Assignment 2

Topics: encounter with a few useful classes like Scanner, variables and data types, operators, and pseudocode

1. Write the pseudocode (i.e. a description of the steps necessary to achieve your goal) for a software application that keeps on asking the user to enter a name to guess. At any trial, if the user's guess is wrong the system should print out a message like, "Sorry, wrong trial, please enter a new guess:", and a congratulation message in the other case.
   Once the number of maximum guesses is reached, the program should inform the use that s/he run out of trials and exit.

2. Create a Java project with two classes like for assignment 1: one class *Main* and one class *TestVars*

   Your class *Main* will look like:

```
public class Main {

        public static void main(String[] args) {

                TestVars test = new TestVars();
                test.runMe();
        }
}
```

   Your class *TestVars* will look like:

```
public class TestVars {

        public void runMe() {

                        /* TO DO: here is where you add your code! */
        }

}
```

3. In method *runMe()* defines three integer variables x, y and z and set them to the initial values of 0, 6 and 10, respectively. From this starting point:

   3a. Print out the value of z as "z = 10".

3b. Add the following code "*z++;"* and try to figure out the value of z before you print it out in Java. Then print it out to check if your assumption was correct.

3c. Set the value of z back to 10 and add this line of code "++z;". Then try to figure out the value of z before you print it out in Java. Then print it out to check if your assumption was correct.

3d. Add the following code "x = ++y;" and try to figure out the values before printing them out in Java

3e. Now set x and y back to their original values 0 and 6, respectively. Add the following line of code "x = y++;" and try to figure out the values before printing them out in Java

3f. Add the lines of code you see below and explain the semantic difference between the + operators in the System.out.println() methods. Afterwards remove the blank space after the first + in the first System.out.println() method and see what happens.

```
z = 6;
System.out.println("z: " + ++ z);  // note the space after the first +!
z = 6;
System.out.println("z: " +z++);
```

3g. Set x and y back to their original values, i.e., 0 and 6, respectively. Then print out the result of the division y/x

3h. Set x and y to 14 and 4, respectively. Then print out the result of the division x/y and the remainder, if possible

3i. Declare two new float variables float_x and float_y and assign them the values 14 and 4, respectively. Then print out the result of the division float_x / float_y and the remainder, if possible

4. Before testing out the following line in Java, please

4a. Try to think whether it will generate a compile-error or not:

```
String myStrangeString = + 1 + - - + - - + + + + + - 1 + " ";
```

If you think such a String is a valid Java String, try to determine its value. Once you have determined its value, write the line above and then generate a print out of the results, if that statement will compile. If it works, explain why it does.

4b. Determine what happens if you would type in the following lines, and explain why (comment what happens on each line):

```
String s1 = "Andrea";
int      i1 = 2,
         i2 = 1;

System.out.println("Result: " + s1 + (i1 + i2) );
System.out.println("Result: " + s1 + i1 + i2);
System.out.println(i1 + - + i2 + " is the result!");
System.out.println(i1 + - + " is the result!");
```

4c. Determine what happens if you would type in the following lines, and explain why:

```
int strangeResult = 07 + 010;
System.out.println("strangeResult has value " + strangeResult);
int strangeSum = 0x7A + 0x10;
System.out.println("strangeSum has value " + strangeSum);
```

4d. Determine what happens if you would type in the following lines, and explain why:

```
int giveMeTroubles = 09;
System.out.println("giveMeTroubles has value " + giveMeTroubles);
int giveMeOtherTroubles = 0x9FL;
System.out.println("giveMeOtherTroubles has value " + giveMeOtherTroubles);
```

5. You should know by now that *System.out.println(arguments)* can be used to print out variables or literals or a combination thereof. What you might don't know is however, how you can read in data: here you will learn one way for doing so. You will make use of the class *Scanner* that you have to import into your java code by adding this line before the class declaration line of *TestVars* i.e. like:

import java.util.Scanner;

public class TestVars {
// HERE YOU CONTINUE AS ABOVE!

In method *runMe()*:

5a. Write and try to understand the following lines

```
Scanner sc = new Scanner(System.in);
System.out.print("Enter your age: ");
```

```
int age = sc.nextInt();
System.out.println("So, you are " + age + " years old");
sc.close();
```

5b. Write some lines similar to 5a but that will allow you to accept three *int* values (e.g. your age, your height in cm, and your weight in kg), two *char* values (e.g. your initials) and one *String* (e.g. your address) as input.
Notice that in 5a you entered an integer (for the age) and called a method with name *nextInt()*. Expect to have to call a different method according to the type of the variable. To find out what method to use, you can find help at this URL:

https://docs.oracle.com/javase/8/docs/api/java/util/Scanner.html

You will probably not be able to understand that web page (no surprise) yet, just go over it (more notably, you will be interested in the table with heading "Method Summary") and see if, by intuition or common sense, you can find something useful. You will find *nextInt()* at that URL; feel free to read its description (click on it: it is a URL link). NOTE: the more you get into Java, the more you will look at such kind of online documentation (it is called a class Application Programming Interface (API)). I am trying to make you slowly used to it.

5c. Print out all the variable name- variable value couples for each of the variables in 5b (i.e. if your *int* variable is called *age* and was assigned value 23, you should print out something like "My age variable's value is 23").

5d. As address in 5b enter first e.g. "Corso Rosmini, 38068 Rovereto (TN)" and then simply "Rovereto". Use both the methods *next()* and *nextLine()* in class *Scanner* (see 5a to figure out how!) for both inputs. Do you see any difference? Please explain.

6. Figure out what the following lines of code produce as output; after you have estimated the result, type them into method *runMe()* and see yourself the results

6a. What does this produce?

```
int a = 5;
int b = 10;
int c = ++a * b--;
System.out.println("a " + a);
System.out.println("b " + b);
System.out.println("c " + c);
```

6b. What does this produce?

```
System.out.println("1 + 2 = " + 1 + 2);
```

System.out.println("1 + 2 = " + (1 + 2));

6c. What does this produce?

System.out.println(1 + 2 + " = 1 + 2");
System.out.println("1 + 2 = " + 1 + 2);