

Zhejiang Normal University, China

Object-Oriented Programming Fundamentals OPPF

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ASSIGNMENT NO: 02

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(FOR INSTRUCTOR USE ONLY)

MARKS OBTAINED:

Comments:
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ASSIGNMENT2

Question

Question Statement.....

- 1.1** (Display three messages) Write a program that displays **Welcome to Java**, **Welcome to Computer Science**, and **Programming is fun**.
- 1.2** (Display five messages) Write a program that displays **Welcome to Java** five times.
- *1.3** (Display a pattern) Write a program that displays the following pattern:

```

      J      A      V      V      A
      J      A A      V      V      A A
J      J      AAAAA      V V      AAAAA
      J J      A      A      V      A      A

```

- 1.4** (Print a table) Write a program that displays the following table:

a	a^2	a^3
1	1	1
2	4	8
3	9	27
4	16	64

- 1.5** (Compute expressions) Write a program that displays the result of

$$\frac{9.5 \times 4.5 - 2.5 \times 3}{45.5 - 3.5}$$

- 1.6** (Summation of a series) Write a program that displays the result of

$$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9.$$

- 1.7** (Approximate π) π can be computed using the following formula:

$$\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots \right)$$

Write a program that displays the result of $4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} \right)$ and $4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} \right)$. Use **1.0** instead of **1** in your program.

- 1.8** (Area and perimeter of a circle) Write a program that displays the area and perimeter of a circle that has a radius of **5.5** using the following formulas:

$$\text{perimeter} = 2 \times \text{radius} \times \pi$$

$$\text{area} = \text{radius} \times \text{radius} \times \pi$$

- 1.9** (Area and perimeter of a rectangle) Write a program that displays the area and perimeter of a rectangle with a width of **4.5** and a height of **7.9** using the following formula:

$$\text{area} = \text{width} \times \text{height}$$

- 1.10** (Average speed in miles) Assume that a runner runs **14** kilometers in **45** minutes and **30** seconds. Write a program that displays the average speed in miles per hour. (Note **1** mile is equal to **1.6** kilometers.)

***1.11** (*Population projection*) The U.S. Census Bureau projects population based on the following assumptions:

- One birth every 7 seconds
- One death every 13 seconds
- One new immigrant every 45 seconds

Write a program to display the population for each of the next five years. Assume that the current population is 312,032,486, and one year has 365 days. *Hint:* In Java, if two integers perform division, the result is an integer. The fractional part is truncated. For example, $5 / 4$ is 1 (not 1.25) and $10 / 4$ is 2 (not 2.5). To get an accurate result with the fractional part, one of the values involved in the division must be a number with a decimal point. For example, $5.0 / 4$ is 1.25 and $10 / 4.0$ is 2.5.

1.12 (*Average speed in kilometers*) Assume that a runner runs 24 miles in 1 hour, 40 minutes, and 35 seconds. Write a program that displays the average speed in kilometers per hour. (Note 1 mile is equal to 1.6 kilometers.)

***1.13** (*Algebra: solve 2×2 linear equations*) You can use Cramer's rule to solve the following 2×2 system of linear equation provided that $ad - bc$ is not 0:

$$\begin{array}{rcl} ax + by = e & x = & \frac{ed - bf}{ad - bc} \\ cx + dy = f & y = & \frac{af - ec}{ad - bc} \end{array}$$

Write a program that solves the following equation and displays the value for x and y : (Hint: replace the symbols in the formula with numbers to compute x and y . This exercise can be done in Chapter 1 without using materials in later chapters.)

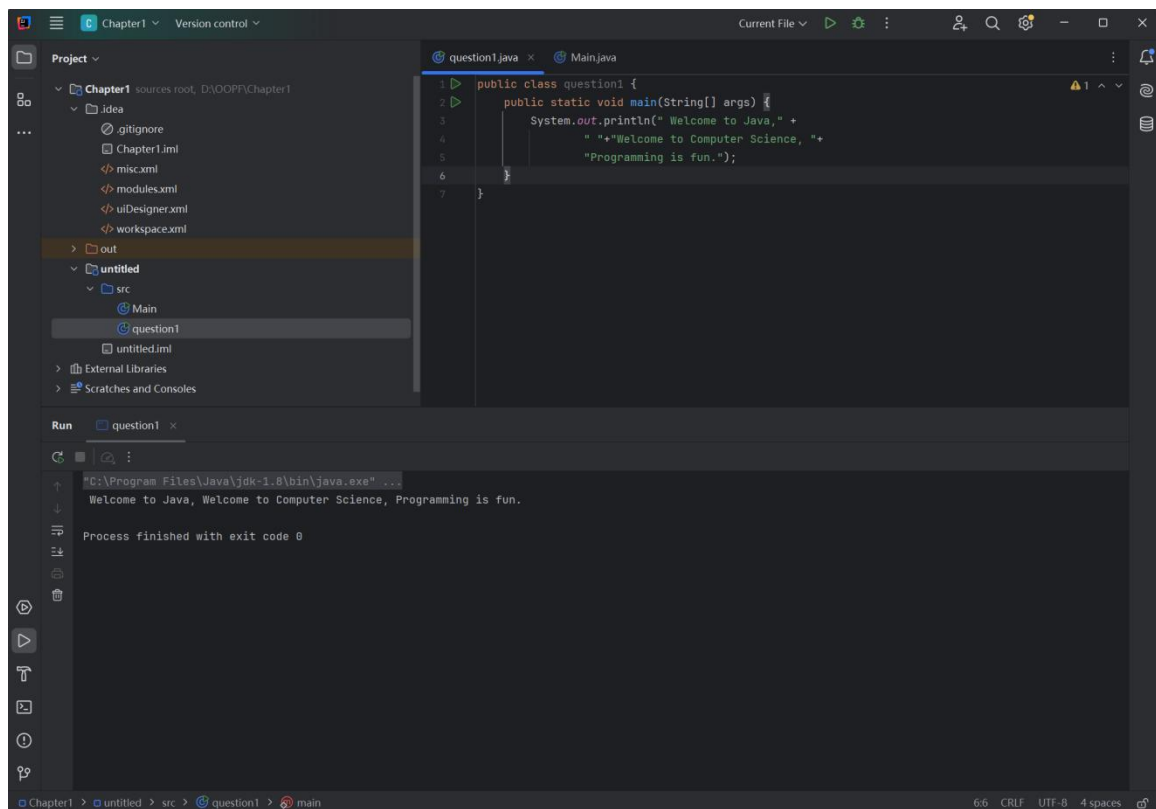
$$3.4x + 50.2y = 44.5$$

$$2.1x + .55y = 5.9$$

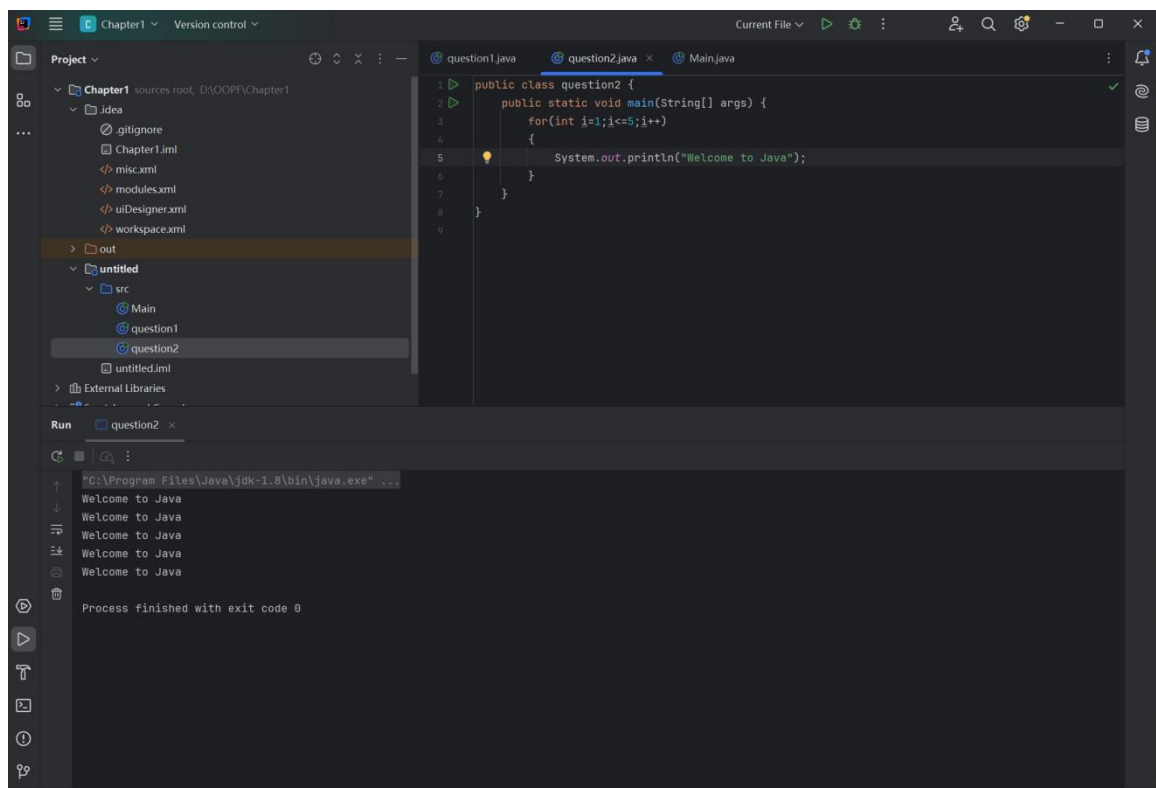
Answer

Your answer starts here.....

1.



2.



3.

```
1 public class question3 {
2     public static void main(String[] args) {
3         System.out.println(" J A V V A");
4         System.out.println(" J A A V V A A");
5         System.out.println(" J J A A A A V V A A A A");
6         System.out.println(" J J A A V A A");
7     }
8 }
9
```

Run question3

C:\Program Files\Java\jdk-1.8\bin\java.exe ...

J A V V A
J A A V V A A
J J A A A A V V A A A A
J J A A V A A

Process finished with exit code 0

4.

```
1 public class question4 {
2     public static void main(String[] args) {
3         System.out.println("a a^2 a^3");
4         int a, b, c;
5         for(a=1;a<=4;a++){
6             b = a * a;
7             c = a * a * a;
8             System.out.println(a + " " + b + " " + c);
9         }
10    }
11 }
12
13
```

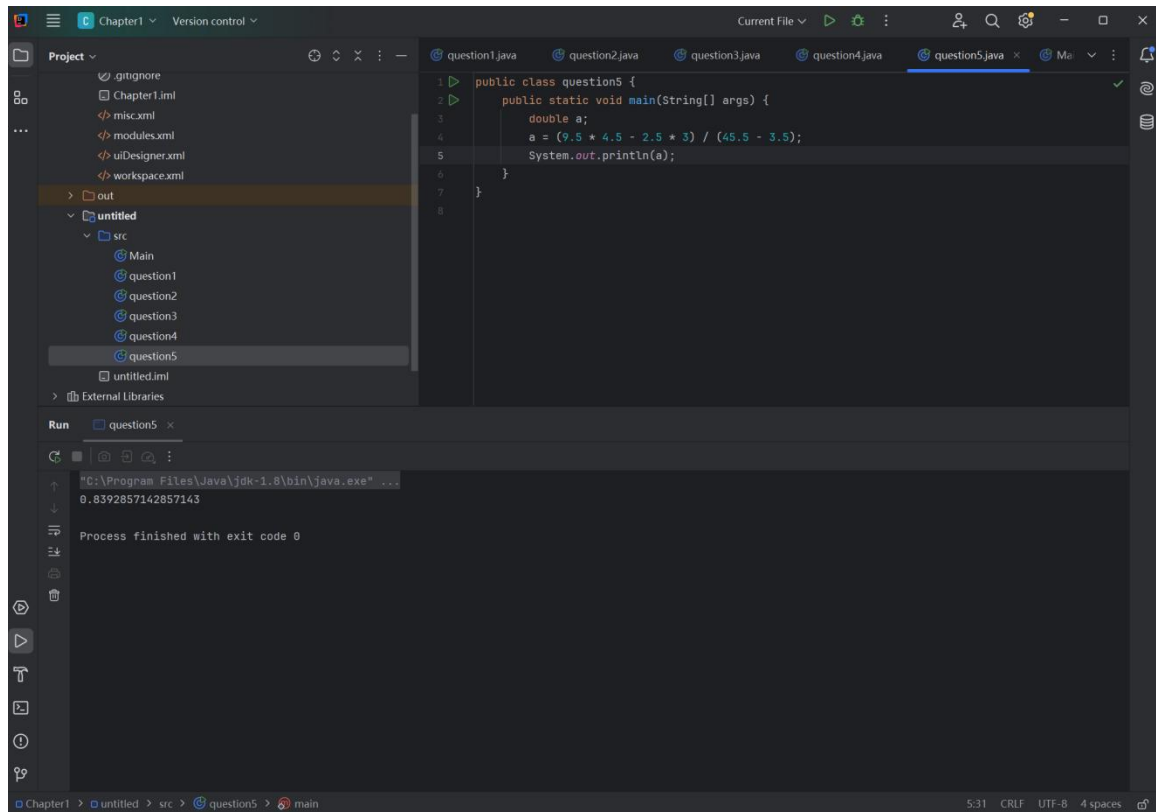
Run question4

C:\Program Files\Java\jdk-1.8\bin\java.exe ...

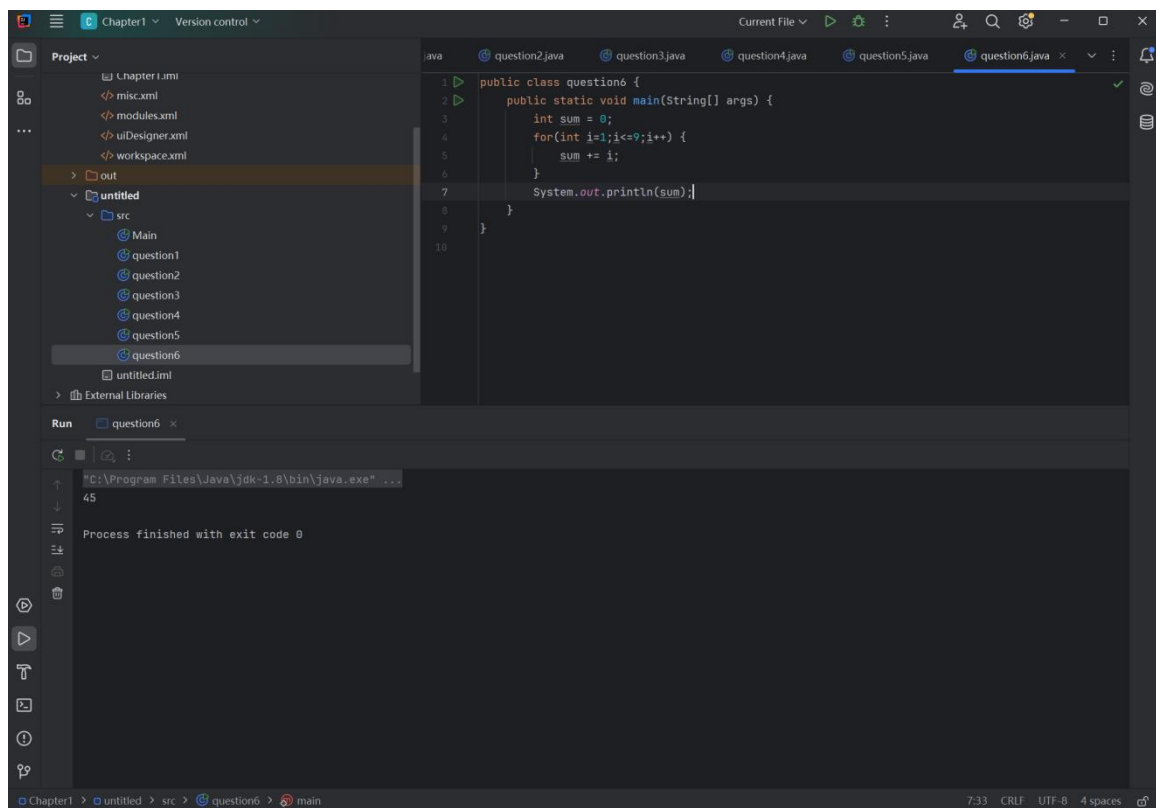
a a^2 a^3
1 1 1
2 4 8
3 9 27
4 16 64

Process finished with exit code 0

5.



6.



7.

```
Project Alt+1
misc.xml
modules.xml
uiDesigner.xml
workspace.xml
out
  untitled
    src
      question1
      question2
      question3
      question4
      question5
      question6
      question7

Run question7 x
C:\Program Files\Java\jdk-1.8\bin\java.exe ...
2.9768461760461765
3.2837384837384844
Process finished with exit code 0
```

```
1 public class question7 {
2     public static void main(String[] args) {
3         double a;
4         double b;
5         a = 4 * (1.0 - 1.0 / 3.0 + 1.0 / 5.0 - 1.0 / 7.0 + 1.0 / 9.0 - 1.0 / 11.0);
6         b = 4 * (1.0 - 1.0 / 3.0 + 1.0 / 5.0 - 1.0 / 7.0 + 1.0 / 9.0 - 1.0 / 11.0 + 1.0 / 13.0);
7         System.out.println(a);
8         System.out.println(b);
9     }
10 }
11
```

8.

```
Project
question1
question2
question3
question4
question5
question6
question7
untitled1
  src
    question8
    untitled1.java
  External Libraries
  Scratches and Consoles

Run question8 x
C:\Program Files\Java\jdk-1.8\bin\java.exe ...
The perimeter of radius 5.5 is 34.54
The area of the circle of radius 5.5 is 94.985
Process finished with exit code 0
```

```
1 public class question8 {
2     public static void main(String[] args) {
3         final double PI = 3.14;
4         //Scanner input = new Scanner(System.in);
5         //System.out.print("Enter the radius of a circle: ");
6         double radius = 5.5;
7         double perimeter = 2 * PI * radius;
8         double area = PI * radius * radius;
9         System.out.println("The perimeter of radius " + radius + " is " + perimeter);
10        System.out.println("The area of the circle of radius " + radius + " is " + area);
11    }
12 }
13
14
15
```

9.


```
public class question9 {  
    public static void main(String[] args) {  
        double width = 4.5;  
        double height = 7.9;  
        double area = width * height;  
        double perimeter = 2 * width * height;  
        System.out.println("The area is " + area);  
        System.out.println("The perimeter is " + perimeter);  
    }  
}
```

Run question9 x

```
"C:\Program Files\Java\jdk-1.8\bin\java.exe" ...  
The area is 35.550000000000004  
The perimeter is 71.10000000000001  
Process finished with exit code 0
```

10.

```
public class question10 {  
    public static void main(String[] args) {  
        double s = 14.0 / 1.6;  
        double t = 45.0 / 60.0;  
        double v = s / t;  
        System.out.println(v);  
    }  
}
```

Run question10 x

```
"C:\Program Files\Java\jdk-1.8\bin\java.exe" ...  
11.666666666666667  
Process finished with exit code 0
```

11.

```
public class question11 {  
    public static void main(String[] args) {  
        double population = 312832486;  
        double seconds = 365 * 24 * 60 * 60;  
        double birth, death, immigrant;  
        birth = seconds / 7.0;  
        death = seconds / 13.0;  
        immigrant = seconds / 45.0;  
        for(int i = 1; i <= 5; i++){  
            population += (birth - death + immigrant);  
            System.out.println(i + ": " + population);  
        }  
    }  
}
```

Run console output:

```
"C:\Program Files\Java\jdk-1.8\bin\java.exe" ...  
1: 3.148125827832967E8  
2: 3.1759267948659344E8  
3: 3.2037277610989816E8  
4: 3.231528728131869E8  
5: 3.259329695164836E8  
Process finished with exit code 0
```

12.

```
public class question12 {  
    public static void main(String[] args) {  
        double s = 24 * 1.6;  
        double t = 1 + 40.0 / 60 + 35.0 / 60 / 60;  
        double v = s / t;  
        System.out.println(v);  
    }  
}
```

Run console output:

```
"C:\Program Files\Java\jdk-1.8\bin\java.exe" ...  
22.986379453189732  
Process finished with exit code 0
```

13.

The screenshot shows an IDE with a project named 'Chapter1'. The 'Project' view on the left shows a folder 'untitled1' containing a 'src' directory with files 'question8' through 'question13'. The 'Run' view at the bottom shows the execution of 'question13.java'.

The code in 'question13.java' is as follows:

```
3 public class question13 {
4     public static void main(String[] args) {
5         System.out.print("Enter a,b,c,d,e,f: ");
6         double a = input.nextDouble();
7         double b = input.nextDouble();
8         double c = input.nextDouble();
9         double d = input.nextDouble();
10        double e = input.nextDouble();
11        double f = input.nextDouble();
12        double x = (e * d - b * f) / (a * d - b * c);
13        double y = (a * f - e * c) / (a * d - b * c);
14        System.out.println("the answer of the 2*2 linear equation : x = " + x + " y = " + y);
15    }
16 }
17
18
```

The output of the program is:

```
Enter a,b,c,d,e,f: 3.4
50.2
2.1
55
44.5
5.9
the answer of the 2*2 linear equation : x = 26.378679888011777 y = -0.8996877469968131
Process finished with exit code 0
```

The status bar at the bottom indicates the file is 'Chapter1 > untitled1 > src > question13 > main' with a line length of 15:87, CRLF line endings, UTF-8 encoding, and 4 spaces for indentation.