IN1007 Programming in Java I

Session 1: Computer Lab

Minimal set of notions/skills... to acquire this week:
- have Java and IntelliJ installed and running
- be able to compile and run basic programs
- be able to use variables and understand primitive types

Setting up

The JDK. The first thing you have to do is to install the JDK. You can find everything you need in the "Setting up" part on the Moodle page.

Text editor. You can use any text editor you want to write Java code and a terminal to enter the commands `javac` and `java` as we have seen in the second video of this week. However, there exist more sophisticated editors that allow you to write Java code and are useful when you work on substantial projects. We are going to use IntelliJ this year. Go to the "Setting up" part on the Moodle page to find out how and where to download it. If you want to use another text editor, that is fine, but the teaching assistants and myself might not be able to help with it.

First task. Your first task consists in being able to compile and run the program HelloWorld that we have seen in the lecture, using IntelliJ. You will find in the third video of this week, all the indications you need to do so. Do not hesitate to ask for help if you struggle here.

```
public class HelloWorld{
    public static void main(String[] args){
        System.out.println("Hello World!");
    }
}
```

Compilation and Execution

In the same IntelliJ project, create a new java class Start:

```
public class Start{
    public static void main(String[] args){
        System.out.println("I am starting with Java");
    }
}
```

1. Compile and run you program. Which files have been created? Which file is compiled and which one is executed?
3. Remove the semi-colon in your program. Compile and run it again. What happens?

An important skill you need to develop is to be able to read and understand compilation errors.

API Java and `Scanner`

In a new java class Divide, write the following program:

```
import java.util.Scanner;

public class Divide{
    public static void main(String[] args){
        int n, r;
        Scanner sc = new Scanner (System.in);
        System.out.println("Choose an integer");
        n = sc.nextInt();
        r = 42/n;
        System.out.println("The result is:" + r );
    }
}
```

1. What does the program do? What happens if you enter 0?
2. Documentations about the predefined functions and classes in Java can be found here: https://docs.oracle.com/en/java/javase/14/docs/api/index.html
Can you find an explanation for `System.out.println()`? And for the class `Scanner`?

We will use the class `Scanner` in the rest of the session. A full explanation will

come later in the term, but to use it, remember to write the instruction `import java.util.Scanner;` before your class, and write similar instructions as in the example before.

Exercises to start with...

Exercise 1

Write a program `Name.java` which displays your full name.

Exercise 2

Write a program which asks for the current year, your birth's year and display your age (assuming that your birthday has already happened this year).

Exercise 3

What are the types and values of the following expressions?

```
4/3             (4-3)*5          1.3/0          4/3.0
117%7           (-1.3)/0         4-3*5          0.3-0.2
0/1.3           4-(3*5)          0.2-0.1        0/0
```

Write a program which displays their values to check your answers. And if you are surprised, have a look here:
https://www.quora.com/Why-is-0-1+0-2-not-equal-to-0-3-in-most-programming-languages

Exercise 4

What are the values of the following expressions?

```
10>5          false||(5!=4)        10==5          false&&(5!=4)
5==5          !(30%3==0)           5==11-6        0.3-0.2==0.2-0.1
```

Write a program to check your answers.

Exercise 5

Write a program that asks the user to enter the name of a TA and their name and displays:

```
Dear name_of_the_TA,
I love your tutorials, they are awesome!
name_of_the_student.
```

Hint: you will have to use the API to find the correct method to use - or just Google it!

Exercise 6

Write a program that asks the user to enter three integers and display `true` if they are in increasing order and `false` otherwise.

More advanced exercises

!!! This part uses notions that have not been introduced yet in the lecture. Only do it if you are already comfortable with Java.

Exercise 7

A palindrome is a word which reads the same backward or forward. For example, "abcba" is a palindrome. The same definition works for integers. For example 13422431 is a palindrome.

1. Write a program that asks the user to enter a `String` and displays true if it is a palindrome and false otherwise.

2. Write a program that asks the user to enter an integer (with type `int`) and displays true if it is a palindrome and false otherwise.

Exercise 8

1. Write a program that asks the user to enter a `String` and displays the longest palindrome that is a substring of it (or one of the longest if several). For example, if the user enters the word "aaabcbaababb" then the program should display "aabcbaa".

2. In the worst case, how many operations will your program do, with respect to the length of the String input by the user?