

Tutorial 02

Input & Output | Operators | Expressions

Exercise 1:

- A. Write a statement that defines a variable length of type double and reads its value from the input using a predefined Scanner object named input.
- B. Which of the following identifiers are valid? Which are Java keywords?
miles, Test, a++, --a, 4#R, \$4, #44, apps, class, public, int, x, y, radius
- C. Identify and fix the errors in the following code:
- ```
public class Test {
 public void main(String args) {
 int i = j = 2;
 System.out.println(i + " " ++ j);
 }
}
```

#### Exercise 2

What is the output of the following program?

```
public class FindMyOutput {
 public static void main(String args[]) {
 int j, k, L;
 j = 30;
 k = 10;
 k = k - 5;
 L = k / 5;
 System.out.println(" j = " + j);
 System.out.print(" k = " + k + ", ");
 System.out.print(" L = " + L);
 }
}
```

#### Exercise 3

Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters. Write a program that prompts the user to enter a weight in kilograms and height in meters and displays the BMI.

Here is a sample run:

```
Enter weight in kilograms: 70 ↵
Enter height in meters: 1.7 ↵
BMI is 24.221453287197235
```

## Exercise 4

- A. Write a program that defines two variables of type byte, reads their values from the console, increases the first variable with an amount of the second one, then prints the results.
- B. If the first number is 100 and the other is 50, what is the output of the program? why?

## Tutorial 02 Solutions

### Exercise 1:

- A. `double length = input.nextDouble();`
- B. Valid: miles, Test, \$4, apps, radius, x, y,  
Keywords: class, public, int,
- C. Here are the errors:

```
public class Test {
public void main(String args) {
int i = j = 2;
System.out.println(i + " " ++ j);
}
```

Here is the program after correcting the errors:

```
public class Test {
public static void main(String[] args) {
int j;
int i = j = 2;
System.out.println(i + " " + j);
}
}
```

### Exercise 2:

```
j = 30
k = 5, l = 1
```

### Exercise 3:

Here are the steps in developing the solution program to this problem:

1. First try to understand the problem by manually finding your BMI.  
Use your height and weight to calculate your BMI
2. Find what is the input to the program. The program should take two inputs: weight and height.<sup>[1]</sup><sub>[SEP]</sub>
3. The program has to store the inputs into variables. So you need to define two variables weight and height.<sup>[1]</sup><sub>[SEP]</sub>
4. The computation that your program will carry out is:  
You need to write the equivalent expression in java.
5. The value that is computed by the expression above has to be stored somewhere. This means that you have to define a variable named bmi to store the computed value in it.
6. Find what the program is supposed to output. The program is supposed to print the BMI of a person.<sup>[1]</sup><sub>[SEP]</sub>

```
import java.util.Scanner;
public class Bmi {
```

```

public static void main(String[] args) {
 Scanner input = new Scanner(System.in);
 // Prompt the user to enter weight in kilograms
 System.out.print("Enter weight in kilograms: ");
 double weight = input.nextDouble();
 // Prompt the user to enter height in meters
 System.out.print("Enter height in meters: ");
 double height = input.nextDouble();
 double bmi = weight / (height * height);
 System.out.print("BMI is " + bmi);
}
}

```

#### Exercise 4:

A.

```

import java.util.Scanner;
class F {
 public static void main(String[] args) {
 Scanner KB = new Scanner(System.in);
 byte a = KB.nextByte();
 byte b = KB.nextByte();
 a += b;
 System.out.println(a);
 }
}

```

B. -106

The range of type byte is -128 to 127 (inclusive).

The expected result (150) is out of range, so an overflow will occur, and the result when the carry is ignored will be -106.

To explain this in binary:

$$\begin{array}{r}
 (100)_{10} \quad (01100100)_2 \\
 (050)_{10} \quad (00110010)_2 \quad + \\
 \hline
 (10010110)_2
 \end{array}$$

The 8<sup>th</sup> bit is the sign bit, 1 means negative

For negative values the 2's complement should be calculated:

0010110 is inverted and 1 is added

1101001 + 1 = 1101010 which is 106

The moral of the story: watch out for the overflow resulting from exceeding the datatype limits.