Exercise sheet 1 – Getting started

Task 0 – Download and install the Java Development Kit

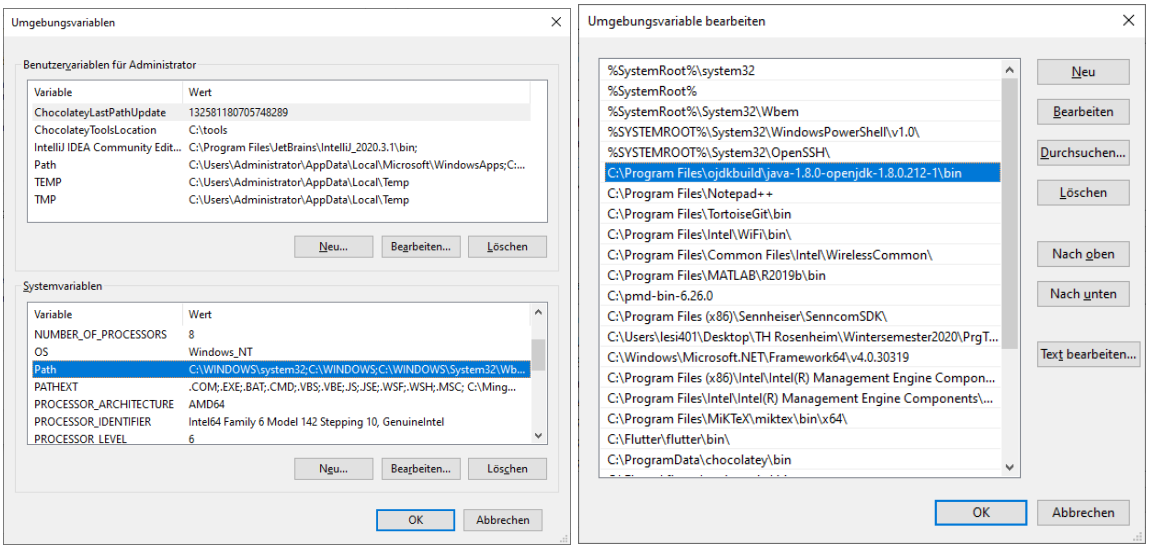
If you would like to do the exercises on your own computer, download the latest version of the Java Development Kit (JDK) from https://jdk.java.net/.

The JDK includes a Java compiler and the runtime environment you need to run Java programmes.

Install the JDK on your computer in the directory `C:\Programme\Java`.

Then adjust the **Path** environment variable accordingly. To do so, perform the following steps:

1. Open the `CONTROL PANEL`
2. Search for `ENVIRONMENT VARIABLES`
3. Select `EDIT ENVIRONMENT VARIABLES`
4. Select under `SYSTEM VARIABLES` the variable "Path" and click `EDIT`.
5. Select `NEW` and add the `bin` subfolder to the path for your JDK installation



Please note: If you are working in the Computer Centre, the JDK is already installed on the computers! Please double check.

Task 1 – Setting up the work environment

Before you start creating your first Java programme, it is a good idea to create a directory structure as a work environment. Think of a suitable directory structure that will help you to find study-related documents quickly and easily, even in a few months or semesters. So don't just save everything to

the desktop, or the default locations suggested by any application software. Instead, create clear structures that you can keep an overview of and influence yourself.

Then create an appropriate folder structure (e.g. H:\Studies\ProgB\Coding) on a drive of your choice (laptop, H drive or another storage medium). You can save your programming projects within this folder structure. Then create another subfolder for the first programming project or exercise (e.g. Exercise01).

Task 2 – Create, compile and execute the simple example programme HelloWorld.java

The following source code section shows the simple example programme HelloWorld.java:

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

a) In any text editor (e.g. Windows Notepad or also Notepad++), create an unformatted document for ASCII or Unicode texts. Copy the above source code to your document and save it as `HelloWorld.java`.

b) Use the Java compiler to compile your programme `HelloWorld.java` into the executable binary file `HelloWorld.class`. Then execute the following command at the command line in the directory where your `HelloWorld.java` file is stored.

```
javac HelloWorld.java
```

The compiler then creates the executable file `HelloWorld.class` in this directory.

c) Afterwards, run your programme. To do so, enter the following command in the command line.

```
java HelloWorld
```

Task 3 – Create, compile and execute the example programme SumTemplate.java

The following source code section shows the example programme `SumTemplate.java`:

```
public class SumTemplate {
	public static void main(String[] args) {
		// Integer which is counted up to
		int boundary;
		// Sum of the previously added digits
		int sum;
		// Integer which comes next
		int counter;

		// Define the starting value of the variables
		boundary = 4;
		sum = 0;
		counter = 1;

		// Calculate the sum of all digits from 1 to boundary
		while (counter <= boundary) {
			sum = sum + counter;
			counter = counter + 1;
		}

		// Output the sum, together with an explanatory text
		System.out.print("The sum of the digits from 1 to ");
		System.out.print(boundary);
		System.out.print(" is ");
		System.out.println(sum);
	}
}
```

The programme adds the values of the digits from 0 to `boundary`, whereby the value of `boundary` is defined in the programme. The result of this sum calculation is then output with a corresponding explanatory text.

Use this example programme as a template for your first programmes, which you will create yourself when completing the next exercises. Use this example programme as orientation for your structuring and comments.

a) Use the procedure described in Task 2 to create a source code file named `SumTemplate.java` and copy the above source code to the file created.

b) Use the Java compiler to compile your programme SumTemplate.java into the executable binary file `SumTemplate.class`.

c) Afterwards, run your programme.

d) If everything worked properly, your programme will generate the following output:

The sum of the digits from 0 to 4 is 10

Task 4 – Create and execute your own programme Sum.java

Now copy the example programme `SumTemplate.java` into a new file named `Sum.java`.

a) Within your programme, change the old name `SumTemplate` to `Sum`.

```
public class Sum {
```

b) Change the `boundary` limit of the summands to a different value, e.g. 10. Save your programme. Then compile your programme and run it. What output does your programme generate now?

c) Test the programme with the following values `boundary` $\in \{0, 1, 2, 3, 4, 5, 10\}$.