B.Sc in CSE

SST, Bangladesh Open University

CSE21P8 Assignment-II

Elementary Programs with Java

Submitted By	Submitted To
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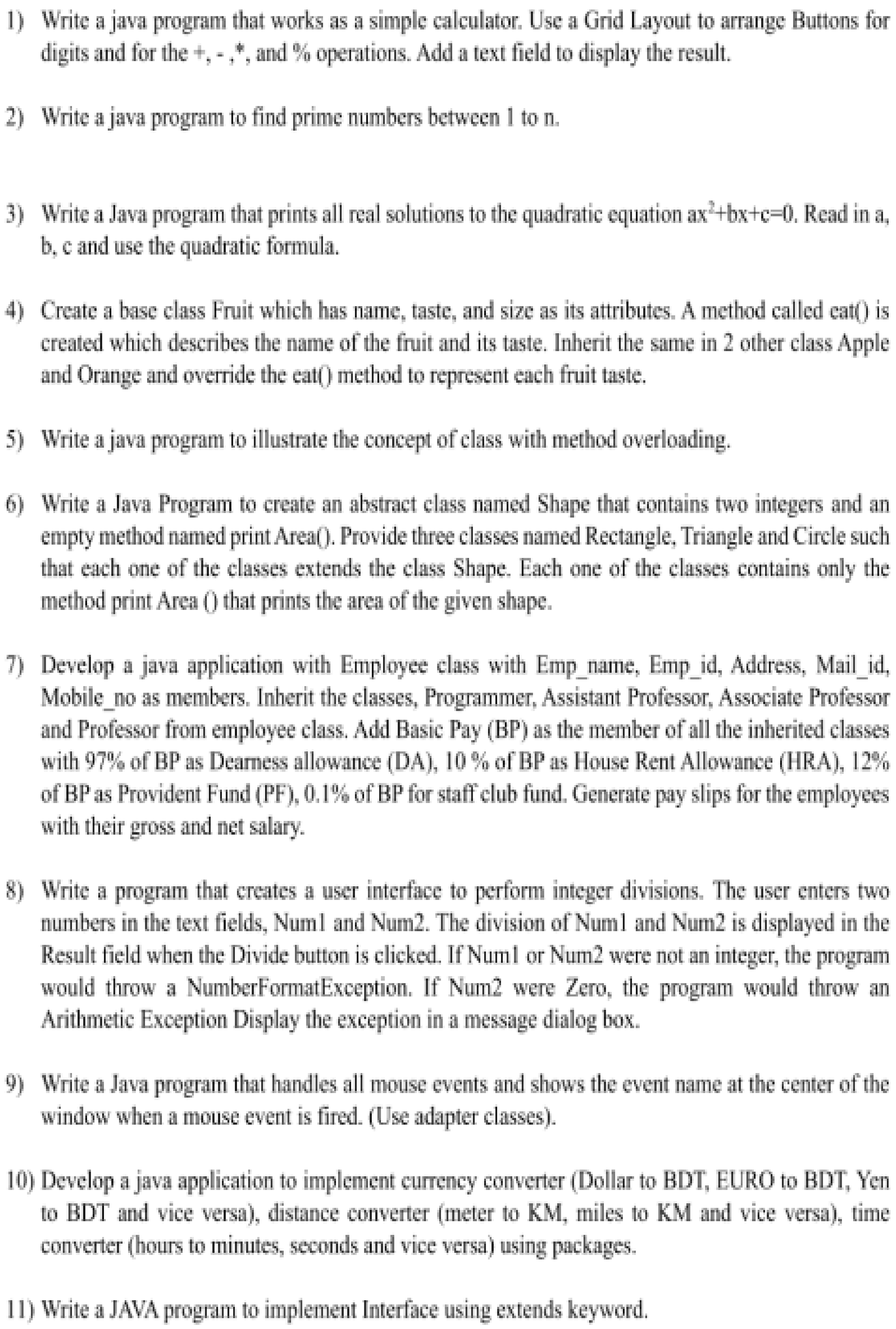
Date of Submission: 29 Dec 23

Question



1) Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the +, - ,*, and % operations. Add a text field to display the result.

2) Write a java program to find prime numbers between 1 to n.

3) Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.

4) Create a base class Fruit which has name, taste, and size as its attributes. A method called eat() is created which describes the name of the fruit and its taste. Inherit the same in 2 other class Apple and Orange and override the eat() method to represent each fruit taste.

5) Write a java program to illustrate the concept of class with method overloading.

6) Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

7) Develop a java application with Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as Dearness allowance (DA), 10 % of BP as House Rent Allowance (HRA), 12% of BP as Provident Fund (PF), 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.

8) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

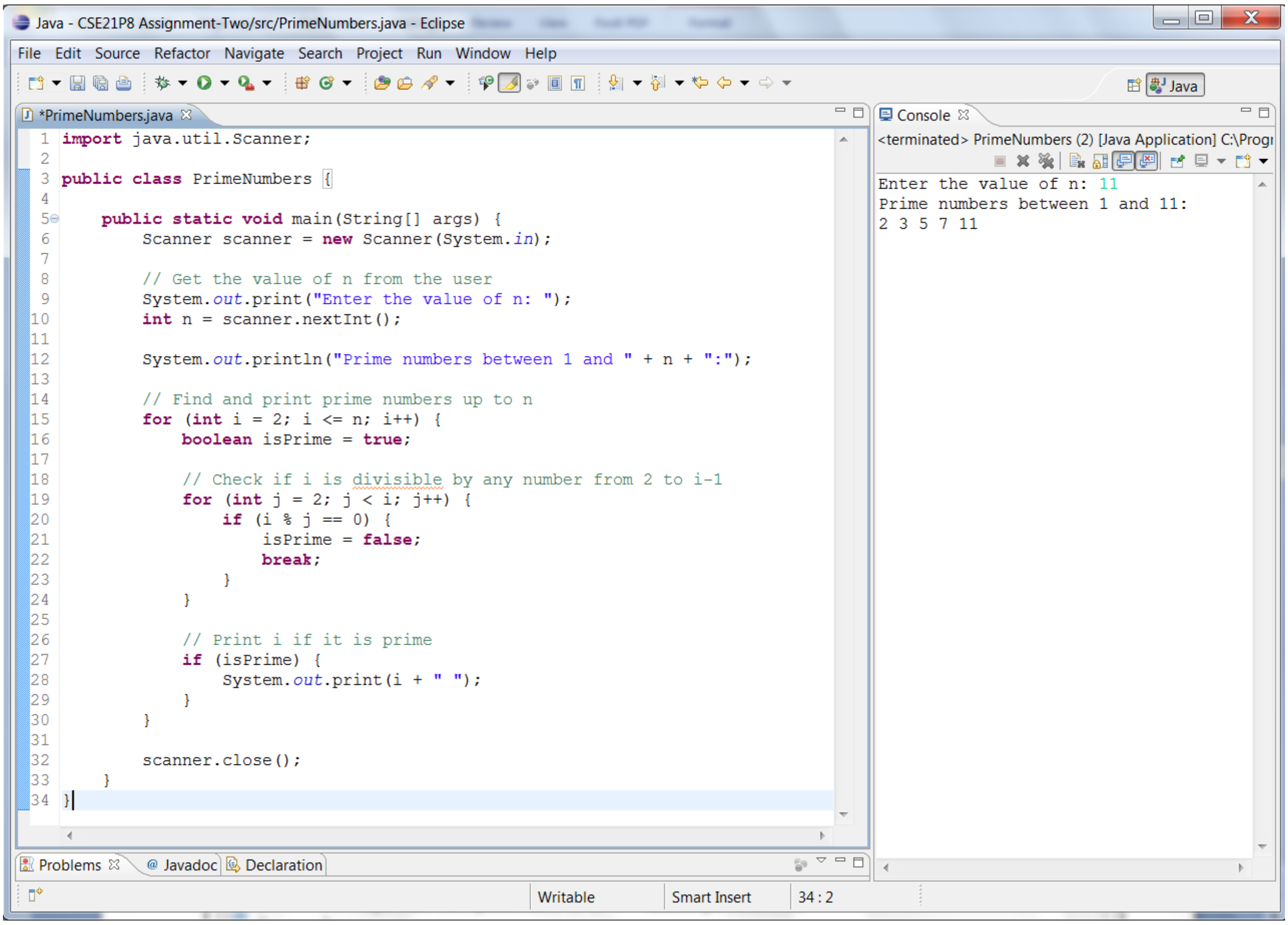
9) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).

10) Develop a java application to implement currency converter (Dollar to BDT, EURO to BDT, Yen to BDT and vice versa), distance converter (meter to KM, miles to KM and vice versa), time converter (hours to minutes, seconds and vice versa) using packages.

11) Write a JAVA program to implement Interface using extends keyword.

Answer

2. Prime Numbers


Java - CSE21P8 Assignment-Two/src/PrimeNumbers.java - Eclipse
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Java
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Console
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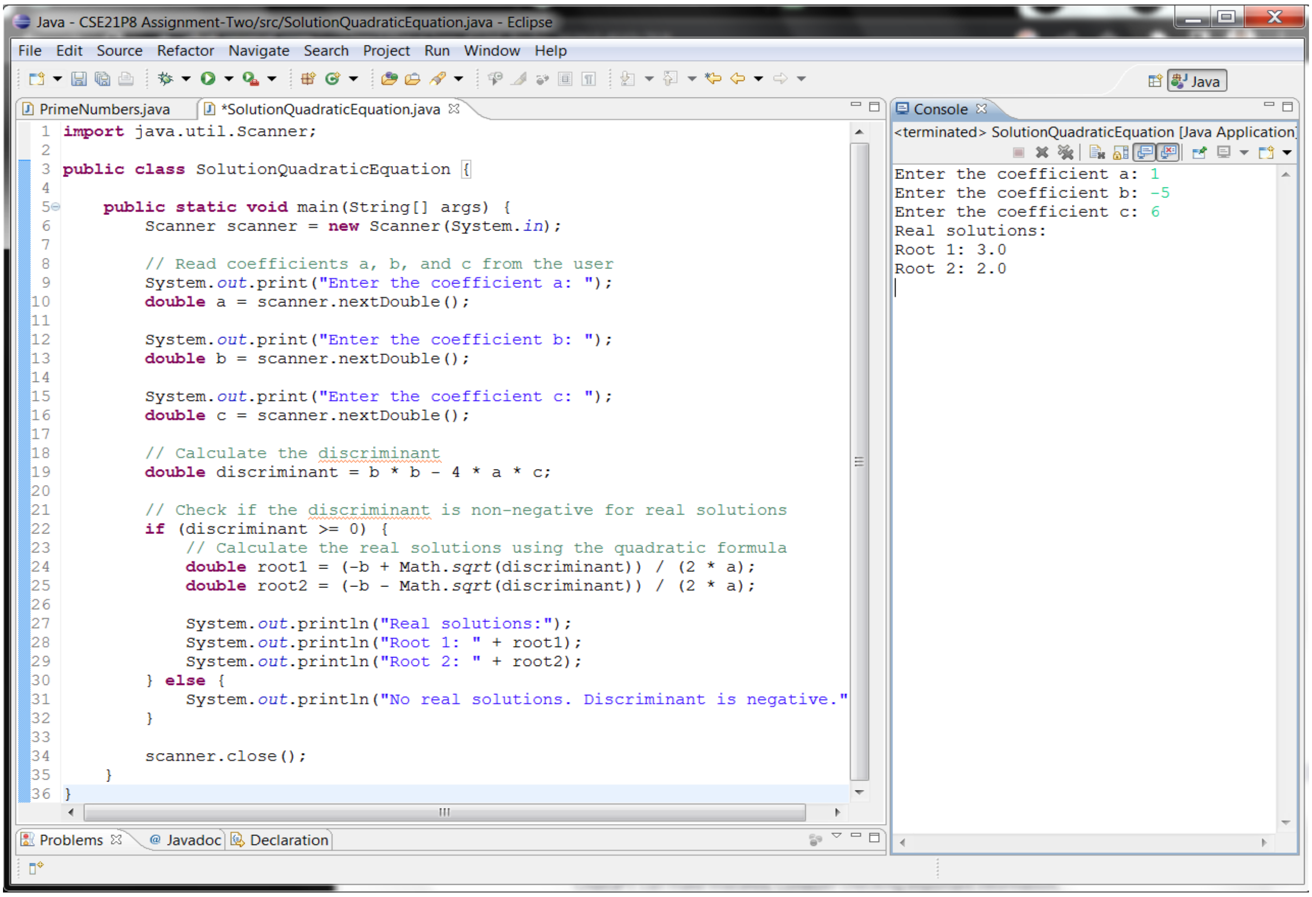
```java
import java.util.Scanner;

public class PrimeNumbers {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Get the value of n from the user
        System.out.print("Enter the value of n: ");
        int n = scanner.nextInt();

        System.out.println("Prime numbers between 1 and " + n + ":");

        // Find and print prime numbers up to n
        for (int i = 2; i <= n; i++) {
            boolean isPrime = true;

            // Check if i is divisible by any number from 2 to i-1
            for (int j = 2; j < i; j++) {
                if (i % j == 0) {
                    isPrime = false;
                    break;
                }
            }

            // Print i if it is prime
            if (isPrime) {
                System.out.print(i + " ");
            }
        }

        scanner.close();
    }
}
```

```
Enter the value of n: 11
Prime numbers between 1 and 11:
2 3 5 7 11
```

3. Quadratic Equation Solution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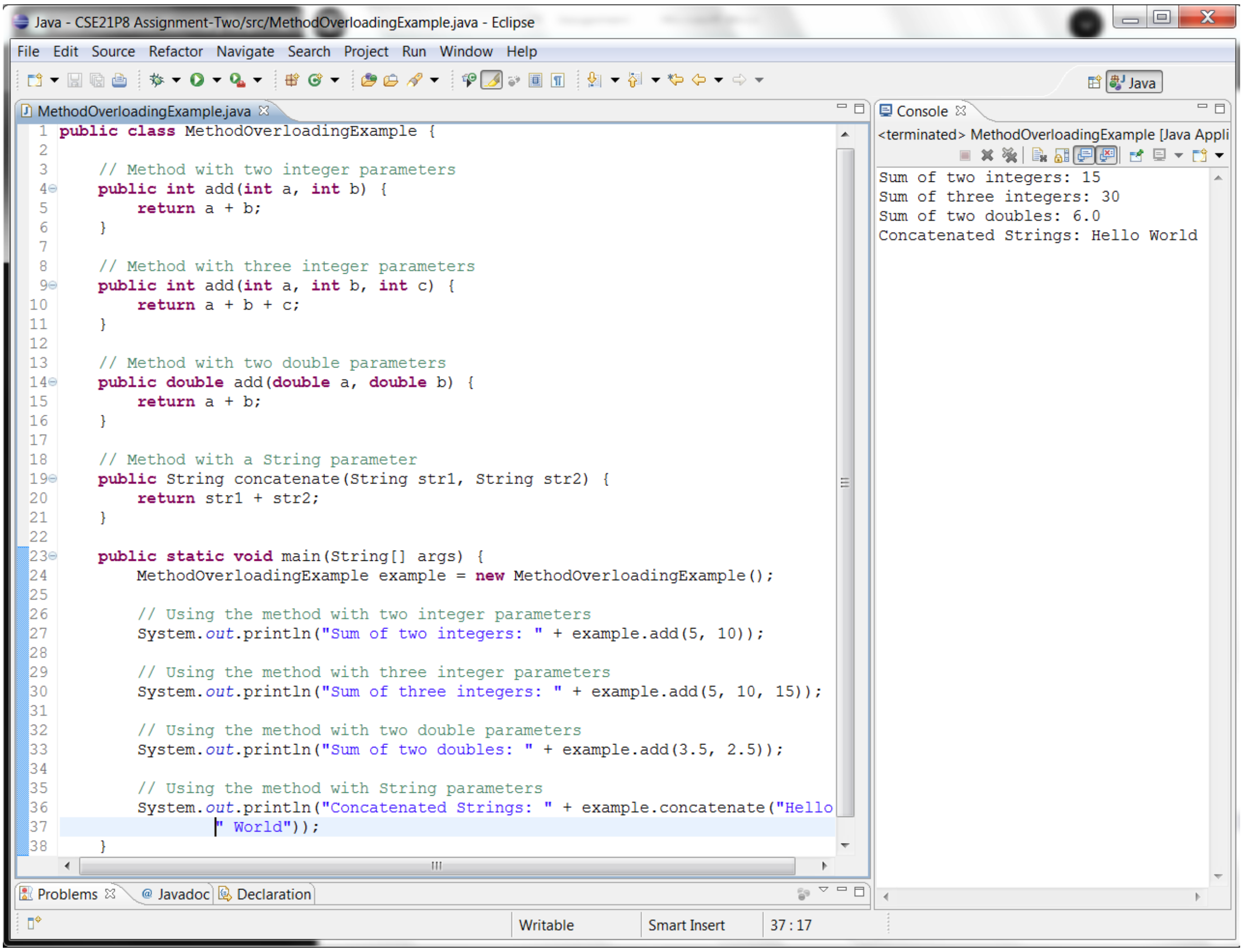
Declaration

```java
import java.util.Scanner;

public class SolutionQuadraticEquation {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Read coefficients a, b, and c from the user
        System.out.print("Enter the coefficient a: ");
        double a = scanner.nextDouble();

        System.out.print("Enter the coefficient b: ");
        double b = scanner.nextDouble();

        System.out.print("Enter the coefficient c: ");
        double c = scanner.nextDouble();

        // Calculate the discriminant
        double discriminant = b * b - 4 * a * c;

        // Check if the discriminant is non-negative for real solutions
        if (discriminant >= 0) {
            // Calculate the real solutions using the quadratic formula
            double root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
            double root2 = (-b - Math.sqrt(discriminant)) / (2 * a);

            System.out.println("Real solutions:");
            System.out.println("Root 1: " + root1);
            System.out.println("Root 2: " + root2);
        } else {
            System.out.println("No real solutions. Discriminant is negative."
        }

        scanner.close();
    }
}
```

```
Enter the coefficient a: 1
Enter the coefficient b: -5
Enter the coefficient c: 6
Real solutions:
Root 1: 3.0
Root 2: 2.0
```

5. Method Overloading Example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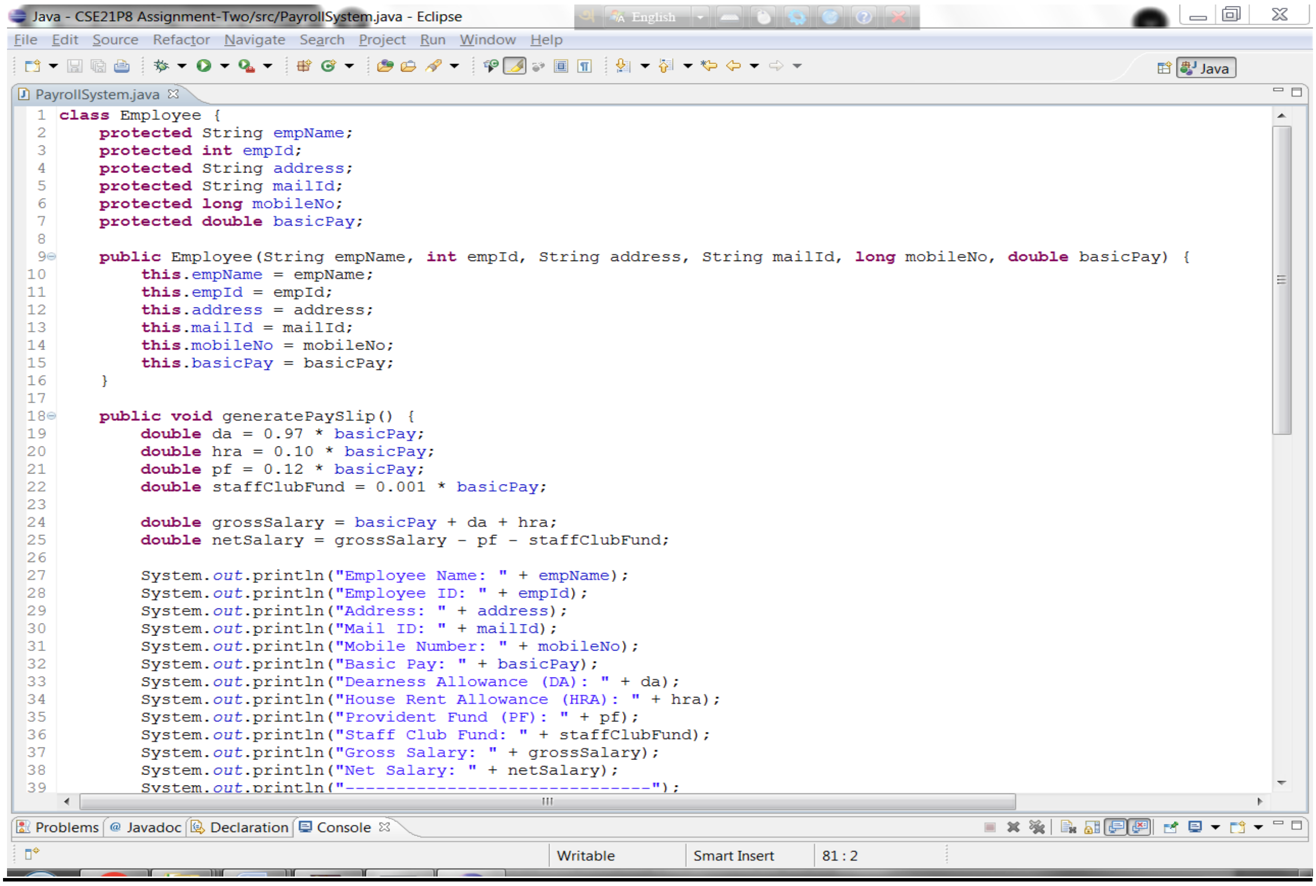
```java
public class MethodOverloadingExample {

    // Method with two integer parameters
    public int add(int a, int b) {
        return a + b;
    }

    // Method with three integer parameters
    public int add(int a, int b, int c) {
        return a + b + c;
    }

    // Method with two double parameters
    public double add(double a, double b) {
        return a + b;
    }

    // Method with a String parameter
    public String concatenate(String str1, String str2) {
        return str1 + str2;
    }

    public static void main(String[] args) {
        MethodOverloadingExample example = new MethodOverloadingExample();

        // Using the method with two integer parameters
        System.out.println("Sum of two integers: " + example.add(5, 10));

        // Using the method with three integer parameters
        System.out.println("Sum of three integers: " + example.add(5, 10, 15));

        // Using the method with two double parameters
        System.out.println("Sum of two doubles: " + example.add(3.5, 2.5));

        // Using the method with String parameters
        System.out.println("Concatenated Strings: " + example.concatenate("Hello
                " World"));
    }
```

```
Sum of two integers: 15
Sum of three integers: 30
Sum of two doubles: 6.0
Concatenated Strings: Hello World
```

7. Generate Pay Slip


Java - CSE21P8 Assignment-Two/src/PayrollSystem.java - Eclipse
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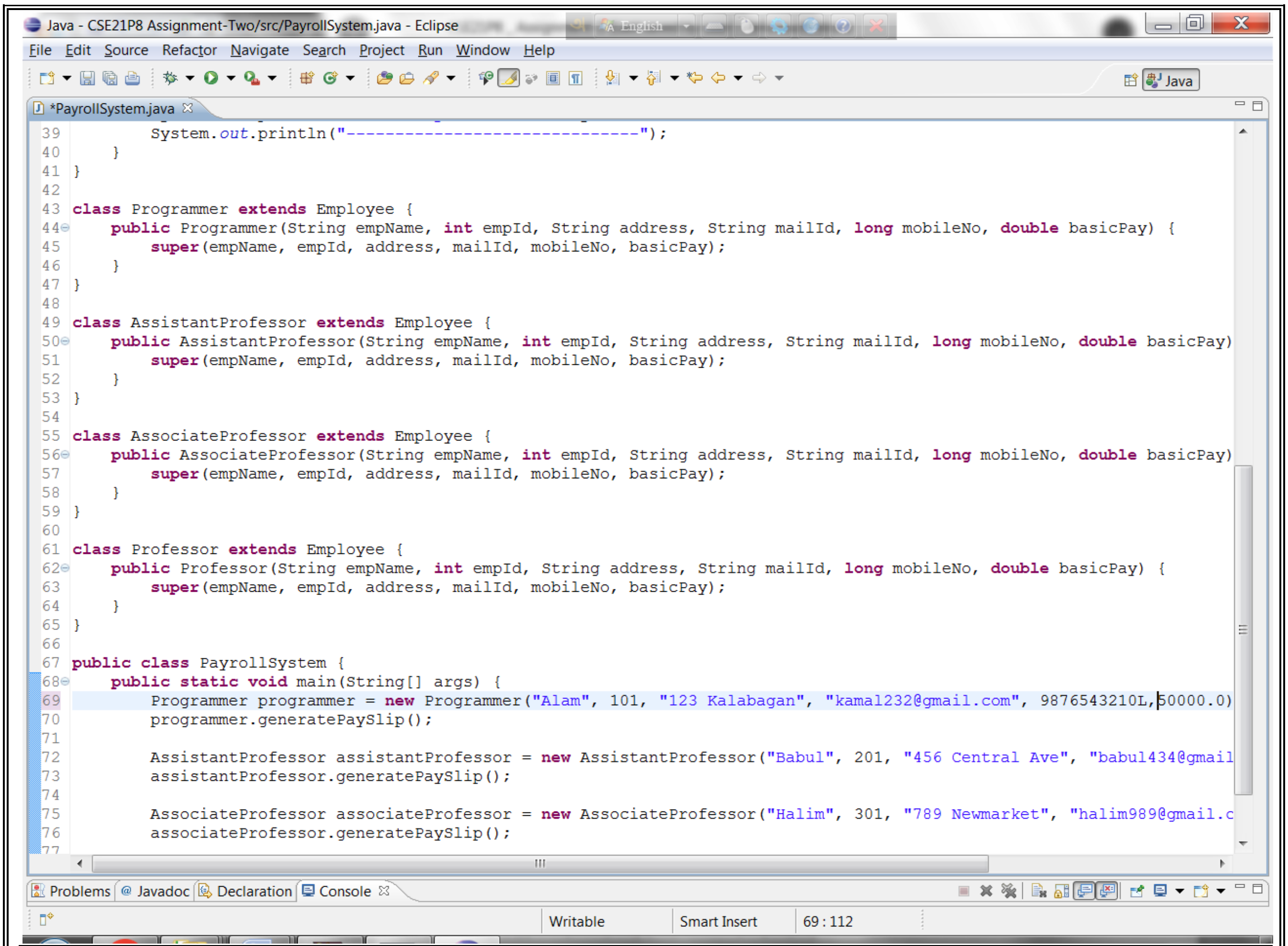
```java
class Employee {
    protected String empName;
    protected int empId;
    protected String address;
    protected String mailId;
    protected long mobileNo;
    protected double basicPay;

    public Employee(String empName, int empId, String address, String mailId, long mobileNo, double basicPay) {
        this.empName = empName;
        this.empId = empId;
        this.address = address;
        this.mailId = mailId;
        this.mobileNo = mobileNo;
        this.basicPay = basicPay;
    }

    public void generatePaySlip() {
        double da = 0.97 * basicPay;
        double hra = 0.10 * basicPay;
        double pf = 0.12 * basicPay;
        double staffClubFund = 0.001 * basicPay;

        double grossSalary = basicPay + da + hra;
        double netSalary = grossSalary - pf - staffClubFund;

        System.out.println("Employee Name: " + empName);
        System.out.println("Employee ID: " + empId);
        System.out.println("Address: " + address);
        System.out.println("Mail ID: " + mailId);
        System.out.println("Mobile Number: " + mobileNo);
        System.out.println("Basic Pay: " + basicPay);
        System.out.println("Dearness Allowance (DA): " + da);
        System.out.println("House Rent Allowance (HRA): " + hra);
        System.out.println("Provident Fund (PF): " + pf);
        System.out.println("Staff Club Fund: " + staffClubFund);
        System.out.println("Gross Salary: " + grossSalary);
        System.out.println("Net Salary: " + netSalary);
        System.out.println("------------------------------");
```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Java
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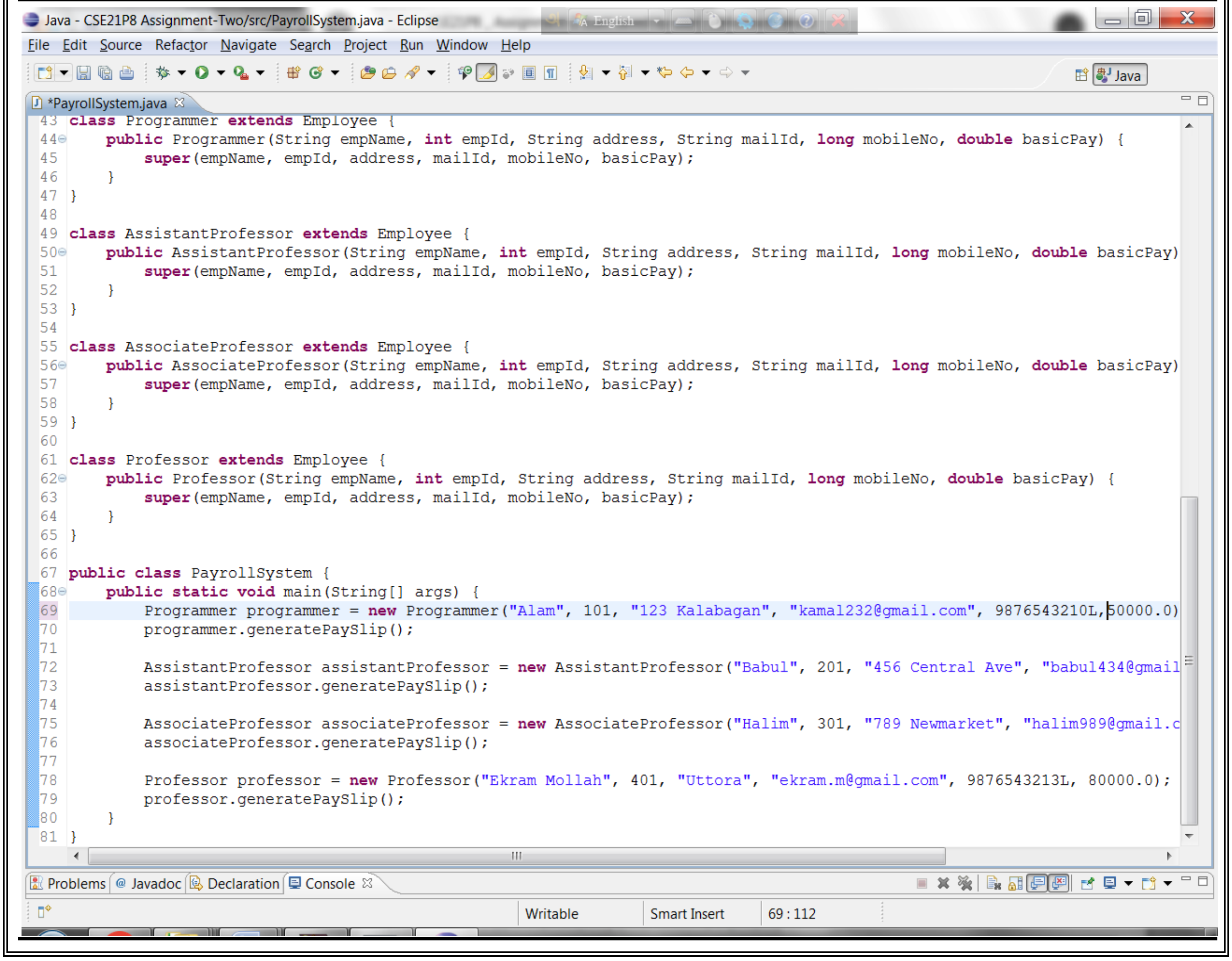
```
        System.out.println("-------------------------------");
    }
}

class Programmer extends Employee {
    public Programmer(String empName, int empId, String address, String mailId, long mobileNo, double basicPay) {
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

class AssistantProfessor extends Employee {
    public AssistantProfessor(String empName, int empId, String address, String mailId, long mobileNo, double basicPay)
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

class AssociateProfessor extends Employee {
    public AssociateProfessor(String empName, int empId, String address, String mailId, long mobileNo, double basicPay)
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

class Professor extends Employee {
    public Professor(String empName, int empId, String address, String mailId, long mobileNo, double basicPay) {
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

public class PayrollSystem {
    public static void main(String[] args) {
        Programmer programmer = new Programmer("Alam", 101, "123 Kalabagan", "kamal232@gmail.com", 9876543210L,50000.0)
        programmer.generatePaySlip();

        AssistantProfessor assistantProfessor = new AssistantProfessor("Babul", 201, "456 Central Ave", "babul434@gmail
        assistantProfessor.generatePaySlip();

        AssociateProfessor associateProfessor = new AssociateProfessor("Halim", 301, "789 Newmarket", "halim989@gmail.c
        associateProfessor.generatePaySlip();
```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Java
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Console
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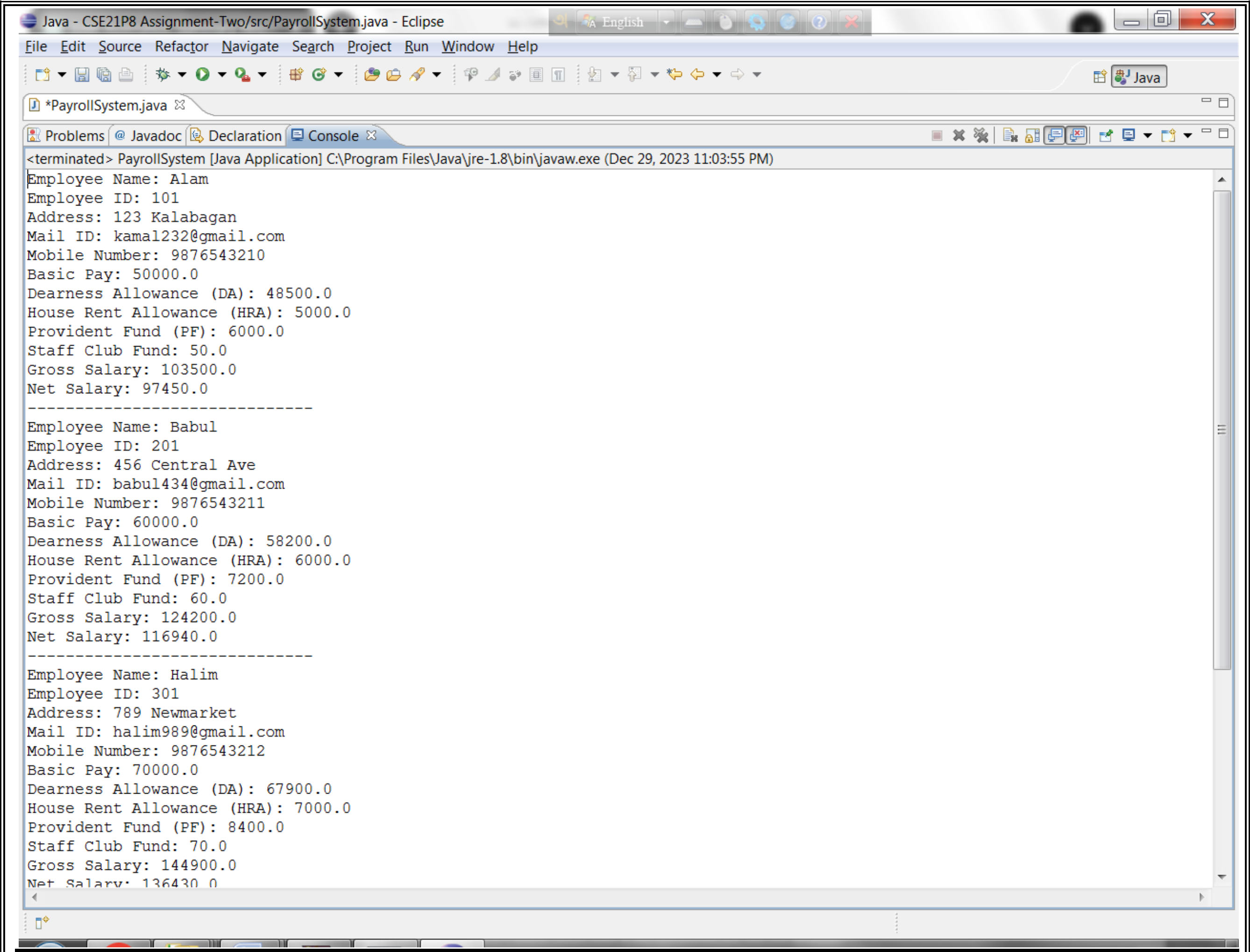
```
class Programmer extends Employee {
    public Programmer(String empName, int empId, String address, String mailId, long mobileNo, double basicPay) {
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

class AssistantProfessor extends Employee {
    public AssistantProfessor(String empName, int empId, String address, String mailId, long mobileNo, double basicPay)
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

class AssociateProfessor extends Employee {
    public AssociateProfessor(String empName, int empId, String address, String mailId, long mobileNo, double basicPay)
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

class Professor extends Employee {
    public Professor(String empName, int empId, String address, String mailId, long mobileNo, double basicPay) {
        super(empName, empId, address, mailId, mobileNo, basicPay);
    }
}

public class PayrollSystem {
    public static void main(String[] args) {
        Programmer programmer = new Programmer("Alam", 101, "123 Kalabagan", "kamal232@gmail.com", 9876543210L,50000.0)
        programmer.generatePaySlip();

        AssistantProfessor assistantProfessor = new AssistantProfessor("Babul", 201, "456 Central Ave", "babul434@gmail
        assistantProfessor.generatePaySlip();

        AssociateProfessor associateProfessor = new AssociateProfessor("Halim", 301, "789 Newmarket", "halim989@gmail.c
        associateProfessor.generatePaySlip();
```

```

        Professor professor = new Professor("Ekram Mollah", 401, "Uttora", "ekram.m@gmail.com", 9876543213L, 80000.0);
        professor.generatePaySlip();
    }
}
```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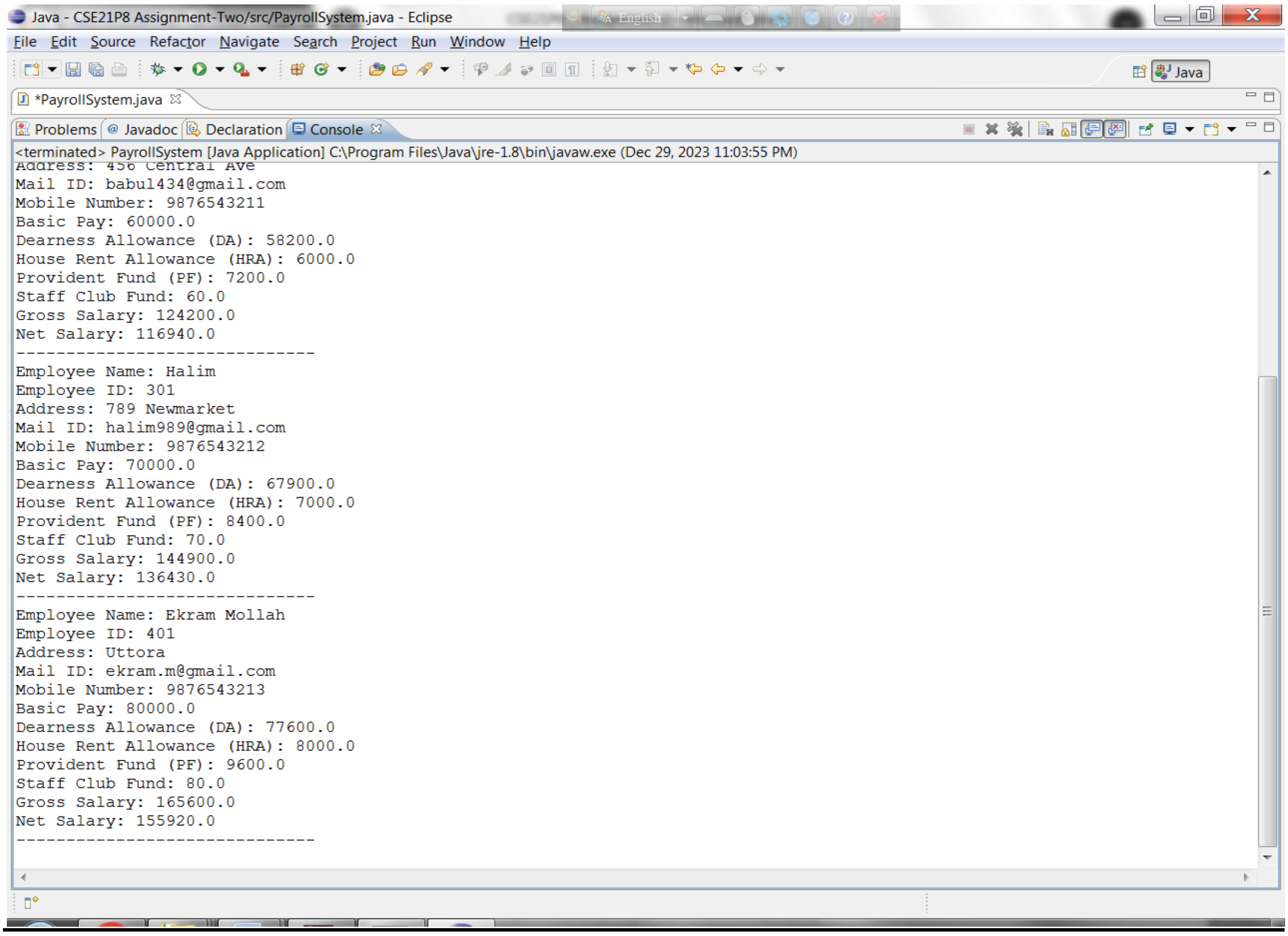
<terminated> PayrollSystem [Java Application] C:\Program Files\Java\jre-1.8\bin\javaw.exe (Dec 29, 2023 11:03:55 PM)

```
Employee Name: Alam
Employee ID: 101
Address: 123 Kalabagan
Mail ID: kamal232@gmail.com
Mobile Number: 9876543210
Basic Pay: 50000.0
Dearness Allowance (DA): 48500.0
House Rent Allowance (HRA): 5000.0
Provident Fund (PF): 6000.0
Staff Club Fund: 50.0
Gross Salary: 103500.0
Net Salary: 97450.0
------------------------------
Employee Name: Babul
Employee ID: 201
Address: 456 Central Ave
Mail ID: babul434@gmail.com
Mobile Number: 9876543211
Basic Pay: 60000.0
Dearness Allowance (DA): 58200.0
House Rent Allowance (HRA): 6000.0
Provident Fund (PF): 7200.0
Staff Club Fund: 60.0
Gross Salary: 124200.0
Net Salary: 116940.0
------------------------------
Employee Name: Halim
Employee ID: 301
Address: 789 Newmarket
Mail ID: halim989@gmail.com
Mobile Number: 9876543212
Basic Pay: 70000.0
Dearness Allowance (DA): 67900.0
House Rent Allowance (HRA): 7000.0
Provident Fund (PF): 8400.0
Staff Club Fund: 70.0
Gross Salary: 144900.0
Net Salary: 136430.0
```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<terminated> PayrollSystem [Java Application] C:\Program Files\Java\jre-1.8\bin\javaw.exe (Dec 29, 2023 11:03:55 PM)

```
Address: 456 Central Ave
Mail ID: babul434@gmail.com
Mobile Number: 9876543211
Basic Pay: 60000.0
Dearness Allowance (DA): 58200.0
House Rent Allowance (HRA): 6000.0
Provident Fund (PF): 7200.0
Staff Club Fund: 60.0
Gross Salary: 124200.0
Net Salary: 116940.0
------------------------------
Employee Name: Halim
Employee ID: 301
Address: 789 Newmarket
Mail ID: halim989@gmail.com
Mobile Number: 9876543212
Basic Pay: 70000.0
Dearness Allowance (DA): 67900.0
House Rent Allowance (HRA): 7000.0
Provident Fund (PF): 8400.0
Staff Club Fund: 70.0
Gross Salary: 144900.0
Net Salary: 136430.0
------------------------------
Employee Name: Ekram Mollah
Employee ID: 401
Address: Uttora
Mail ID: ekram.m@gmail.com
Mobile Number: 9876543213
Basic Pay: 80000.0
Dearness Allowance (DA): 77600.0
House Rent Allowance (HRA): 8000.0
Provident Fund (PF): 9600.0
Staff Club Fund: 80.0
Gross Salary: 165600.0
Net Salary: 155920.0
------------------------------
```

[redacted]