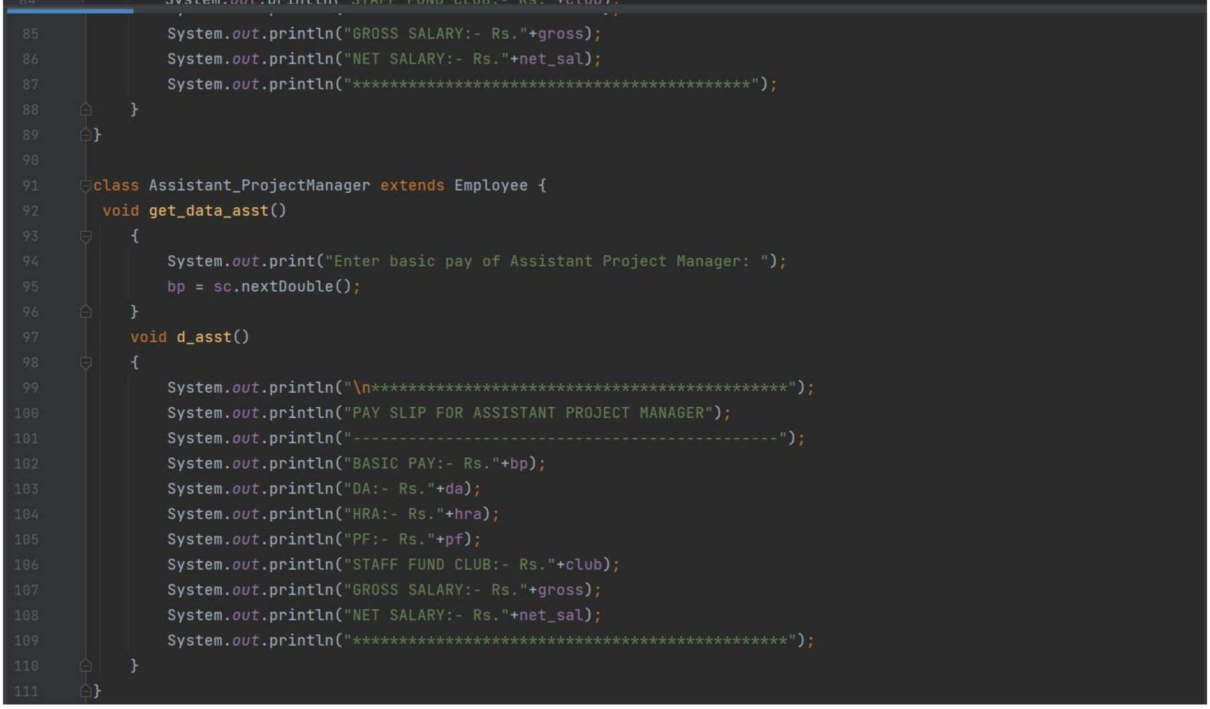
```java

//Assignment 3- Inheritance.
import java.util.Scanner;
class Employee {
    int emp_id;
    long mobile_no;
    String emp_name, address, mail_id;
    double salary,bp,da,hra,pf,club,net_sal,gross;
    Scanner sc = new Scanner(System.in);

    void get_data()
    {
        System.out.print("Enter Name: ");
        emp_name = sc.nextLine();
        System.out.print("Enter Mail-ID: ");
        mail_id = sc.nextLine();
        System.out.print("Enter Address: ");
        address = sc.nextLine();
        System.out.print("Enter Employee ID: ");
        emp_id = sc.nextInt();
        System.out.print("Enter Mobile number: ");
        mobile_no = sc.nextLong();
    }

    void display() {

        System.out.println("EMPLOYEE NAME - "+emp_name);
        System.out.println("EMPLOYEE ID - "+emp_id);
```



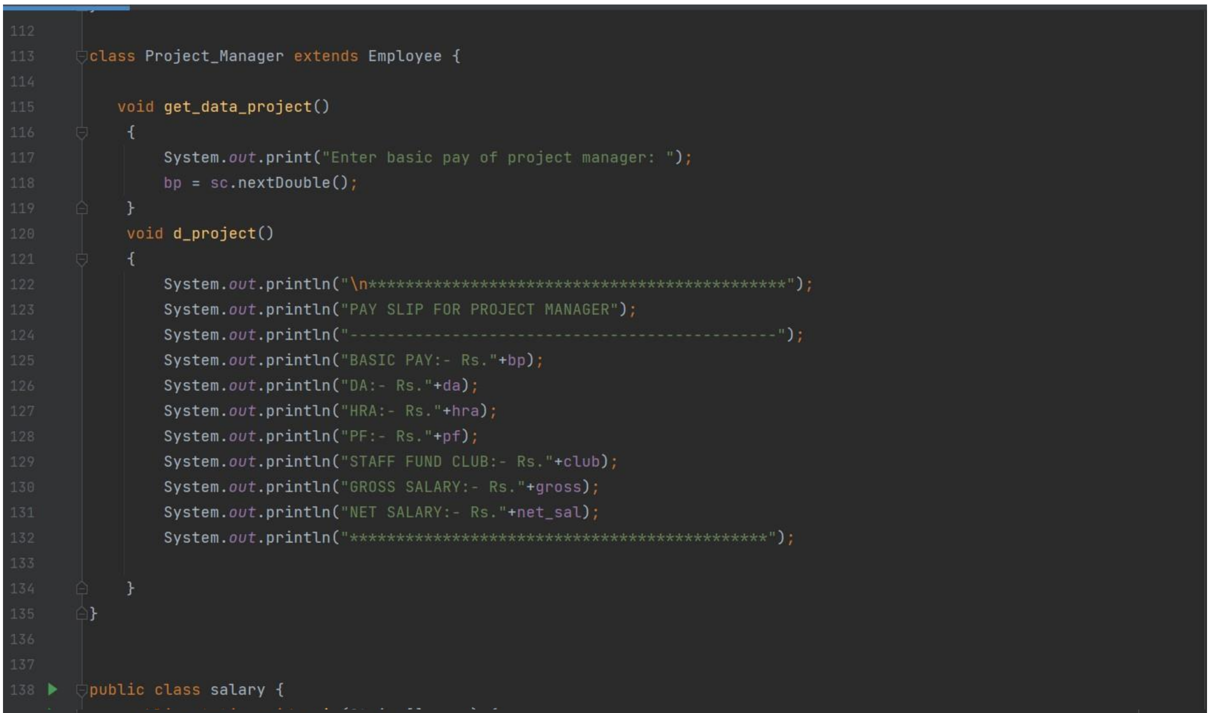
```java
        System.out.println("MAIL-ID - "+mail_id);
        System.out.println("ADDRESS -  "+address);
        System.out.println("MOBILE NUMBER - "+mobile_no);
        System.out.println("**********************************************");
        }

    void calculateSalary(){
        da = (0.97 * bp);
        hra = (0.10 * bp);
        pf = (0.12 * bp);
        club = (0.001 * bp);
        gross = (bp + da + hra);
        net_sal = (gross - pf - club);
    }
}

class Programmer extends Employee {
 void get_data_prog()
    {
        System.out.print("Enter basic pay of programmer: ");
        bp = sc.nextDouble();
    }
   void d_prog()
    {
        System.out.println("\n**********************************************");
        System.out.println("PAY SLIP FOR PROGRAMMER");
        System.out.println("----------------------------------------------");
```



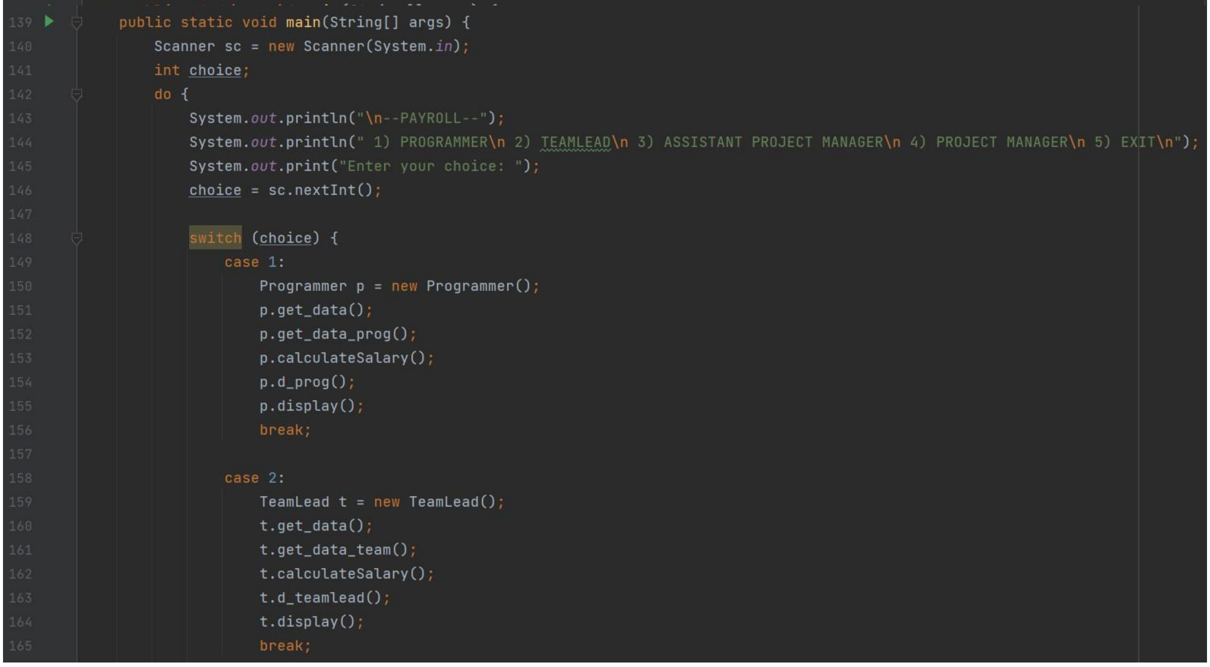
```
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF CLUB FUND:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("********************************************");
    }
}

class TeamLead extends Employee {

     void get_data_team()
    {
        System.out.print("Enter basic pay of Team Lead: ");
        bp = sc.nextDouble();
    }
    void d_teamlead()
    {
        System.out.println("\n*********************************************");
        System.out.println("PAY SLIP FOR TEAM LEAD");
        System.out.println("--------------------------------------------");
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF FUND CLUB:- Rs."+club);
```



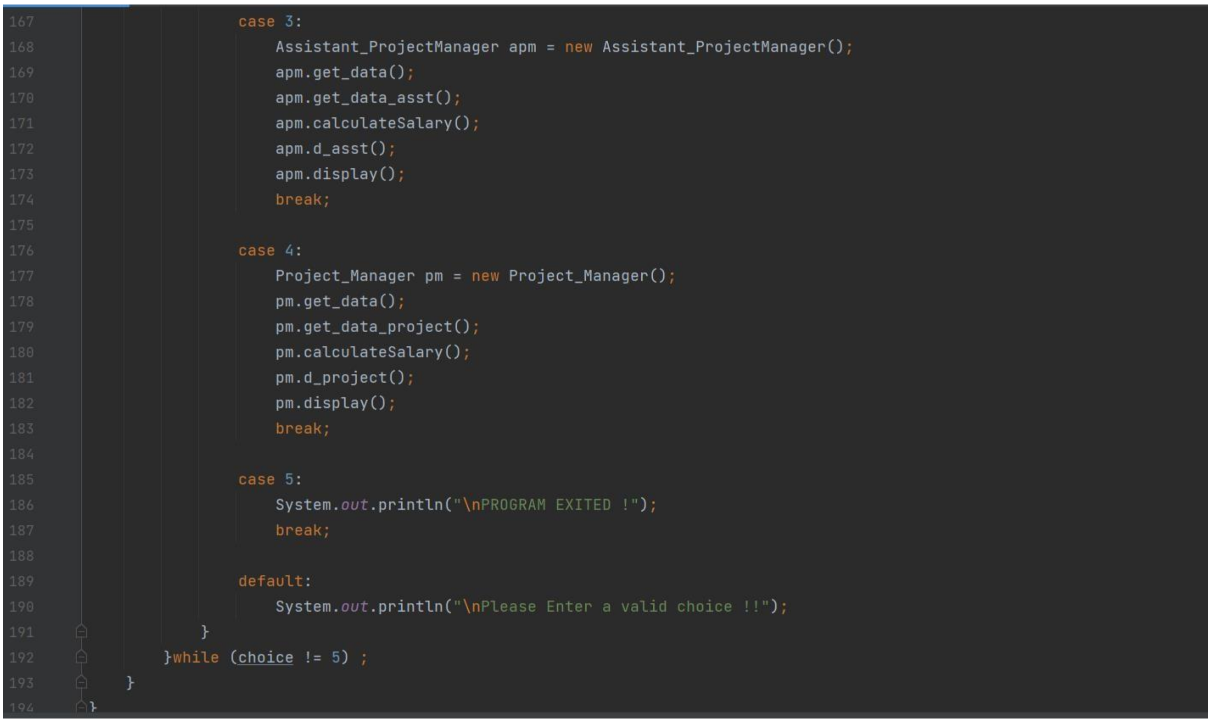
```
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("*******************************************");
    }
}

class Assistant_ProjectManager extends Employee {
 void get_data_asst()
    {
        System.out.print("Enter basic pay of Assistant Project Manager: ");
        bp = sc.nextDouble();
    }
    void d_asst()
    {
        System.out.println("\n*********************************************");
        System.out.println("PAY SLIP FOR ASSISTANT PROJECT MANAGER");
        System.out.println("-----------------------------------------------");
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF FUND CLUB:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("***********************************************");
    }
}
```



```java

class Project_Manager extends Employee {

   void get_data_project()
    {
        System.out.print("Enter basic pay of project manager: ");
        bp = sc.nextDouble();
    }
    void d_project()
    {
        System.out.println("\n*********************************************");
        System.out.println("PAY SLIP FOR PROJECT MANAGER");
        System.out.println("----------------------------------------------");
        System.out.println("BASIC PAY:- Rs."+bp);
        System.out.println("DA:- Rs."+da);
        System.out.println("HRA:- Rs."+hra);
        System.out.println("PF:- Rs."+pf);
        System.out.println("STAFF FUND CLUB:- Rs."+club);
        System.out.println("GROSS SALARY:- Rs."+gross);
        System.out.println("NET SALARY:- Rs."+net_sal);
        System.out.println("*********************************************");

    }
}


public class salary {
```

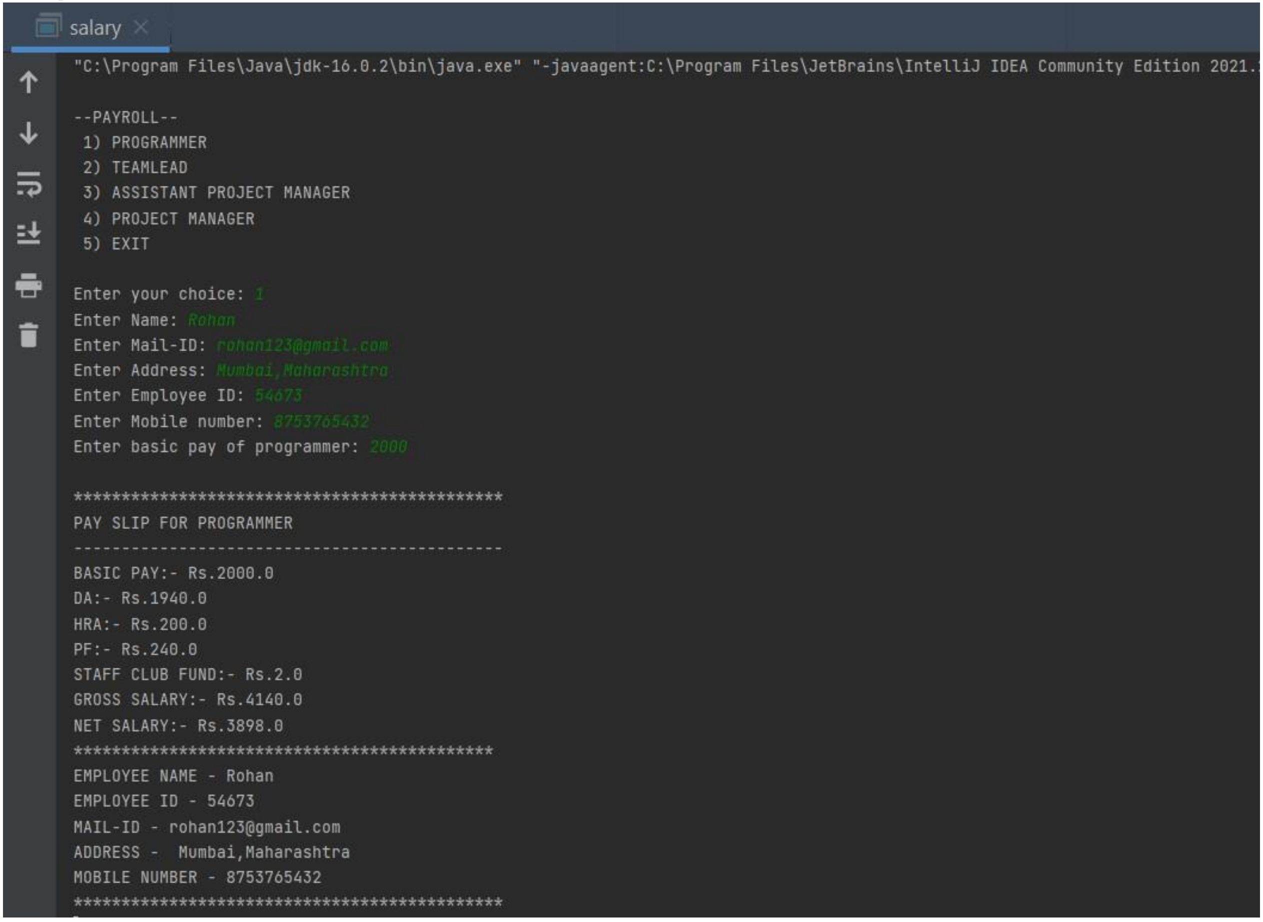


```java
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int choice;
        do {
            System.out.println("\n--PAYROLL--");
            System.out.println(" 1) PROGRAMMER\n 2) TEAMLEAD\n 3) ASSISTANT PROJECT MANAGER\n 4) PROJECT MANAGER\n 5) EXIT\n");
            System.out.print("Enter your choice: ");
            choice = sc.nextInt();

            switch (choice) {
                case 1:
                    Programmer p = new Programmer();
                    p.get_data();
                    p.get_data_prog();
                    p.calculateSalary();
                    p.d_prog();
                    p.display();
                    break;

                case 2:
                    TeamLead t = new TeamLead();
                    t.get_data();
                    t.get_data_team();
                    t.calculateSalary();
                    t.d_teamlead();
                    t.display();
                    break;
```

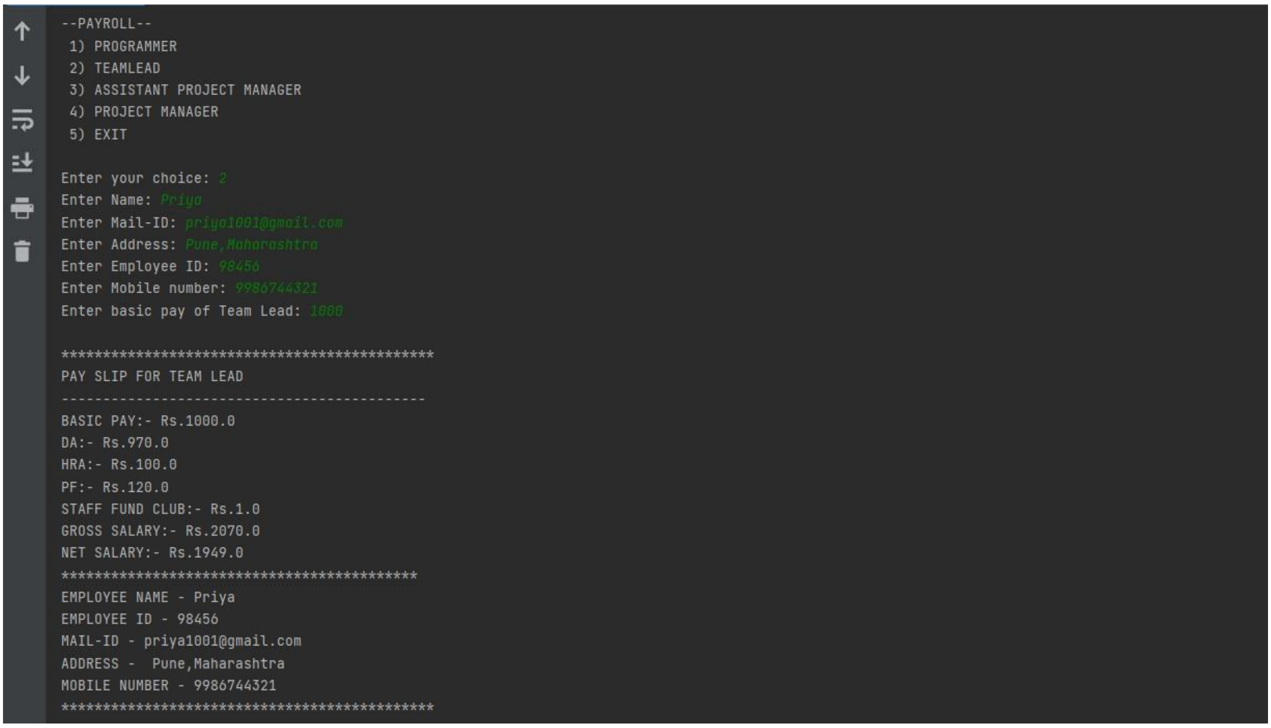


```java
                case 3:
                    Assistant_ProjectManager apm = new Assistant_ProjectManager();
                    apm.get_data();
                    apm.get_data_asst();
                    apm.calculateSalary();
                    apm.d_asst();
                    apm.display();
                    break;

                case 4:
                    Project_Manager pm = new Project_Manager();
                    pm.get_data();
                    pm.get_data_project();
                    pm.calculateSalary();
                    pm.d_project();
                    pm.display();
                    break;

                case 5:
                    System.out.println("\nPROGRAM EXITED !");
                    break;

                default:
                    System.out.println("\nPlease Enter a valid choice !!");
            }
        }while (choice != 5) ;
    }
}
```

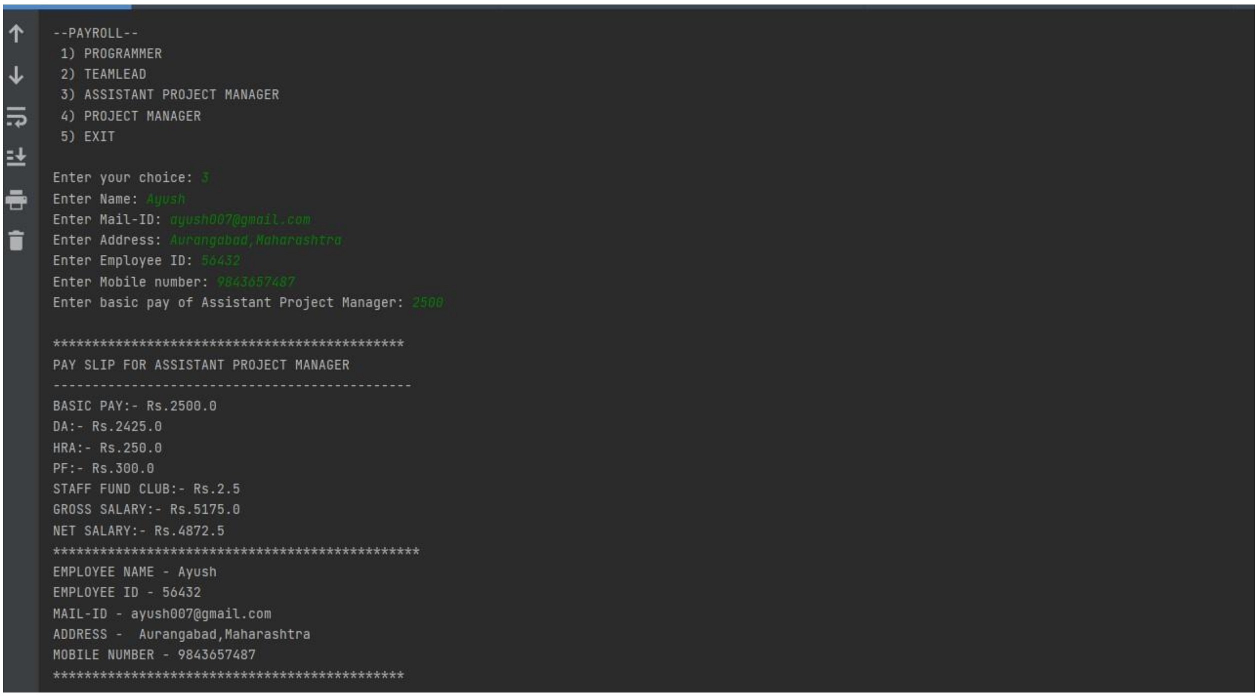
Output-



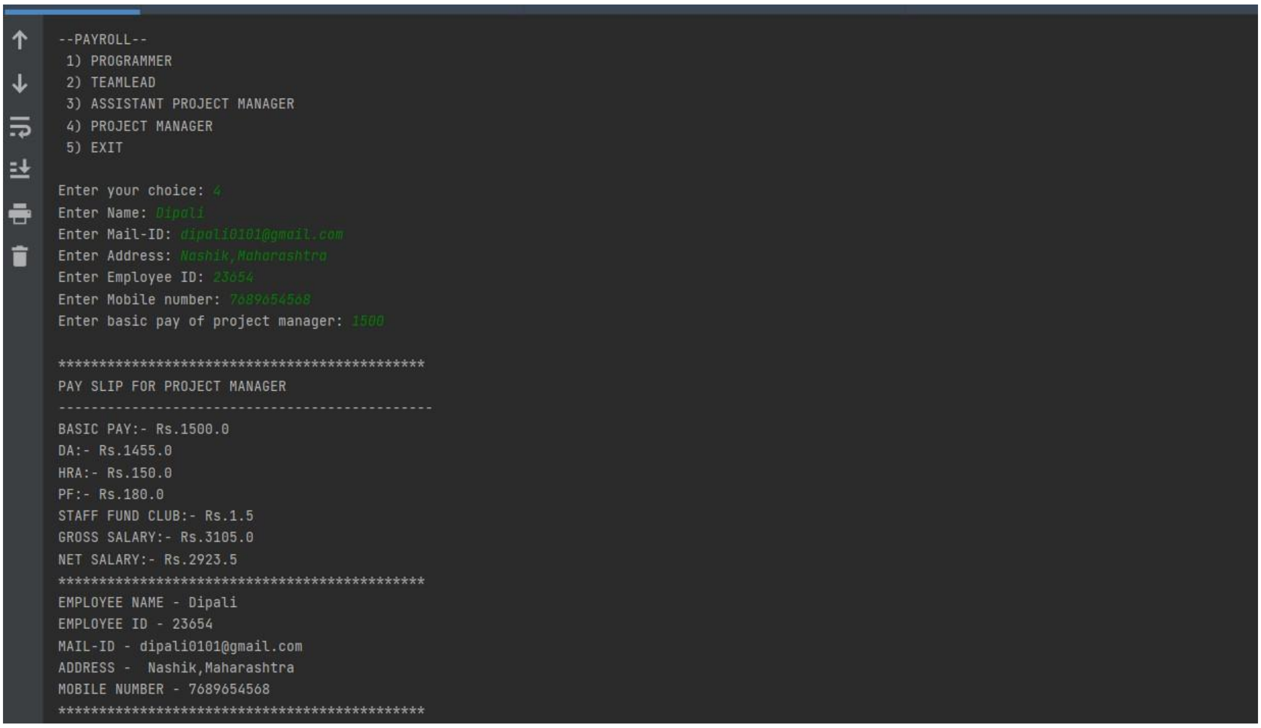
```
"C:\Program Files\Java\jdk-16.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.

--PAYROLL--
 1) PROGRAMMER
 2) TEAMLEAD
 3) ASSISTANT PROJECT MANAGER
 4) PROJECT MANAGER
 5) EXIT

Enter your choice: 1
Enter Name: Rohan
Enter Mail-ID: rohan123@gmail.com
Enter Address: Mumbai,Maharashtra
Enter Employee ID: 54673
Enter Mobile number: 8753765432
Enter basic pay of programmer: 2000

*********************************************
PAY SLIP FOR PROGRAMMER
---------------------------------------------
BASIC PAY:- Rs.2000.0
DA:- Rs.1940.0
HRA:- Rs.200.0
PF:- Rs.240.0
STAFF CLUB FUND:- Rs.2.0
GROSS SALARY:- Rs.4140.0
NET SALARY:- Rs.3898.0
********************************************
EMPLOYEE NAME - Rohan
EMPLOYEE ID - 54673
MAIL-ID - rohan123@gmail.com
ADDRESS -  Mumbai,Maharashtra
MOBILE NUMBER - 8753765432
*********************************************
```



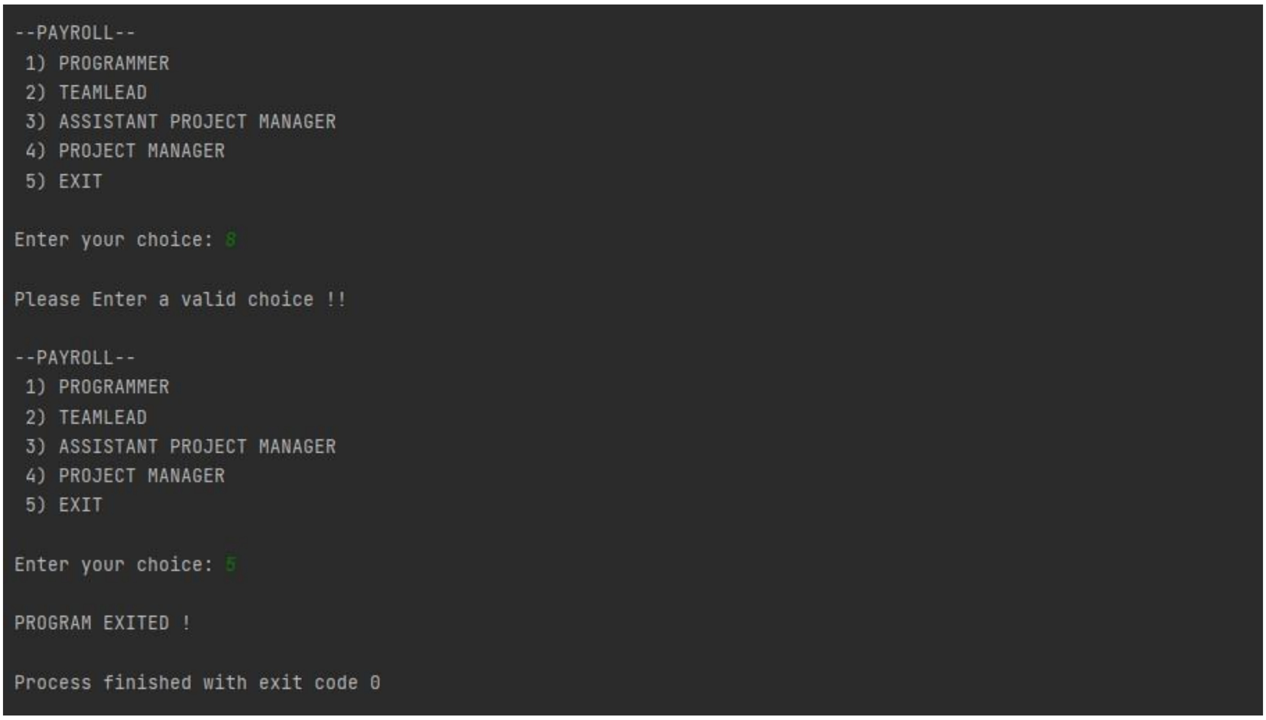
```
--PAYROLL--
 1) PROGRAMMER
 2) TEAMLEAD
 3) ASSISTANT PROJECT MANAGER
 4) PROJECT MANAGER
 5) EXIT

Enter your choice: 2
Enter Name: Priya
Enter Mail-ID: priya1001@gmail.com
Enter Address: Pune,Maharashtra
Enter Employee ID: 98456
Enter Mobile number: 9986744321
Enter basic pay of Team Lead: 1000

*********************************************
PAY SLIP FOR TEAM LEAD
--------------------------------------------
BASIC PAY:- Rs.1000.0
DA:- Rs.970.0
HRA:- Rs.100.0
PF:- Rs.120.0
STAFF FUND CLUB:- Rs.1.0
GROSS SALARY:- Rs.2070.0
NET SALARY:- Rs.1949.0
*******************************************
EMPLOYEE NAME - Priya
EMPLOYEE ID - 98456
MAIL-ID - priya1001@gmail.com
ADDRESS -  Pune,Maharashtra
MOBILE NUMBER - 9986744321
*********************************************
```



```
--PAYROLL--
 1) PROGRAMMER
 2) TEAMLEAD
 3) ASSISTANT PROJECT MANAGER
 4) PROJECT MANAGER
 5) EXIT

Enter your choice: 3
Enter Name: Ayush
Enter Mail-ID: ayush007@gmail.com
Enter Address: Aurangabad,Maharashtra
Enter Employee ID: 56432
Enter Mobile number: 9843657487
Enter basic pay of Assistant Project Manager: 2500

*********************************************
PAY SLIP FOR ASSISTANT PROJECT MANAGER
----------------------------------------------
BASIC PAY:- Rs.2500.0
DA:- Rs.2425.0
HRA:- Rs.250.0
PF:- Rs.300.0
STAFF FUND CLUB:- Rs.2.5
GROSS SALARY:- Rs.5175.0
NET SALARY:- Rs.4872.5
***********************************************
EMPLOYEE NAME - Ayush
EMPLOYEE ID - 56432
MAIL-ID - ayush007@gmail.com
ADDRESS -  Aurangabad,Maharashtra
MOBILE NUMBER - 9843657487
*********************************************
```



```
--PAYROLL--
 1) PROGRAMMER
 2) TEAMLEAD
 3) ASSISTANT PROJECT MANAGER
 4) PROJECT MANAGER
 5) EXIT

Enter your choice: 4
Enter Name: Dipali
Enter Mail-ID: dipali0101@gmail.com
Enter Address: Nashik,Maharashtra
Enter Employee ID: 23654
Enter Mobile number: 7689654568
Enter basic pay of project manager: 1500

*********************************************
PAY SLIP FOR PROJECT MANAGER
----------------------------------------------
BASIC PAY:- Rs.1500.0
DA:- Rs.1455.0
HRA:- Rs.150.0
PF:- Rs.180.0
STAFF FUND CLUB:- Rs.1.5
GROSS SALARY:- Rs.3105.0
NET SALARY:- Rs.2923.5
*********************************************
EMPLOYEE NAME - Dipali
EMPLOYEE ID - 23654
MAIL-ID - dipali0101@gmail.com
ADDRESS -  Nashik,Maharashtra
MOBILE NUMBER - 7689654568
*********************************************
```



```
--PAYROLL--
 1) PROGRAMMER
 2) TEAMLEAD
 3) ASSISTANT PROJECT MANAGER
 4) PROJECT MANAGER
 5) EXIT

Enter your choice: 8

Please Enter a valid choice !!

--PAYROLL--
 1) PROGRAMMER
 2) TEAMLEAD
 3) ASSISTANT PROJECT MANAGER
 4) PROJECT MANAGER
 5) EXIT

Enter your choice: 5

PROGRAM EXITED !

Process finished with exit code 0
```

Conclusion- Hence, we have studied the concept of Inheritance and its types.