Installation of the Eclipse IDE & the LeJOS EV3 plugin

November 6th, 2020

The following tutorial summarizes the principles for developing Java programs with Eclipse. To work with the Lego Mindstorms Robots via LeJOS, we support Windows operating systems and Ubuntu-based Linux distributions. Other operating systems might work as well but we offer no OS-specific support.

1 Setting Up Eclipse

Linux The easiest way to install Eclipse on Ubuntu is to use the command line. In Ubuntu 16.04 and newer, the *snap* packet manager is already installed by default. Here, the whole installation boils down to two terminal commands (You can open up a terminal window with the shortcut *strg+alt+t*):

Install java runtime environment

```
sudo apt install default-jre
```

Install Eclipse

```
sudo snap install --classic eclipse
```

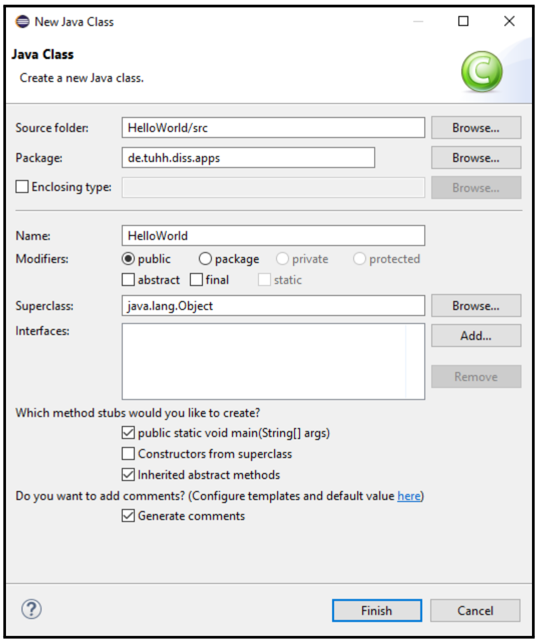
Windows If you want to install Eclipse for Java development on your notebooks, first download a version of the Java OpenJDK:
`https://download.java.net/.../openjdk-15.0.1_windows-x64_bin.zip`.
Follow the installation instructions and make sure that your environment variables, especially `PATH` include the Java JDK (read here for further details).

Download the "Eclipse IDE for Java Developers" for your operating system:
`https://www.eclipse.org/.../eclipse-ide-enterprise-java-developers`
On your laptop you are free to choose an alternative path for your workspace that should be located in your home folder, e.g. `C:\Users\<YourUserName>\eclipse_workspace\`.
Please note that you have to alter the path according to your needs!

2 Create a Java Project

Eclipse uses projects to organize the work of the programs. Via the menu item *File→ New→ Project* and selecting *Java Project*, a new Java project is created. In the following window, it is sufficient to enter the name of the project, which shall be *HelloWorld* for this example. Click on *Finish* afterwards. Note: Depending on the project type, the appearance (perspective) of Eclipse changes. In the example, the Java-Perspective is set as the default.

Write *HelloWorld* Class A new Java class is created by clicking with the right mouse button on the project name, the selected directory or package. Afterwards, select the entry *New→Class*. Here, you



Java Class
Create a new Java class.

Source folder: HelloWorld/src
Package: de.tuhh.diss.apps
□ Enclosing type:

Name: HelloWorld
Modifiers: ● public ○ package ○ private ○ protected
□ abstract □ final □ static
Superclass: java.lang.Object
Interfaces:

Which method stubs would you like to create?
☑ public static void main(String[] args)
□ Constructors from superclass
☑ Inherited abstract methods
Do you want to add comments? (Configure templates and default value here)
☑ Generate comments

Figure 1: Creating a new *HelloWorld* class in Eclipse.

must specify the package name and class name. Note that Eclipse will always create the correct file structure for the Java class.

By checking `public static void main(String[] args)`, the method `main()` is created automatically. Create a class with the name *HelloWorld* in the underlying package `de.tuhh.diss.apps` and mark the box `public static void main(String[] args)`. Press *Finish* to create the Java class.

Implement the method `main()`: For a simple *HelloWorld* application, add

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

to the method. When executed, this line writes the text "Hello World" to the console.

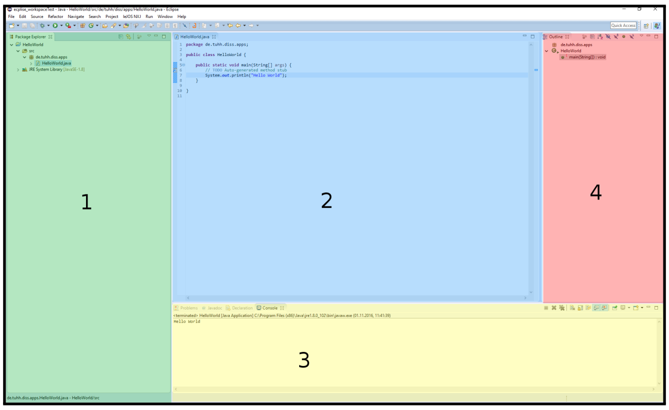
By saving the file, the source code automatically translates into byte code. Via the menu *Run*→*Run*, you can run the Java program. The output is shown on the console in the lower part of the window.

The Java Perspective The individual windows of Eclipse are referred as views. All visible views are part of a perspective that controls the positions of the windows. Figure 2 shows the most important Java perspective.

View 1 "Package Explorer" provides an overview of the projects existing in the current workspace. You can navigate between the projects and manage files. For more information on the project explorer, visit this web page.

View 2 "Editor". You can easily switch between opened files by using the tab bar on the top. Errors or warnings are displayed directly in the source code. You can even set up break points for debugging, by double-clicking on the line numbers.

View 3 contains tabs. The tab *"Problems"* lists the current errors in the source code. The tab *"Console"*



ecplise_workspaceTest - Java - HelloWorld/src/de/tuhh/diss/apps/HelloWorld.java - Eclipse
File Edit Source Refactor Navigate Search Project leJOS NXJ Run Window Help
Quick Access
Package Explorer
HelloWorld
src
de.tuhh.diss.apps
HelloWorld.java
JRE System Library [JavaSE-1.8]
HelloWorld.java
Outline
de.tuhh.diss.apps
HelloWorld
main(String[]) : void
Problems
Javadoc
Declaration
Console
1
2
3
4

```java
package de.tuhh.diss.apps;

public class HelloWorld {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        System.out.println("Hello World");
    }

}
```

```
<terminated> HelloWorld [Java Application] C:\Program Files (x86)\Java\jre1.8.0_102\bin\javaw.exe (01.11.2016, 11:41:39)
Hello World
```

Figure 2: All four views of the Java perspective in Eclipse.

shows data printed by the program.

View 4 "Outline" displays information about the currently opened file. It provides a good overview of the structure (methods and variables in case of Java) of the file.

3 Setting up LeJOS EV3

Setting up LeJOS is required for solving labs 2 – 4. Follow the given instructions carefully for a smooth start into the lab assignments.

Linux Start with downloading the file *leJOS_EV3_0.9.1-beta.tar.gz* from
`https://sourceforge.net/projects/ev3.lejos.p/files/0.9.1-beta/`.
Extract the content to some path in your home folder, e.g. `/home/<YourUserName>/EV3_HOME`, and remember the path.

Afterwards, install the Eclipse Plugin for LeJoS by following the guide available through:
`https://sourceforge.net/p/lejos/wiki/Installing%20the%20Eclipse%20plugin/`
During this tutorial, you will be asked to provide a path to your *EV3_HOME* folder. Enter the path to where you have extracted the LEJOS library to in the previous step.

Windows Start with the official tutorial available through:
`https://sourceforge.net/p/lejos/wiki/Windows%20Installation/`.
You do not have to use the `EV3SDCard` utility, since the availble robots already contain a configured SD card and can be used directly. Afterwards, install the Eclipse Plugin for LeJOS by following the guide available through:
`https://sourceforge.net/p/lejos/wiki/Installing%20the%20Eclipse%20plugin/`.
Please note: you will program the robots via USB cables. Since the EV3 does not act as a normal USB device, you have to install a separate driver on your computer to support IP over USB. You can follow the guidelines available in chapter 2.1 of:
`http://www.aplu.ch/home/ev3_inst.html`.
We do not change the default IP address of our robots: you can keep `10.0.1.1`.