JAVA WEEKEND ASSIGNMENT
31st May 2025 – 1st June 2025
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TASK 1: Car Customization and Option Display

Create a program that allows users to customize a car build and prints all the selected options. The user will provide input via standard input, and the output will be displayed on standard output.

1. Car Manufacturer:
    - Mahindra
    - Tata
    - Maruti
2. Model (for Mahindra):
    - Scorpio
    - Thar
    - Scorpio N
    - XUV 700
3. Transmission Variant:
    - Manual
    - Automatic
4. Fuel Type:
    - Diesel
    - Petrol
    - CNG
5. Accessories:
    1. Color
        - Silver
        - Blue
        - Yellow
    2. Location:
        - Delhi
        - Bangalore
        - Hyderabad
        - Chennai

Solution:

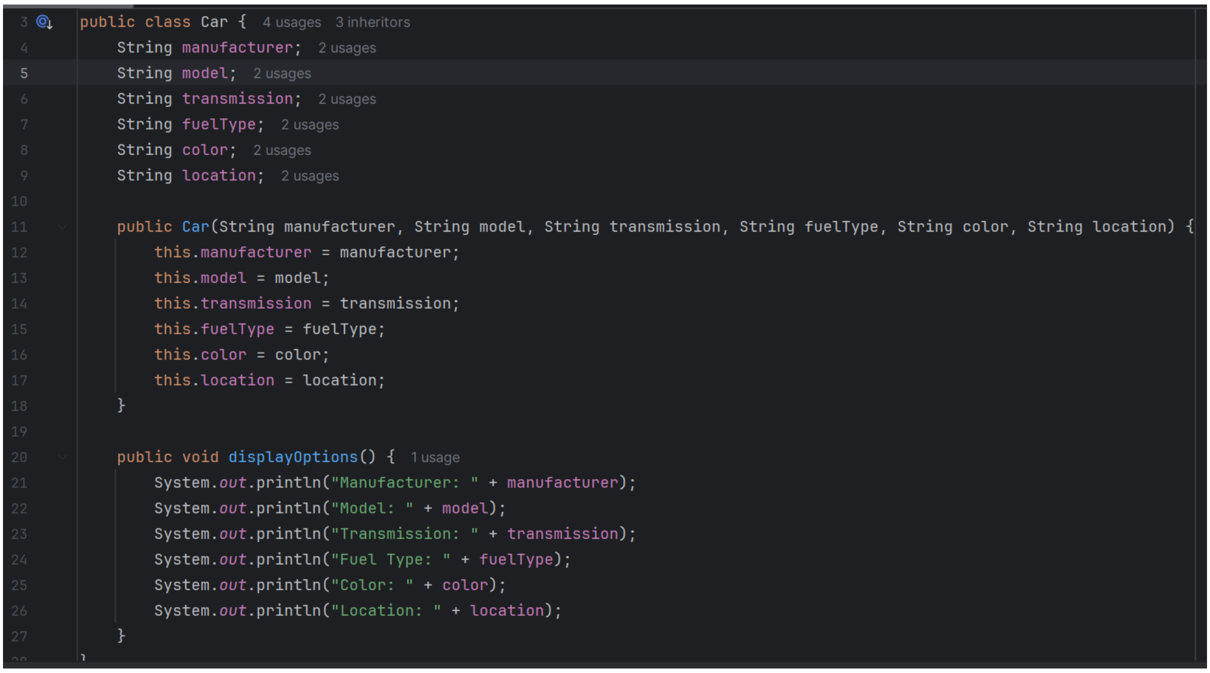
Parent Class: Car

Child Classes:

- Mahindra → models: Scorpio, Thar, etc.
- Tata
- Maruti

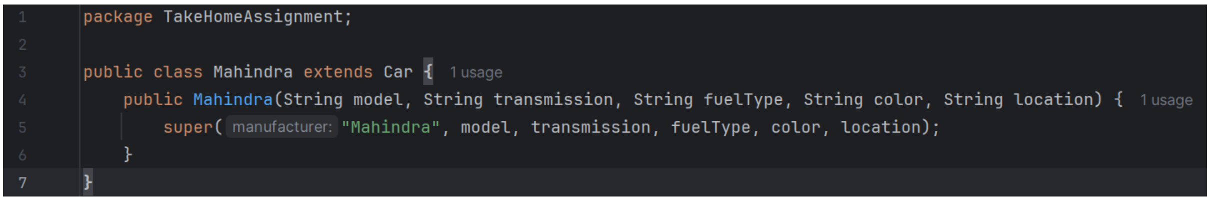
Each brand may have model info and options for transmission, fuel, color, location.

PARENT CLASS: CAR



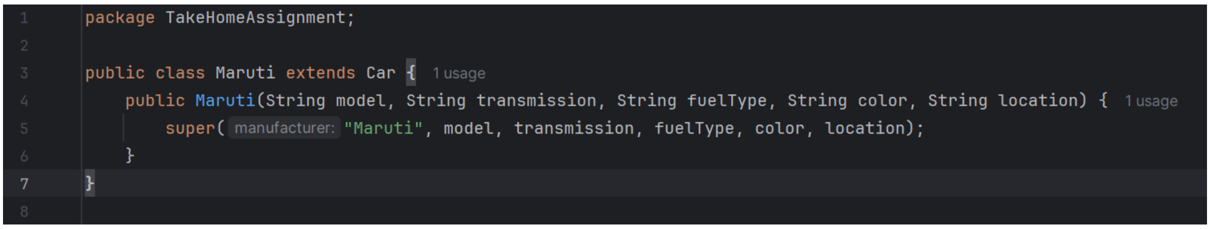
```
public class Car {  4 usages  3 inheritors
    String manufacturer;  2 usages
    String model;  2 usages
    String transmission;  2 usages
    String fuelType;  2 usages
    String color;  2 usages
    String location;  2 usages

    public Car(String manufacturer, String model, String transmission, String fuelType, String color, String location) {
        this.manufacturer = manufacturer;
        this.model = model;
        this.transmission = transmission;
        this.fuelType = fuelType;
        this.color = color;
        this.location = location;
    }

    public void displayOptions() {  1 usage
        System.out.println("Manufacturer: " + manufacturer);
        System.out.println("Model: " + model);
        System.out.println("Transmission: " + transmission);
        System.out.println("Fuel Type: " + fuelType);
        System.out.println("Color: " + color);
        System.out.println("Location: " + location);
    }
}
```

CHILD CLASSES: CHILD CLASS 1: MAHINDRA



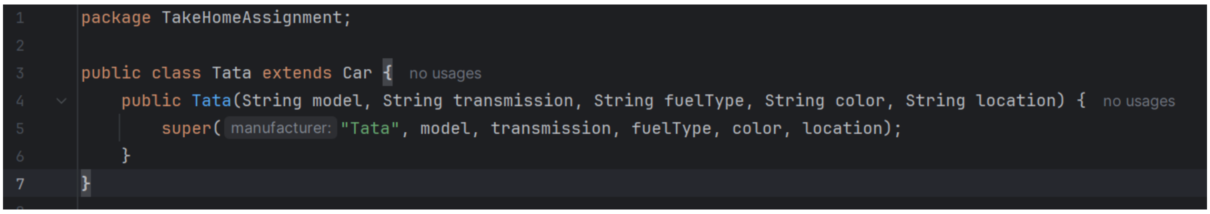
```
package TakeHomeAssignment;

public class Mahindra extends Car {  1 usage
    public Mahindra(String model, String transmission, String fuelType, String color, String location) {  1 usage
        super( manufacturer: "Mahindra", model, transmission, fuelType, color, location);
    }
}
```

CHILD CLASS 2: MARUTI



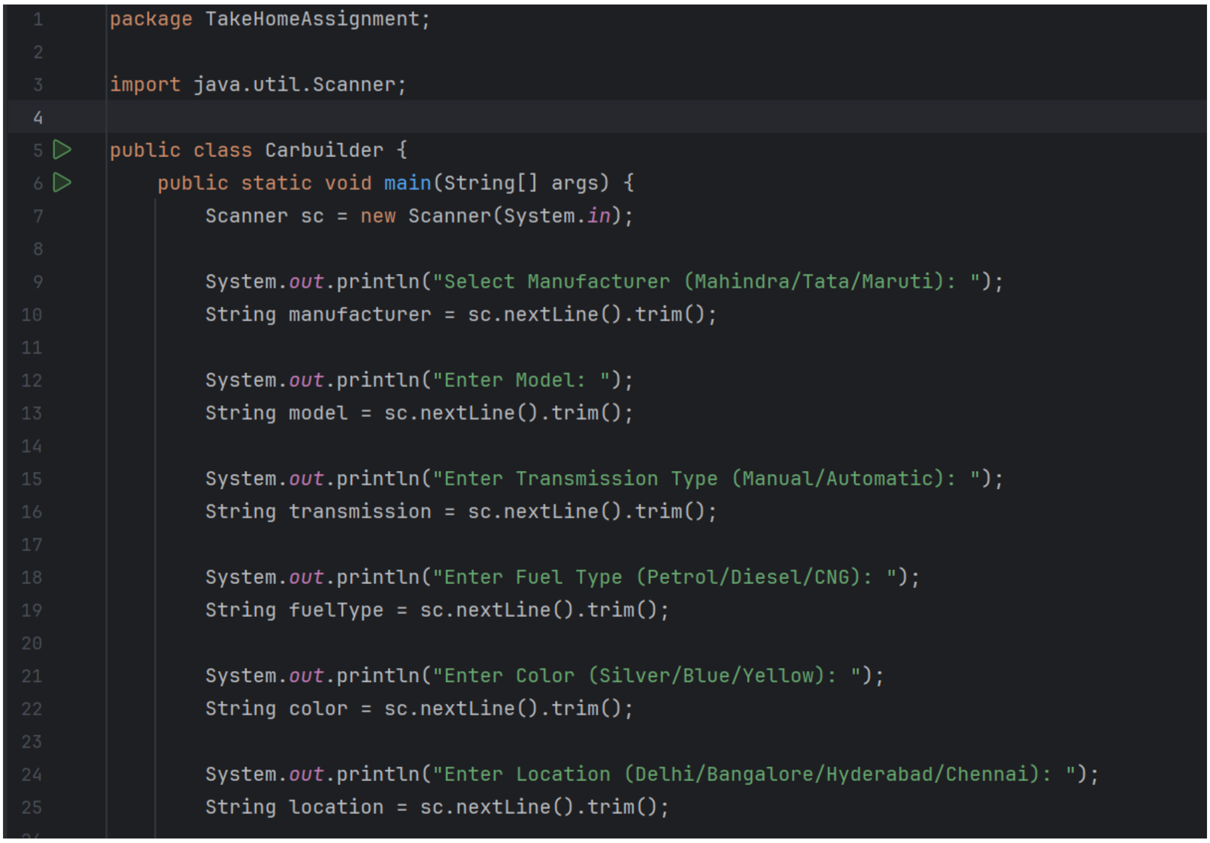
```java
package TakeHomeAssignment;

public class Maruti extends Car {  1 usage
    public Maruti(String model, String transmission, String fuelType, String color, String location) {  1 usage
        super( manufacturer: "Maruti", model, transmission, fuelType, color, location);
    }
}

```

CHILD CLASS 3: TATA

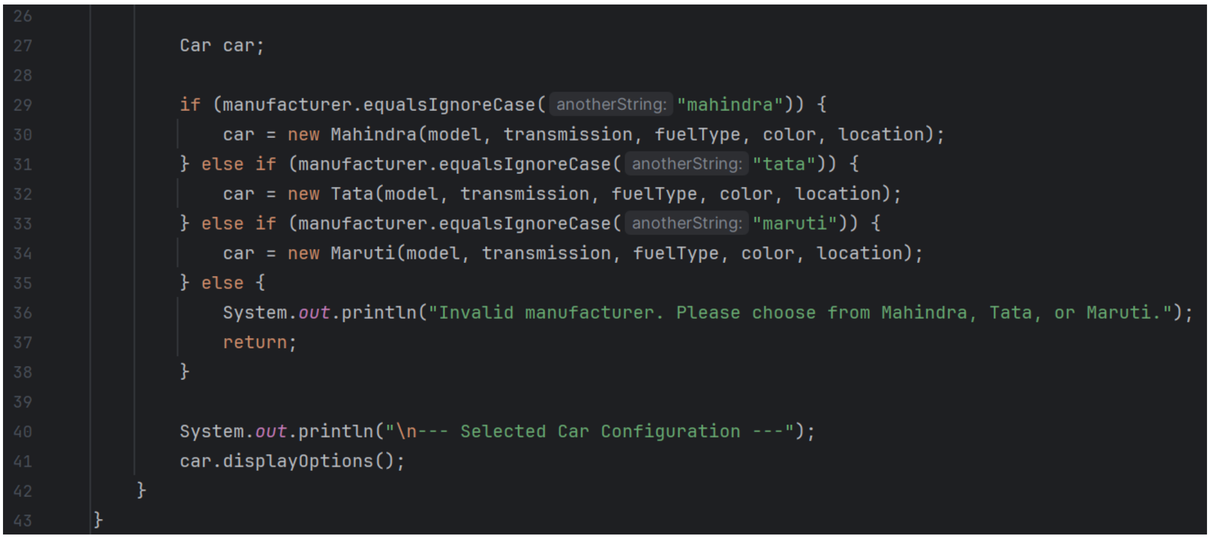


```java
package TakeHomeAssignment;

public class Tata extends Car {  no usages
    public Tata(String model, String transmission, String fuelType, String color, String location) {  no usages
        super( manufacturer: "Tata", model, transmission, fuelType, color, location);
    }
}
```

THE MAIN FUNCTION:

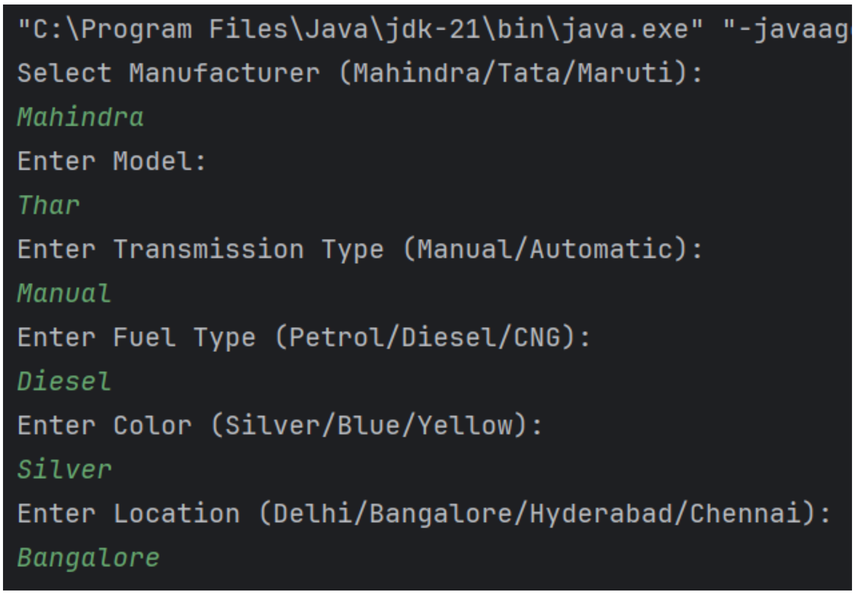


```java
package TakeHomeAssignment;

import java.util.Scanner;

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

        System.out.println("Select Manufacturer (Mahindra/Tata/Maruti): ");
        String manufacturer = sc.nextLine().trim();

        System.out.println("Enter Model: ");
        String model = sc.nextLine().trim();

        System.out.println("Enter Transmission Type (Manual/Automatic): ");
        String transmission = sc.nextLine().trim();

        System.out.println("Enter Fuel Type (Petrol/Diesel/CNG): ");
        String fuelType = sc.nextLine().trim();

        System.out.println("Enter Color (Silver/Blue/Yellow): ");
        String color = sc.nextLine().trim();

        System.out.println("Enter Location (Delhi/Bangalore/Hyderabad/Chennai): ");
        String location = sc.nextLine().trim();
```



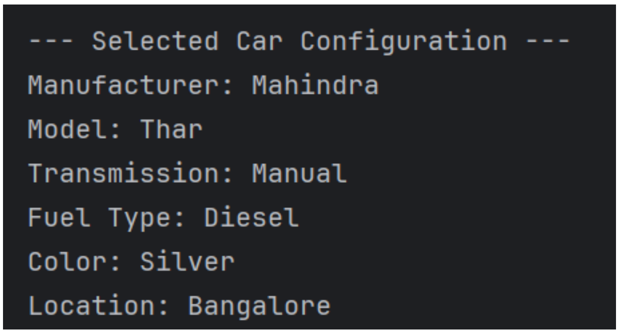
```java

        Car car;

        if (manufacturer.equalsIgnoreCase( anotherString: "mahindra")) {
            car = new Mahindra(model, transmission, fuelType, color, location);
        } else if (manufacturer.equalsIgnoreCase( anotherString: "tata")) {
            car = new Tata(model, transmission, fuelType, color, location);
        } else if (manufacturer.equalsIgnoreCase( anotherString: "maruti")) {
            car = new Maruti(model, transmission, fuelType, color, location);
        } else {
            System.out.println("Invalid manufacturer. Please choose from Mahindra, Tata, or Maruti.");
            return;
        }

        System.out.println("\n--- Selected Car Configuration ---");
        car.displayOptions();
    }
}
```

THE INPUT:



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaag
Select Manufacturer (Mahindra/Tata/Maruti):
Mahindra
Enter Model:
Thar
Enter Transmission Type (Manual/Automatic):
Manual
Enter Fuel Type (Petrol/Diesel/CNG):
Diesel
Enter Color (Silver/Blue/Yellow):
Silver
Enter Location (Delhi/Bangalore/Hyderabad/Chennai):
Bangalore
```

THE OUTPUT:



```
--- Selected Car Configuration ---
Manufacturer: Mahindra
Model: Thar
Transmission: Manual
Fuel Type: Diesel
Color: Silver
Location: Bangalore
```

TASK 2: Tax Calculation

Write a program to calculate the annual tax owed by an individual based on their salary, age, and other parameters. The user will input their details, and the program will output the total tax amount.

Parameters:

1. **Salary (in INR):**
   - Annual salary of the individual.
2. **Age (in years):**
   - Age of the individual.
3. **Investment in Tax-saving Instruments (in INR):**
   - Amount invested in tax-saving instruments like PPF, ELSS, etc.
4. **Health Insurance Premium (in INR):**
   - Annual health insurance premium paid by the individual.
5. **Home Loan Interest (in INR):**
   - Annual interest paid on a home loan.

Tax Slabs:

1. **For individuals below 60 years:**
   - Up to ₹2,50,000: No tax
   - ₹2,50,001 to ₹5,00,000: 5%
   - ₹5,00,001 to ₹10,00,000: 20%
   - Above ₹10,00,000: 30%
2. **For individuals between 60 and 80 years:**
   - Up to ₹3,00,000: No tax
   - ₹3,00,001 to ₹5,00,000: 5%
   - ₹5,00,001 to ₹10,00,000: 20%
   - Above ₹10,00,000: 30%
3. **For individuals above 80 years:**
   - Up to ₹5,00,000: No tax
   - ₹5,00,001 to ₹10,00,000: 20%
   - Above ₹10,00,000: 30%

Deductions:

1. **Section 80C:**
   - Maximum deduction of ₹1,50,000 for investments in tax-saving instruments.
2. **Section 80D:**
   - Maximum deduction of ₹25,000 for health insurance premium (₹50,000 for senior citizens).
3. **Section 24:**

- Maximum deduction of ₹2,00,000 for home loan interest.

Output:

The program should output the total tax amount owed by the individual after considering the applicable deductions.

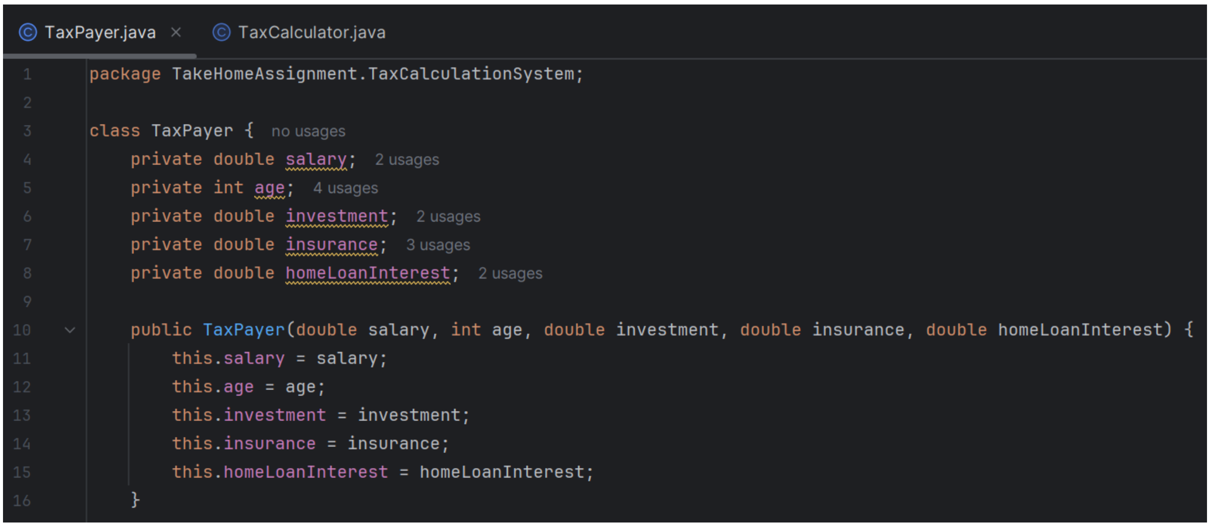
SOLUTION:

Class TaxPayer to store individual's details.

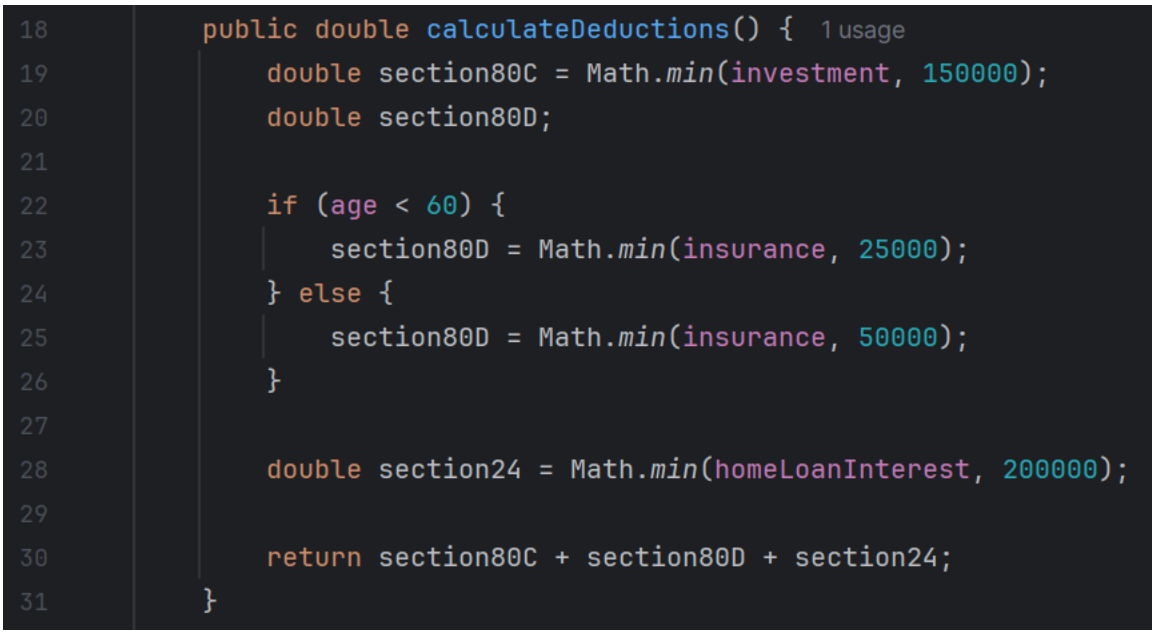
Methods to:

- Calculate total deductions
- Calculate taxable income
- Compute tax based on slabs and age

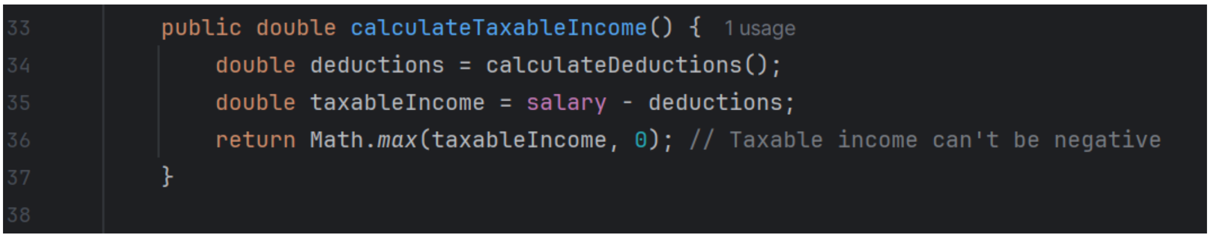
TaxPayer.java



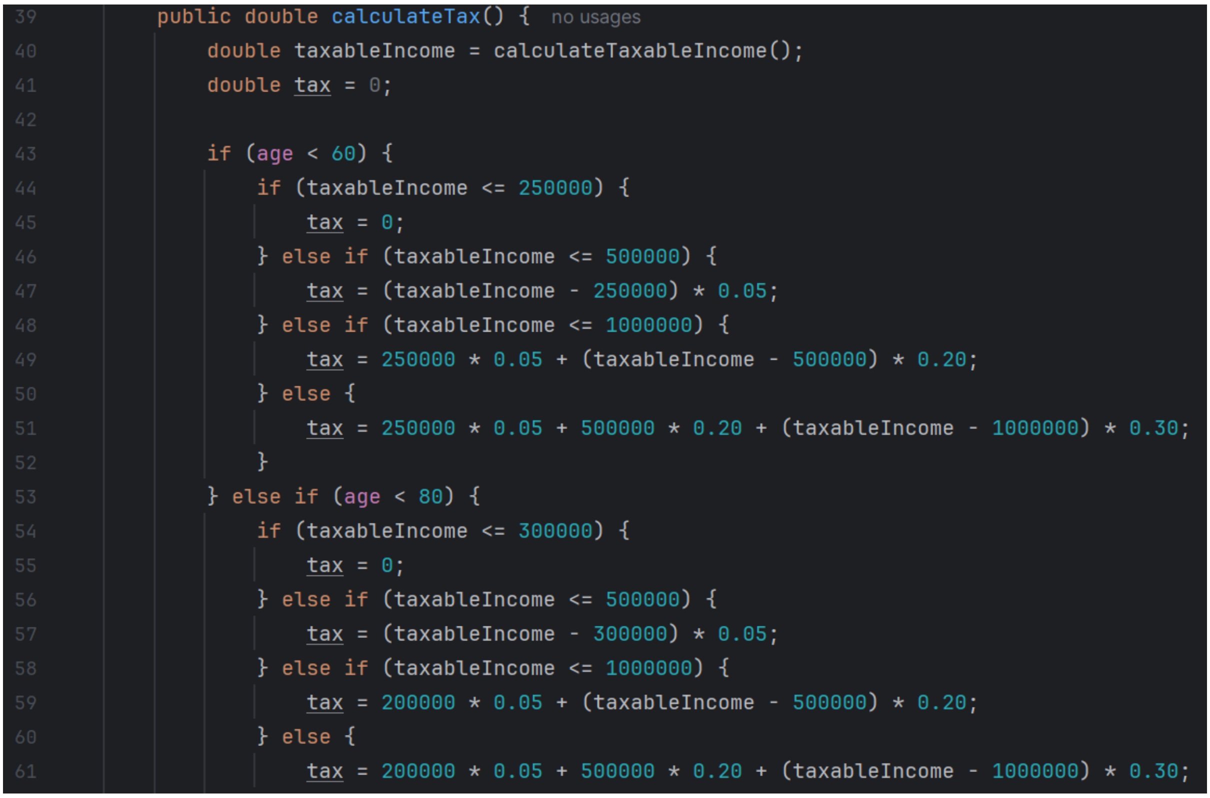
```java
package TakeHomeAssignment.TaxCalculationSystem;

class TaxPayer {
    private double salary;
    private int age;
    private double investment;
    private double insurance;
    private double homeLoanInterest;

    public TaxPayer(double salary, int age, double investment, double insurance, double homeLoanInterest) {
        this.salary = salary;
        this.age = age;
        this.investment = investment;
        this.insurance = insurance;
        this.homeLoanInterest = homeLoanInterest;
    }
```



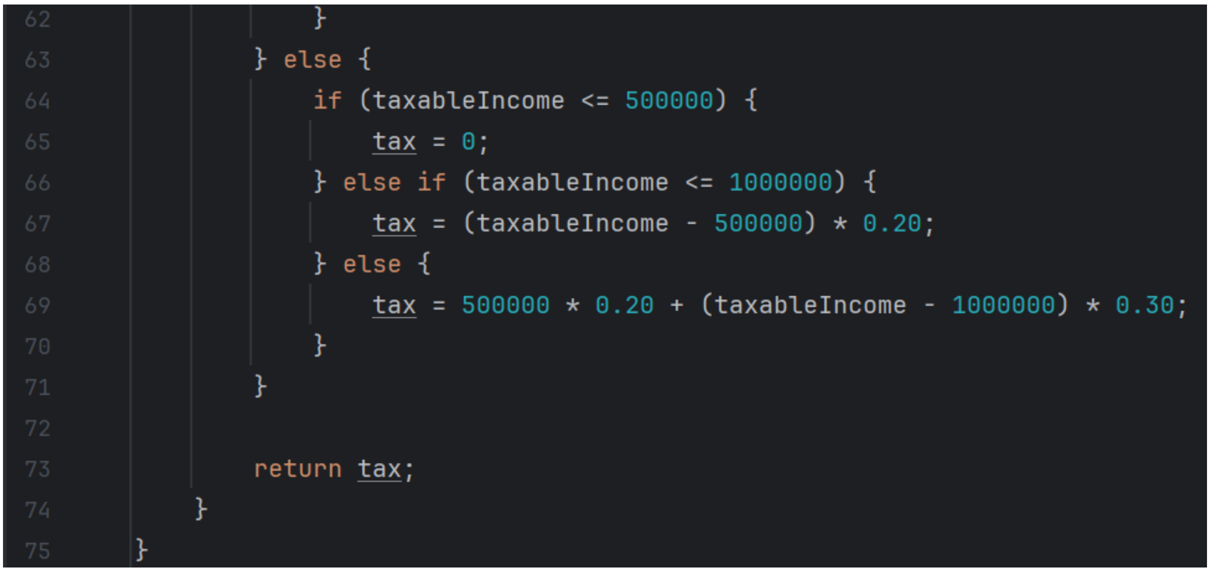
```java
    public double calculateDeductions() {  1 usage
        double section80C = Math.min(investment, 150000);
        double section80D;

        if (age < 60) {
            section80D = Math.min(insurance, 25000);
        } else {
            section80D = Math.min(insurance, 50000);
        }

        double section24 = Math.min(homeLoanInterest, 200000);

        return section80C + section80D + section24;
    }
```



```java
    public double calculateTaxableIncome() {  1 usage
        double deductions = calculateDeductions();
        double taxableIncome = salary - deductions;
        return Math.max(taxableIncome, 0); // Taxable income can't be negative
    }

```

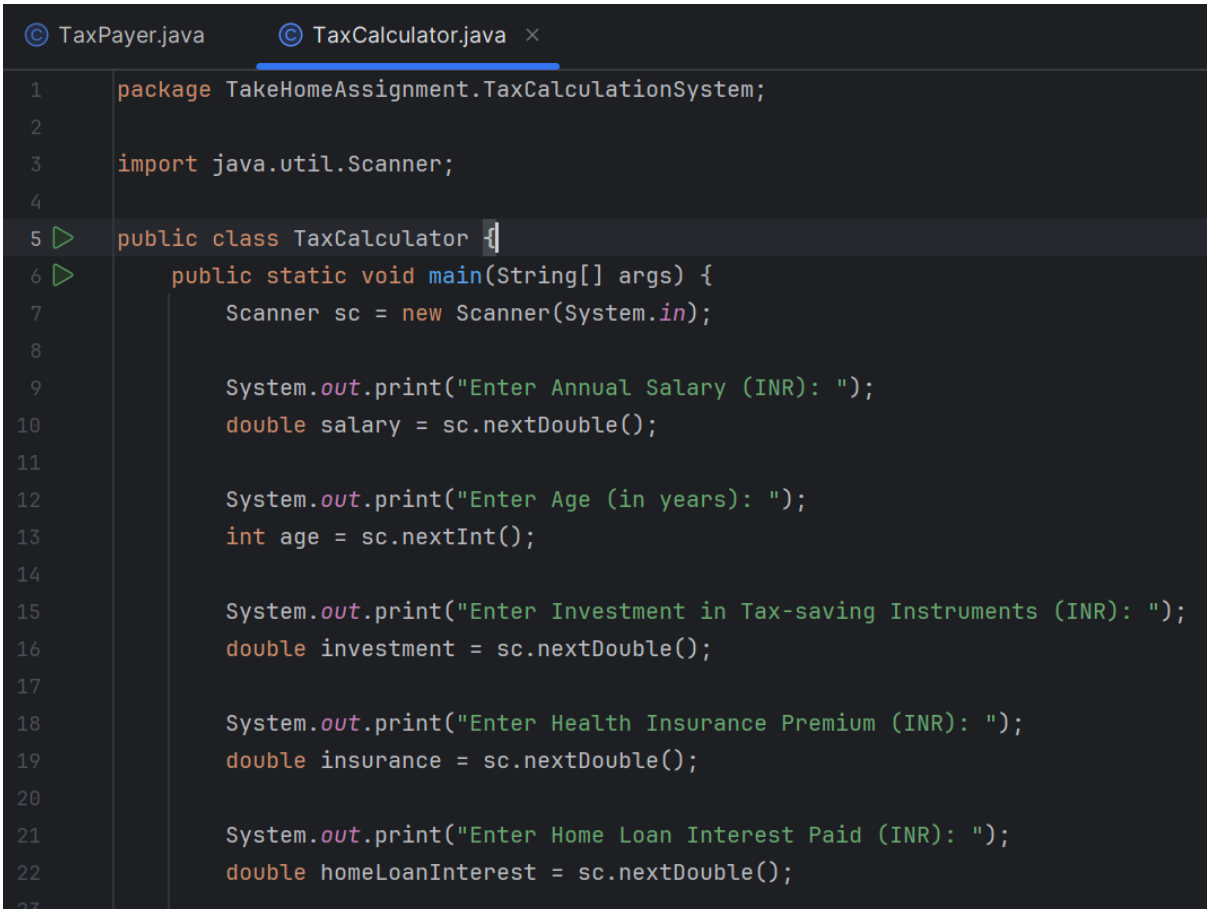


```java
    public double calculateTax() {  no usages
        double taxableIncome = calculateTaxableIncome();
        double tax = 0;

        if (age < 60) {
            if (taxableIncome <= 250000) {
                tax = 0;
            } else if (taxableIncome <= 500000) {
                tax = (taxableIncome - 250000) * 0.05;
            } else if (taxableIncome <= 1000000) {
                tax = 250000 * 0.05 + (taxableIncome - 500000) * 0.20;
            } else {
                tax = 250000 * 0.05 + 500000 * 0.20 + (taxableIncome - 1000000) * 0.30;
            }
        } else if (age < 80) {
            if (taxableIncome <= 300000) {
                tax = 0;
            } else if (taxableIncome <= 500000) {
                tax = (taxableIncome - 300000) * 0.05;
            } else if (taxableIncome <= 1000000) {
                tax = 200000 * 0.05 + (taxableIncome - 500000) * 0.20;
            } else {
                tax = 200000 * 0.05 + 500000 * 0.20 + (taxableIncome - 1000000) * 0.30;
```

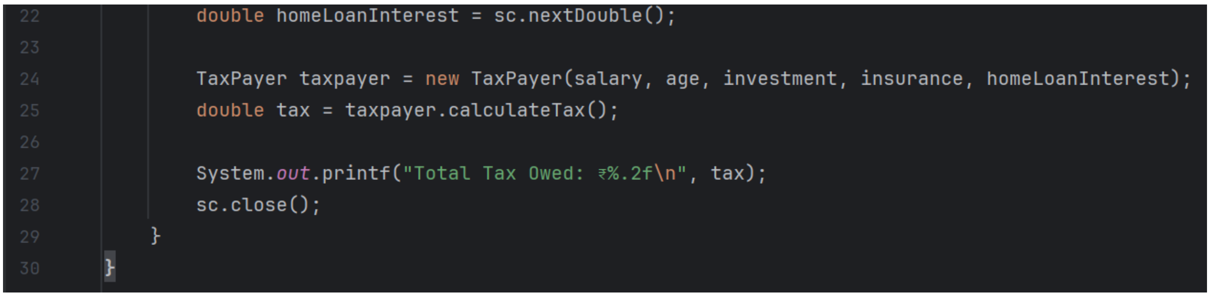


```java
            }
        } else {
            if (taxableIncome <= 500000) {
                tax = 0;
            } else if (taxableIncome <= 1000000) {
                tax = (taxableIncome - 500000) * 0.20;
            } else {
                tax = 500000 * 0.20 + (taxableIncome - 1000000) * 0.30;
            }
        }

        return tax;
    }
}
```

TaxCalculator.java

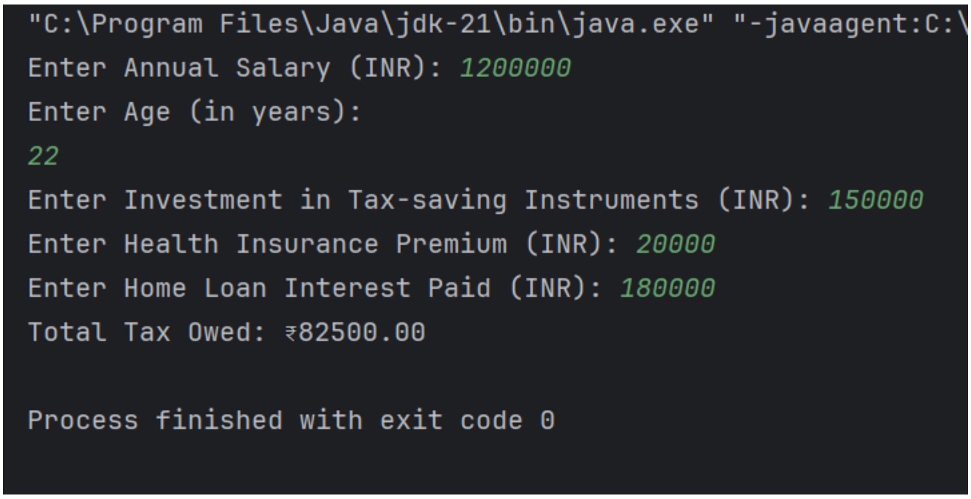


```java
package TakeHomeAssignment.TaxCalculationSystem;

import java.util.Scanner;

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

        System.out.print("Enter Annual Salary (INR): ");
        double salary = sc.nextDouble();

        System.out.print("Enter Age (in years): ");
        int age = sc.nextInt();

        System.out.print("Enter Investment in Tax-saving Instruments (INR): ");
        double investment = sc.nextDouble();

        System.out.print("Enter Health Insurance Premium (INR): ");
        double insurance = sc.nextDouble();

        System.out.print("Enter Home Loan Interest Paid (INR): ");
        double homeLoanInterest = sc.nextDouble();
```



```
        double homeLoanInterest = sc.nextDouble();

        TaxPayer taxpayer = new TaxPayer(salary, age, investment, insurance, homeLoanInterest);
        double tax = taxpayer.calculateTax();

        System.out.printf("Total Tax Owed: ₹%.2f\n", tax);
        sc.close();
    }
}
```

INPUT and OUTPUT



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\
Enter Annual Salary (INR): 1200000
Enter Age (in years):
22
Enter Investment in Tax-saving Instruments (INR): 150000
Enter Health Insurance Premium (INR): 20000
Enter Home Loan Interest Paid (INR): 180000
Total Tax Owed: ₹82500.00

Process finished with exit code 0
```