Installing Java and IntelliJ IDEA

0. General.

   a. The instructions below deal mostly with installing software on Windows. If you are installing it on OS X (Apple), Unix, Linux, or some other operating system you will need to make appropriate changes.

   b. I install most Java software in a separate folder under `C:\Java`; e.g., I install the JDK in `C:\Java\jdk-14`, and I install JavaFX in `C:\Java\javafx-sdk-14`. I install IntelliJ Eclipse in the location it chooses as the default.

   c. Several of the steps below involve creating or editing environment variables. In all cases I recommend creating/editing system environment variables, not user environment variables. Also, use caution when editing environment variables, especially `PATH` and `CLASSPATH`. Remember that ';' is the separator for entries in Windows, but ':' is the separator for entries in Linux/Unix. (See separate handout on editing environment variables.)

   d. You should be running a 64-bit version of Windows, and there are 64-bit versions of Java, JavaFX, IntelliJ IDEA, etc. Sometimes you will need to search for the 64-bit version, and sometimes it will be installed by default. In general, you should run only 64-bit Java.

1. Java Development Kit (JDK)

   a. If you have an outdated version of Java installed, remove it. For versions of Java 10 and lower, you will likely need to use Control Panel to uninstall it. When using Control Panel, you should uninstall all versions of the JDK and the JRE.

   b. Download the latest version of the Java Development Kit (e.g., JDK 14) from http://jdk.java.net/. The file name will be something like `openjdk-14_windows-x64_bin.zip`.

   c. Unzip the JDK file to a directory on your computer . I recommend that you not put it in any directory with spaces in the name. Instead, create a separate directory `C:\Java` and unzip it there. After unzipping, the directory containing the JDK should be something like `C:\Java\jdk-14`. Check this directory to make sure that it contains several subdirectories including subdirectories named `bin` (`C:\Java\jdk-14\bin`) and `lib` (`C:\Java\jdk-14\lib`).

   d. Optional. For future reference, save links in your browser to both
   – the API documentation
   (https://docs.oracle.com/en/java/javase/14/docs/api/index.html)
   – the Tool Specifications
   (https://docs.oracle.com/en/java/javase/14/docs/specs/man/index.html)

   e. Create an environment variable named `JAVA_HOME` with the value of the directory where the JDK is installed; e.g., `C:\Java\jdk-14`.

   f. Add `%JAVA_HOME%\bin` to the PATH environment variable.

g. Test your installation by typing "`javac -version`" at the command line. The response should be something like "`javac 14`". Also, type "`java -version`" at the command line, and you should see a similar but more detailed response.

2. IntelliJ IDEA

   a. I recommend that you install Java JDK (see item 1 above) first.

   b. Download the IntelliJ IDEA installer from https://www.jetbrains.com/idea/. There are two editions, Ultimate and Community. The free Community edition is sufficient for our needs. Double clicking the downloaded file to install and use the default locations.

Note that IntelliJ IDEA includes Kotlin. A separate download for the Kotlin compiler is not required.

   c. Feel free to configure Intellij IDEA. For example, you might want to configure File → Settings → Editor → Code Style → Kotlin to format your source code using a style other than the default. Once you have configured the formatter, you can export the settings to an XML file and then later import them on a different installation of IntelliJ IDEA.

   d. I recommend placing a shortcut to the executable (something like `C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2020.2\bin\idea64.exe`) somewhere on the desktop.

   e. Test your installation by double clicking on the shortcut or menu entry.

3. JavaFX (Optional)

   a. Download the latest version (currently 14) of JavaFX from https://openjfx.io/. The file name will be something like `openjfx-14_windows-x64_bin-sdk.zip`.

   b. Unzip the file to `C:\Java`. Double check that `C:\Java` contains a subdirectory named similar to `javafx-sdk-14` (`C:\Java\javafx-sdk-14`), and that this subdirectory has several subdirectories, including one named `lib` (`C:\Java\javafx-sdk-14\lib`).

   c. Create an environment variable named `JFX_HOME` with the value of the directory where JavaFX is installed; e.g., `C:\Java\javafx-sdk-14`.

   d. Create a User Library in Eclipse: Window → Preferences → Java → Build Path → User Libraries → New. Name it JavaFX 14 and include the jars under the `lib` subdirectory for JavaFX 14 (`C:\Java\javafx-sdk-14\lib`).

   e. Add JavaFX 14 to any Eclipse Java project that needs to use JavaFX. Right mouse click on the project name and select Build Path → Configure Build Path… → Libraries (tab) → Modulepath → Add Library… → User Library → Next → select JavaFX 14 → Finish

   f. When running an application from Eclipse, you might see the error message:
   Error: JavaFX runtime components are missing, and are required to run this application
   If you encounter this message, the take the following actions starting with menu item Run: Run → Run Configurations… → Arguments (tab). In the text box labeled "VM Arguments:" enter
   "`--module-path=${env_var:JFX_HOME}\lib --add-modules=javafx.controls`"