

Tutorial 03

Input & Output | Operators | Expressions

Exercise 1:

A. Show the result of the following code: □

1. `System.out.println(2 * (5 / 2 + 5 / 2));`
2. `System.out.println(2 * 5 / 2 + 2 * 5 / 2);`
3. `System.out.println(2 * (5 / 2));`
4. `System.out.println(2 * 5 / 2);` □

B. Are the following statements correct? If so, show the output.

1. `System.out.println("25 / 4 is " + 25 / 4);`
2. `System.out.println("25 / 4.0 is " + 25 / 4.0);`
3. `System.out.println("3 + 2 is " + 3 + 2);`
4. `System.out.println("3 + 2 is " + (3 + 2));`
5. `System.out.println("3 * 2 / 4 is " + 3 * 2 / 4);`
6. `System.out.println("3.0 * 2 / 4 is " + 3.0 * 2 / 4);`

C. Suppose m and r are integers. Write a Java expression for mr2 to obtain a floating-point result.

D. How would you write the following arithmetic expression in Java?

1. $\frac{4}{3(r+34)} - 9(a+bc) + \frac{3+d(2+a)}{a+bd}$
2. $5.5 \times (r+2.5)^{2.5+t}$

E. Show the output of the following code:

```
double a = 6.5;
a += a + 1;
System.out.println(a);
a = 6;
a /= 2;
System.out.println(a);
```

F. Show the output of the following code:

```
int a = 6;
int b = a++;
System.out.println(a);
System.out.println(b);
a = 6;
b = ++a;
System.out.println(a);
System.out.println(b);
```

G. Is the following code going to print 0.1 and why?

```
System.out.println(1.0 - 0.9);
```

Exercise 2:

Choose the correct answer:

- A.** The value of $15 / 2$ is:
(i) 7 (ii) 7.5 (iii) $7 \frac{1}{2}$ (iv) 0.75 (v) none
- B.** The value of $18 / 3$ is:
(i) 6 (ii) 0.167 (iii) 6.0(iv) none
- C.** The value of $22 \% 7$ is:
(i) 3 (ii) 1 (iii) 3.142 (iv) $22/7$
- D.** The value of $5 \% 7$ is:
(i) 0 (ii) 2 (iii) 5 (iv) undefined
- E.** The value of $17.0 / 4$ is:
(i) 4 (ii) 4.25 (iii) 4.0(iv) undefined
- F.** The value of $5 - 3.0 + 2$ is:
(i) 0 (ii) 0.0 (iii) 4 (iv) 4.0
- G.** The value of $7 - 5 * 2 + 1$ is:
(i) -2 (ii) 5 (iii) 6 (iv) none

Exercise 3

What are the values of x, y, z and w after running all statements?

```
int x=5, y, z=3, w;  
y = x - z;  
z = 2 * y + 3;  
w = x - 2 * y + z;  
z = w - x;  
w++;
```

Exercise 4

Evaluate the following expressions:

- A.** $3 + 4 * 6 / 8 - 2$
- B.** $3 + 5 * 6 / 4 - 3$
- C.** $3 + 5.0 * 6 / 4 - 3$
- D.** `int x=2, y=4;`
`double z=7.0, w=12.0;`
a. `x * w + z - y;`
b. `x > w`
c. `(x>y) || (z<w)`
d. `!(x>w) && (z==w)`

Exercise 5

Write a program that changes a given amount of money into smaller monetary units. The program lets the user enter an amount as a double value representing a total in Riyals and Halals, and outputs a report listing the monetary equivalent in the maximum number of riyals, halves (SR 0.5), quarters (SR 0.25), qirsh (SR 0.5), and halalah (SR 0.01), in this order, to result in the minimum number of coins.

Here is a sampler un:

```
Enter an amount, for example, 11.88: 11.88 ↵
Your amount 11.56 consists of
  11 riyals
   1 halves
   1 quarters
   2 qirshs
   3 halalahs
```

Tutorial 03 Solutions

Exercise 1:

A.

1. 8
2. 10
3. 4
4. 5 □

B.

1. $25 / 4$ is 6
2. $25 / 4.0$ is 6.25
3. $3 + 2$ is 32
4. $3 + 2$ is 5
5. $3 * 2 / 4$ is 1
6. $3.0 * 2 / 4$ is 1.5

C. `m * Math(r, 2)`

D.

1. `4 / (3 * (r + 34)) - 9 * (a+b*c)+(3+d*(2+a)) / (a+b*d)`
2. `5.5 * Math.pow(r + 2.5, 2.5 + t)`

E.

```
14.0
3.0
```

F.

```
7
6
7
7
```

G. No. double and float in java use rounding in expressing floating point numbers.

Exercise 2:

A. (i) B. (i) C. (ii) D. (iii) E. (ii) F. (iv) G. (i)

Exercise 3:

```
x = 5
y = 2
z = 3
w = 9
```

Exercise 4:

A. (i) B. (i) C. (ii) D|a. 27.5 D|b. false D|c. true D|d. false

Exercise 5:

Here are the steps in developing the program:

- A. Prompt the user to enter the amount as a decimal number, such as 11.88
- B. Convert the amount (e.g., 11.88) into halalas (1188).
- C. Divide the halalas by 100 to find the number of riyals. Obtain the remaining halalas using the halalas remainder 100.
- D. Divide the remaining halalas by 50 to find the number of halves.
- E. Divide the remaining halalas by 25 to find the number of quarters.
- F. Divide the remaining halalas by 5 to find the number of qirshs.
- G. The remaining halalas are the halalas (can not be divided).
- H. Display the result.

```
import java.util.Scanner;
public class ComputeChange {
    public static void main(String[] args) {
        // Create a Scanner
        Scanner input = new Scanner(System.in);
        // Receive the amount
        System.out.print("Enter an amount in double, for example
11.88: ");
        double amount = input.nextDouble();
        int remainingAmount = (int) (amount * 100);
        // Find the number of one riyals
        int numberOfOneRiyals = remainingAmount / 100;
        remainingAmount = remainingAmount % 100;
        // Find the number of halves in the remaining amount
        int numberOfHalves = remainingAmount / 50;
        remainingAmount = remainingAmount % 50;
        // Find the number of quarters in the remaining amount
        int numberOfQuarters = remainingAmount / 25;
        remainingAmount = remainingAmount % 25;
        // Find the number of qirshs in the remaining amount
        int numberOfQirshs = remainingAmount / 5;
        remainingAmount = remainingAmount % 5;
        // Find the number of halalas in the remaining amount
        int numberOfHalalas = remainingAmount;
        // Display results
        System.out.println("Your amount " + amount + " consists of");
        System.out.println(" " + numberOfOneRiyals + " riyals");
        System.out.println(" " + numberOfHalves + " halves ");
        System.out.println(" " + numberOfQuarters + " quarters");
        System.out.println(" " + numberOfQirshs + " qirshs");
        System.out.println(" " + numberOfHalalas + " halalas");
    }
}
```