# Questions and Exercises

*These questions and exercises is an opportunity to see what you've learnt from the lecture as well as practice the new things we've been talking about. In other words, these questions and exercises are completely optional but it's recomended to do them. In the end of the document you will find the answers to the questions as well as possible solutions to the exercises, note that one can solve an exercise in different ways. There will also be some suggestions about what one could code if one want to continue with some more advanced things. These suggestions will not come with a possible solution and might include things that haven't been covered in the lecture.*

**Question 1**
In the end of each statement you're supposed to add something. What?

**Question 2**
In the following code that is meant to print out Hello World there is an error. What's wrong and what should one do to fix it?

*System.out.println('Hello World');*

**Question 3**
Given this code for creating a scanner

*import java.util.Scanner;*
*Scanner myScanner = new Scanner(System.in);*

how would one get the next two words that the user is typing?

**Question 4**
Before you use a variable you need to declare it. To do so two parts are required, which ones? And how are they used when declaring a variable?

**Question 5**
What would the following code print out on the screen? Answer the question before you run the code.

*int number = 17;*
*number /= 3;*
*System.out.println("The result is: " + number);*

**Exercise 1**
Given two declared integers x and y. Write a program that swaps their values. For instance if x

begins with the value 10 and y with -5 your code should make sure that x ends with the value -5 and y with 10. Observe that it should work with any integers. Print the values before and after the swap.

**Exercise 2**
Write a program that asks the user for three integers. Add the first two integers together and multiply the sum with the last integer. Print out the calculation and the result. For instance if the user enters 5, 10 and 2 the output should be the following

*(5 + 10) * 2 = 30*

**Exercise 3**
Write a program that asks the user for two integers. After the integers have been stored, calculate the quotient of the two numbers (i.e. divide the first number with  the second number) and print it out on the screen. However, it should NOT use integer division.


**Further explorations 1**
By using Math.round(0.5) one would round 0.5 to the closest integer (i.e. 1). Use this to re-write exercise 3 to output the result rounded off so it has just one digit after the decimal point. Also print out how accurate the result is (i.e. How far it is from the real result). For instance 17 / 3 would give you 5.7 with the accuracy offset being 0.0333...

**Further explorations 2**
Write a program that asks the user for a word. Convert the first character to uppercase and the rest to lowercase. For more information what you can do with Strings check this documentation page: http://docs.oracle.com/javase/6/docs/api/java/lang/String.html . I would recommend you to take a look at toUpperCase, toLowerCase and substring. Some examples on how the output should look like can be seen below

*hello => Hello*
*aBcDeF => Abcdef*
*09AB => 09ab*

# Answers and solutions

**Answer to Question 1**
In the end of each statement you must add a semicolon(looks like this ;) . This is to tell the code that one statement has ended and the next one will begin.


**Answer to Question 2**
When defining a string(some text) you do so by enclosing it in double quotes. Therefore the proper code would be

*System.out.println("Hello World");*

The single quotes that were there instead are used when defining a single character, that's why you'll

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get an error complaining about the e if you run the code given in the question (since it found multiple characters when it expected only one).

**Answer to Question 3**
To read a word from a given scanner (with the name myScanner) one does it like the following code

*myScanner.next();*

Therefore to read two words one simply uses that statement twice, like this

*myScanner.next();*
*myScanner.next();*

However if one also likes to save the words to be used for something it could be done like this

*String word1 = myScanner.next();*
*String word2 = myScanner.next();*

**Answer to Question 4**
When declaring a variable you need to define the data type and the name of said variable. To declare it one simply writes the data type followed by the variable name. If one would like to declare a variable called test that could hold a char value(a character) one would do it like the following example

*char test;*

**Answer to Question 5**
The given code will output the following message

*The result is: 5*

In the given code, one first declares an integer variable and gives it the value of 17. The second line is an example of two things, first of all it's the short form of modifying the value of a variable depending on its old value. The longer version of the second line would be the following

*number = number / 3;*

When seen it its full form it might be easier to see that this is also an example of integer division which is why the result will be five. 17 divided by 3 = 5.667... but since we're dividing one integer with another we will only get the integer part as the result, which is five.

**Possible solution to Exercise 1**
*public class Exercise1 {*

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```java
    public static void main(String[] args) {
        //The two integers to swap
        int x = 10;
        int y = -5;

        System.out.println("X = " + x + " Y = " + y);

        System.out.println("Swapping...");
        //Make the swap by declaring a third variable
        int temp = x;
        x = y;
        y = temp;

        System.out.println("X = " + x + " Y = " + y);
    }

}
```

## Possible solution to Exercise2

```java
import java.util.Scanner;

public class Exercise2 {

    public static void main(String[] args) {
        //Create a scanner to be able to get user input
        Scanner myScanner = new Scanner(System.in);

        //Ask for two integers and sum them together
        System.out.println("Please enter two integers to add together");
        int number1 = myScanner.nextInt();
        int number2 = myScanner.nextInt();
        int sum = number1 + number2;

        //Ask for a third number
        System.out.println("Please enter a third integer to multiply the sum with");
        int number3 = myScanner.nextInt();

        //Calculate the product
        int product = sum * number3;

        //Print the result
        System.out.println("(" + number1 + " + " + number2 + ") * " + number3 + " = " + product);
    }

}
```

**Possible solution to Exercise 3**

```java
import java.util.Scanner;

public class Exercise3 {

    public static void main(String[] args) {
        //Create a scanner to get user input
        Scanner myScanner = new Scanner(System.in);

        //Ask for and store the dividend
        System.out.println("Please enter the integer dividend");
        int dividend = myScanner.nextInt();

        //Ask for and store the divisor
        System.out.println("Please enter the integer divisor");
        int divisor = myScanner.nextInt();

        //Calculate and print the quotient
        //the dividend is converted to a float to prevent integer division
        float quotient = (float)dividend / divisor;
        System.out.println("The quotient of the integers is " + quotient);
    }

}
```

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