Project: Computing Tax

Problem Description:

The United States federal personal income tax is calculated based on filing status and taxable income. There are four filing statuses: single filers, married filing jointly, married filing separately, and head of household. The tax rates vary every year. Table 3.2 shows the rates for 2009. If you are, say, single with a taxable income of $10,000, the first $8,350 is taxed at 10% and the other $1,650 is taxed at 15%. So, your tax is $1,082.5.

Table 1

2009 U.S. Federal Personal Tax Rates

Marginal Tax Rate	Single	Married Filing Jointly or Qualified Widow(er)	Married Filing Separately	Head of Household
10%	$0 – $8,350	$0 – $16,700	$0 – $8,350	$0 – $11,950
15%	$8,351– $33,950	$16,701 – $67,900	$8,351 – $33,950	$11,951 – $45,500
25%	$33,951 – $82,250	$67,901 – $137,050	$33,951 – $68,525	$45,501 – $117,450
28%	$82,251 – $171,550	$137,051 – $208,850	$68,525 – $104,425	$117,451 – $190,200
33%	$171,551 – $372,950	$208,851 – $372,950	$104,426 – $186,475	$190,201 - $372,950
35%	$372,951+	$372,951+	$186,476+	$372,951+

You are to write a program to compute personal income tax. Your program should prompt the user to enter the filing status and taxable income and compute the tax. Enter 0 for single filers, 1 for married filing jointly, 2 for married filing separately, and 3 for head of household.

Here are sample runs of the program:

Sample 1:

```
Enter the filing status: 0
Enter the taxable income: 100000
Tax is 21720.0
```

Sample 2:

```
Enter the filing status: 1
Enter the taxable income: 300339
Tax is 76932.87
```

Sample 3:

```
Enter the filing status: 2
Enter the taxable income: 123500
Tax is 29665.5
```

Sample 4:

```
Enter the filing status: 3
Enter the taxable income: 4545402
Tax is 1565250.7
```

Analysis:
(Describe the problem including input and output in your own words.)
The problem is to create a Java program that calculates personal income tax based on the user's input of their filing status and taxable income. The user is prompted to enter their filing status, which can be one of the following options: single filers, married filing jointly, married filing separately, or head of household (represented as 0, 1, 2, or 3, respectively). After that, the user enters their taxable income, and the program should calculate and display the corresponding tax amount.

The program uses the tax rates and income brackets provided in the year 2009 tax table to determine the tax amount for the given filing status and income. It then displays the calculated tax amount as the output.

For example, if the user enters a filing status of 0 (Single) and a taxable income of $100,000, the program should correctly calculate and display the tax amount as $21,720.0.

The program should handle different filing statuses and income levels to calculate the tax amount accurately according to the specified tax rates and brackets.

Design:
(Describe the major steps for solving the problem.)
To solve the problem of calculating personal income tax based on the provided tax rates and income brackets, you can follow these major steps:

1. Prompt the user for input:
    - Ask the user to enter their filing status (0 for Single, 1 for Married Jointly, 2 for Married Separately, 3 for Head of Household).
    - Prompt the user to enter their taxable income.
2. Define tax brackets and rates:
    - Define arrays to store the income brackets and corresponding tax rates based on the user's chosen filing status. You can use switch-case statements to select the appropriate brackets and rates.
3. Calculate the tax:
    - Initialize a variable to store the total tax amount, starting at 0.0.
    - Use a loop to iterate through the tax brackets based on the chosen filing status. For each bracket:
        - Calculate the tax for the portion of income within the bracket.
        - Update the total tax amount with this calculated tax.
    - Calculate the tax for the remaining income beyond the last bracket.
4. Display the result:
    - Print the calculated tax amount to the user.

Coding: (Copy and paste source code here):

```
import java.util.Scanner;

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

      System.out.print("Enter the filing status (0 - Single, 1 - Married Jointly, 2 - Married
Separately, 3 - Head of Household): ");
      int filingStatus = input.nextInt();

      System.out.print("Enter the taxable income: ");
      double taxableIncome = input.nextDouble();

      double tax = 0.0;

      // Define the tax brackets and rates based on the filing status
      double[] brackets;
      double[] rates;

      switch (filingStatus) {
         case 0: // Single
            brackets = new double[]{8350, 33950, 82250, 171550, 372950};
            rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
            break;
         case 1: // Married Jointly
            brackets = new double[]{16700, 67900, 137050, 208850, 372950};
            rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
            break;
         case 2: // Married Separately
            brackets = new double[]{8350, 33950, 68525, 104425, 186475};
            rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
            break;
         case 3: // Head of Household
            brackets = new double[]{11950, 45500, 117450, 190200, 372950};
            rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
            break;
         default:
            System.out.println("Invalid filing status. Please enter 0, 1, 2, or 3.");
            return;
      }

      int i = 0;
      while (i < brackets.length && taxableIncome > brackets[i]) {
         if (i == 0) {
            tax += brackets[i] * rates[i];
         } else {
```

```
            tax += (brackets[i] - brackets[i - 1]) * rates[i];
          }
          i++;
        }

        // Calculate tax for the remaining income in the highest bracket
        tax += (taxableIncome - brackets[i - 1]) * rates[i];

        System.out.println("Tax is " + tax);
    }
}
```

```java
import java.util.Scanner;

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

        System.out.print("Enter the filing status (0 - Single, 1 - Married Jointly, 2 - Married Separately, 3 - Head of Household
        int filingStatus = input.nextInt();

        System.out.print("Enter the taxable income: ");
        double taxableIncome = input.nextDouble();

        double tax = 0.0;
        // Define the tax brackets and rates based on the filing status
        double[] brackets;
        double[] rates;

        switch (filingStatus) {
            case 0: // Single
                brackets = new double[]{8350, 33950, 82250, 171550, 372950};
                rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
                break;
            case 1: // Married Jointly
                brackets = new double[]{16700, 67900, 137050, 208850, 372950};
                rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
                break;
            case 2: // Married Separately
                brackets = new double[]{8350, 33950, 68525, 104425, 186475};
                rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
                break;
            case 3: // Head of Household
                brackets = new double[]{11950, 45500, 117450, 190200, 372950};
                rates = new double[]{0.10, 0.15, 0.25, 0.28, 0.33, 0.35};
                break;
            default:
                System.out.println("Invalid filing status. Please enter 0, 1, 2, or 3.");
                return;
        }

        int i = 0;
        while (i < brackets.length && taxableIncome > brackets[i]) {...}

        // Calculate tax for the remaining income in the highest bracket
        tax += (taxableIncome - brackets[i - 1]) * rates[i];

        System.out.println("Tax is " + tax);
    }
}
```

Output: (Screenshot and paste your output console here)

```
Enter the filing status (0 - Single, 1 - Married Jointly, 2 - Married Separately, 3 - Head of Household): 3
Enter the taxable income: 4545402
Tax is 1565250.7

Enter the filing status (0 - Single, 1 - Married Jointly, 2 - Married Separately, 3 - Head of Household): 2
Enter the taxable income: 123500
Tax is 29665.5
Enter the filing status (0 - Single, 1 - Married Jointly, 2 - Married Separately, 3 - Head of Household): 1
Enter the taxable income: 300339
Tax is 76932.87
Enter the filing status (0 - Single, 1 - Married Jointly, 2 - Married Separately, 3 - Head of Household): 0
Enter the taxable income: 100000
Tax is 21720.0
```

Testing: (Describe how you test this program)

To test the program, I have used the provided sample inputs and compare the calculated tax with the expected results. Here are the sample outputs you can use for testing:

Sample 1:

- Input: Filing status = 0 (Single), Taxable income = $100,000
- Expected output: Tax is $21,720.0

Sample 2:

- Input: Filing status = 1 (Married Jointly), Taxable income = $300,339
- Expected output: Tax is $76,932.87

Sample 3:

- Input: Filing status = 2 (Married Separately), Taxable income = $123,500
- Expected output: Tax is $29,665.5

Sample 4:

- Input: Filing status = 3 (Head of Household), Taxable income = $4,545,402
- Expected output: Tax is $1,565,250.7

Submit the following items:

1. This worksheet on Blackboard.
2. Worksheet should include copy/paste of your code.
3. Screenshot of your code.
4. Screenshot of your output console
5. Answers to the questions in this document.