HOW TO USE THE TWO-WAY TWO-STACK PUSHDOWN AUTOMATA:

Important Things: IntelliJ IDE, JDK, JavaFX, toread.txt

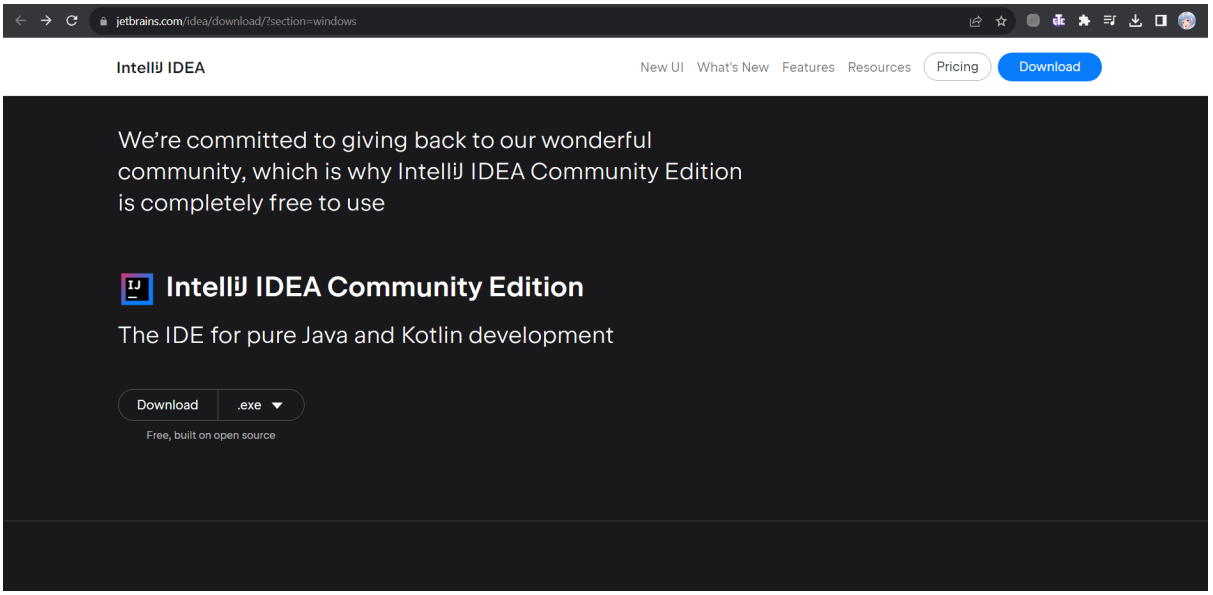
For the installation and usage of this program, you will need the IntelliJ IDE Community Edition. This will also only be done on Windows. If you have IntelliJ, skip these steps. If you don't, here's how to install it:

INSTALLING INTELLIJ COMMUNITY EDITION

Go to the IntelliJ downloads here:

https://www.jetbrains.com/idea/download/?section=windows

Make sure you scroll down to get the Community Edition instead of the Ultimate Edition, since the Ultimate Edition is behind a paywall.



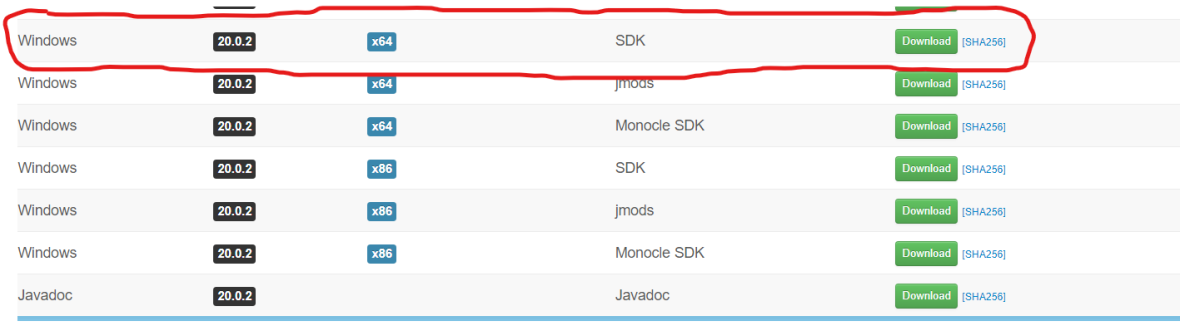
Once downloading the installation wizard, open up the wizard. Click next to everything, and wait for it to finish installing on your computer. Once done installing, close the wizard by clicking finish and open up IntelliJ (you can also click the Run IntelliJ IDEA Community Edition to make things quicker). Once open, there will be an End User License Agreement that you must agree upon before using it. After this, IntelliJ is now up and running.

JAVAFX

This program utilises the JavaFX library, thus we will be needing to download the libraries needed to run the program. If you have JavaFX installed, skip this part. If you don't have JavaFX, follow these steps:

Go to this website here to download the library: https://gluonhq.com/products/javafx/

Scroll down until you see options for Linux, macOS and Windows. Click the download for Windows and SDK



Windows	20.0.2	x64	SDK	Download [SHA256]
Windows	20.0.2	x64	jmods	Download [SHA256]
Windows	20.0.2	x64	Monocle SDK	Download [SHA256]
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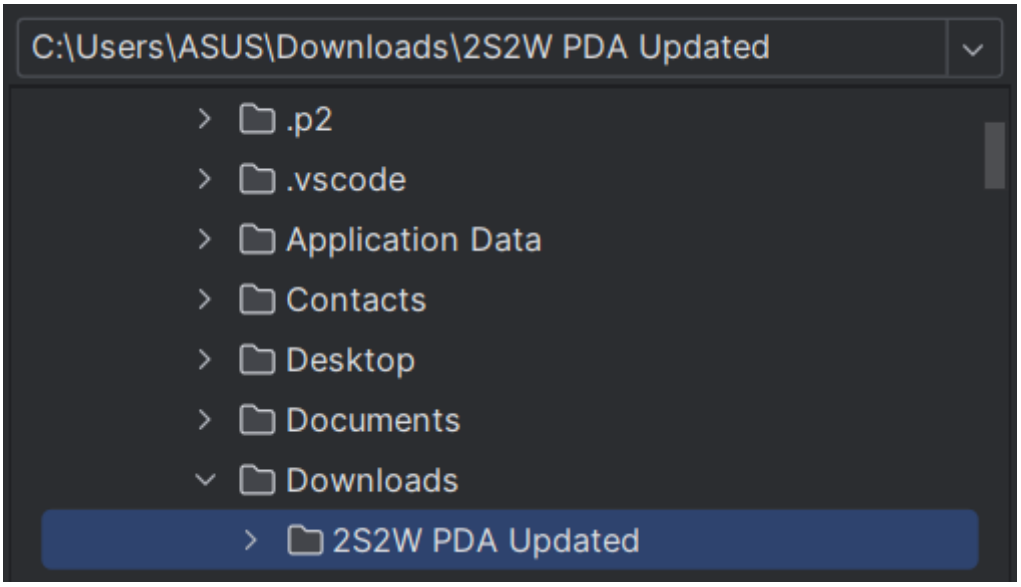
Windows	20.0.2	x86	jmods	Download [SHA256]
Windows	20.0.2	x86	Monocle SDK	Download [SHA256]
Javadoc	20.0.2		Javadoc	Download [SHA256]

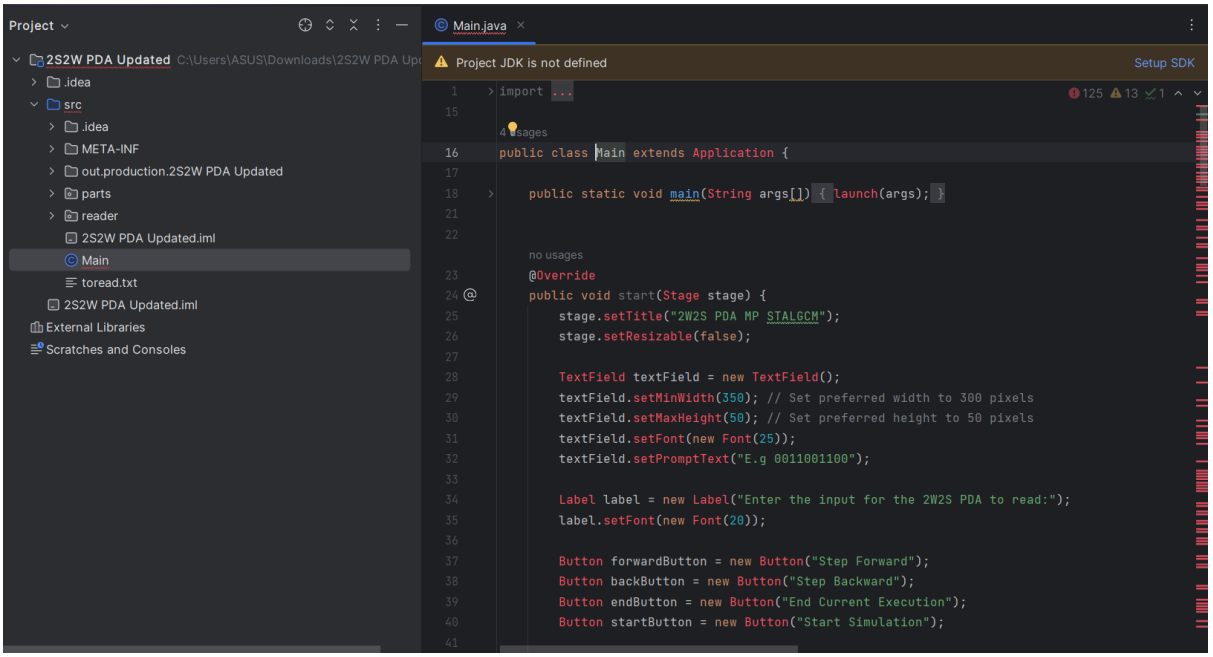
After downloading the zip file, unzip the zip file. For now, just keep it in the downloads folder. We will be using it for later.

RUNNING THE PROGRAM

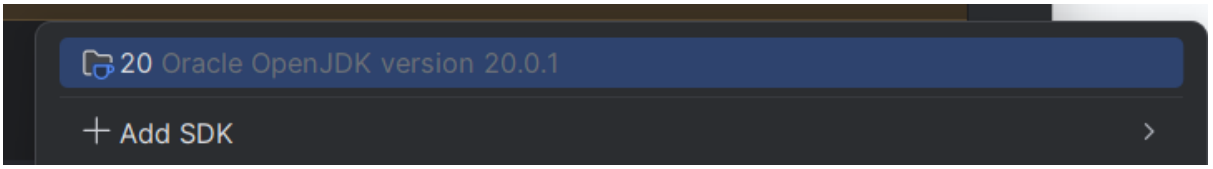
To run the program, we would first need to do a few things in IntelliJ. This is just to setup the project. To start, open IntelliJ and open the project folder “2W2S PDA GUI Updated”. There might be a warning screen about the project being untrustworthy, just click trust project to proceed.



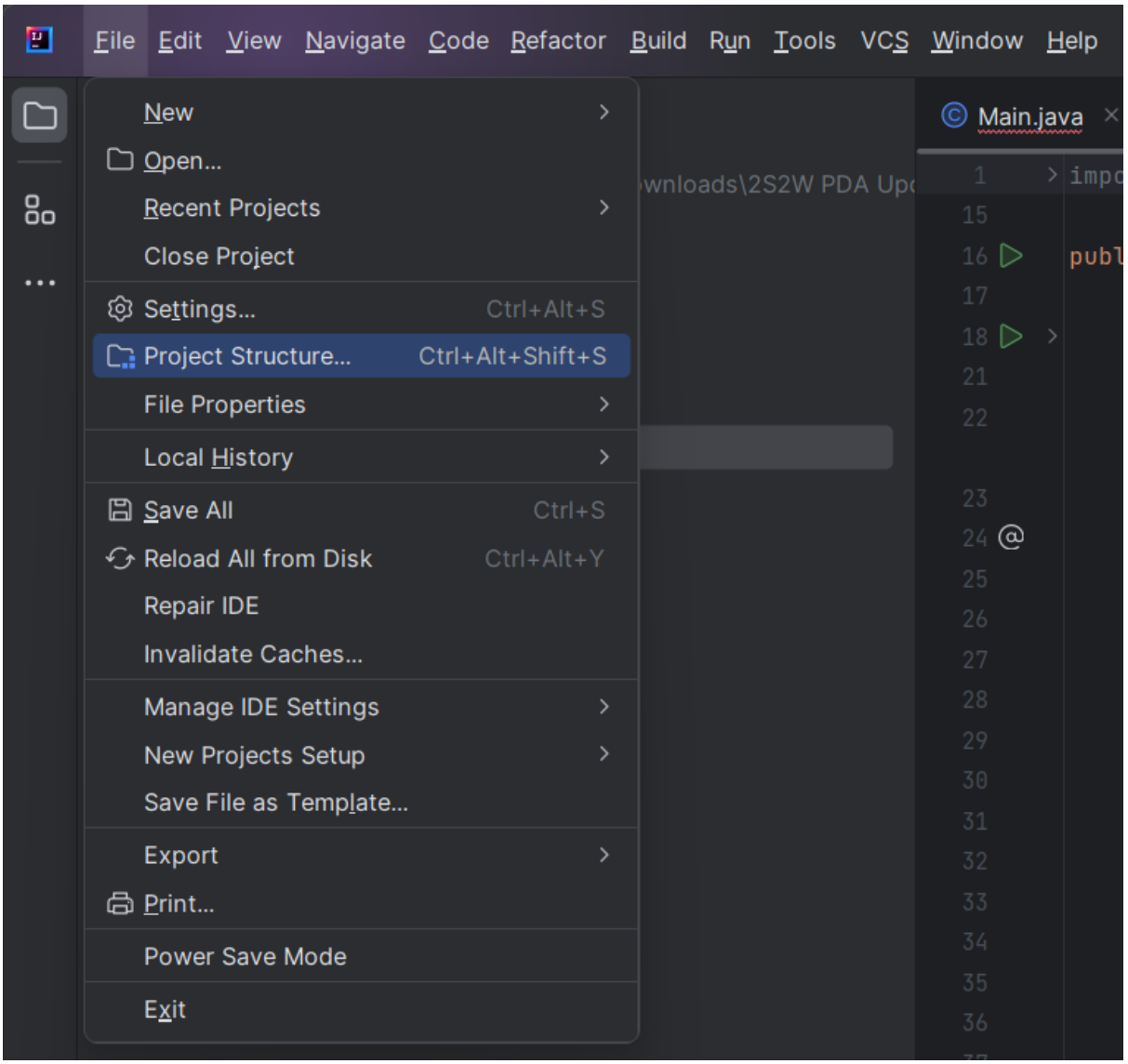
After opening the folder, double click the file named “Main”. You should see this now, where we would need to configure a few things.



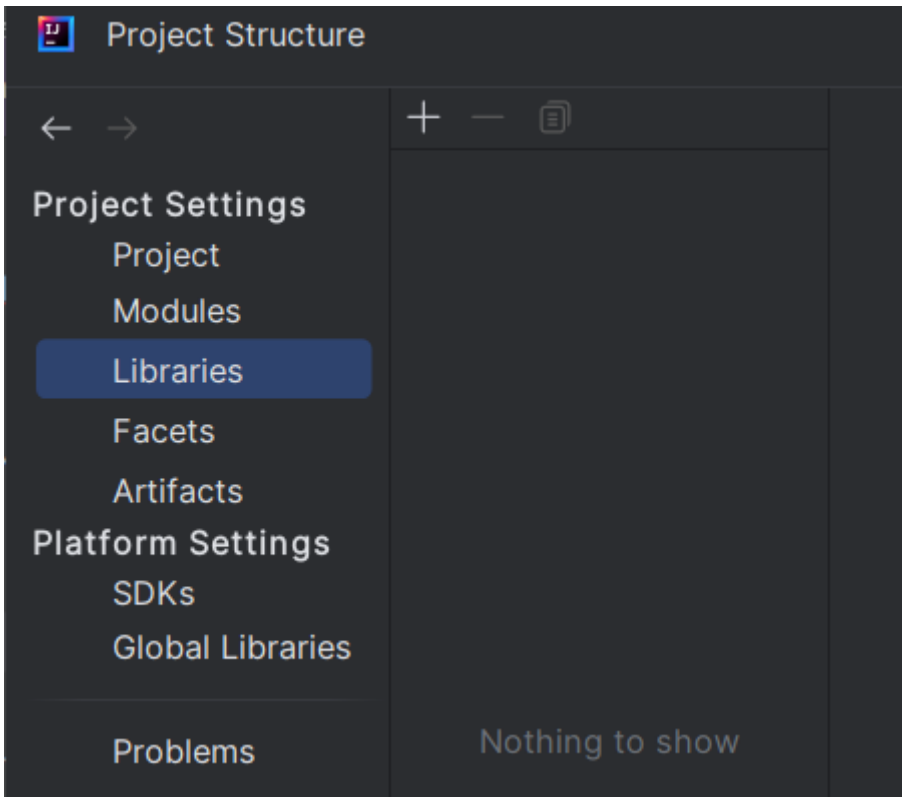
Firstly, click the Setup JDK in the top right and click The Java JDK.



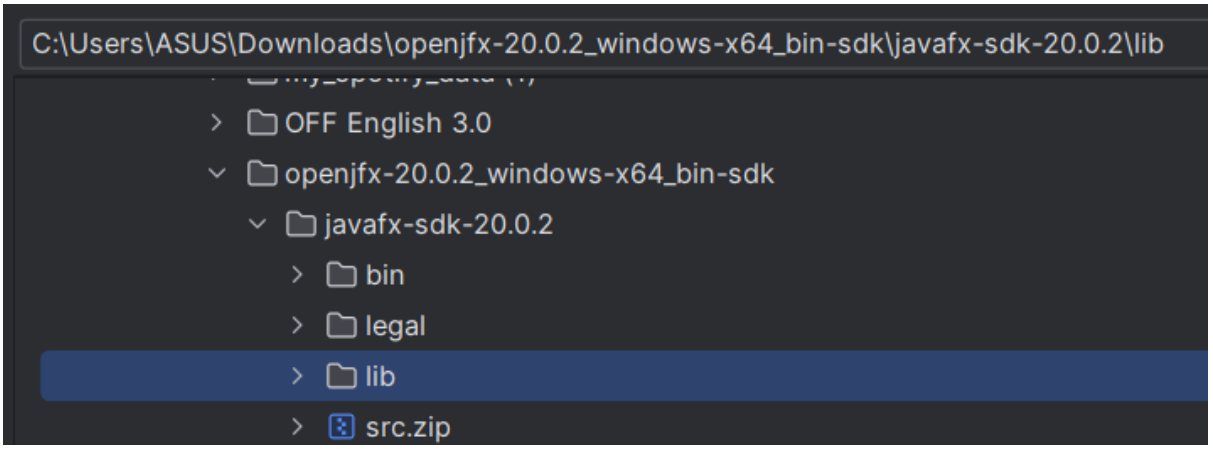
There should still be errors left, which means we now need to install JavaFX into our program. To do this, we will need to add JavaFX as a referenced library. Go to File > Project Structure



Then, go to Libraries:

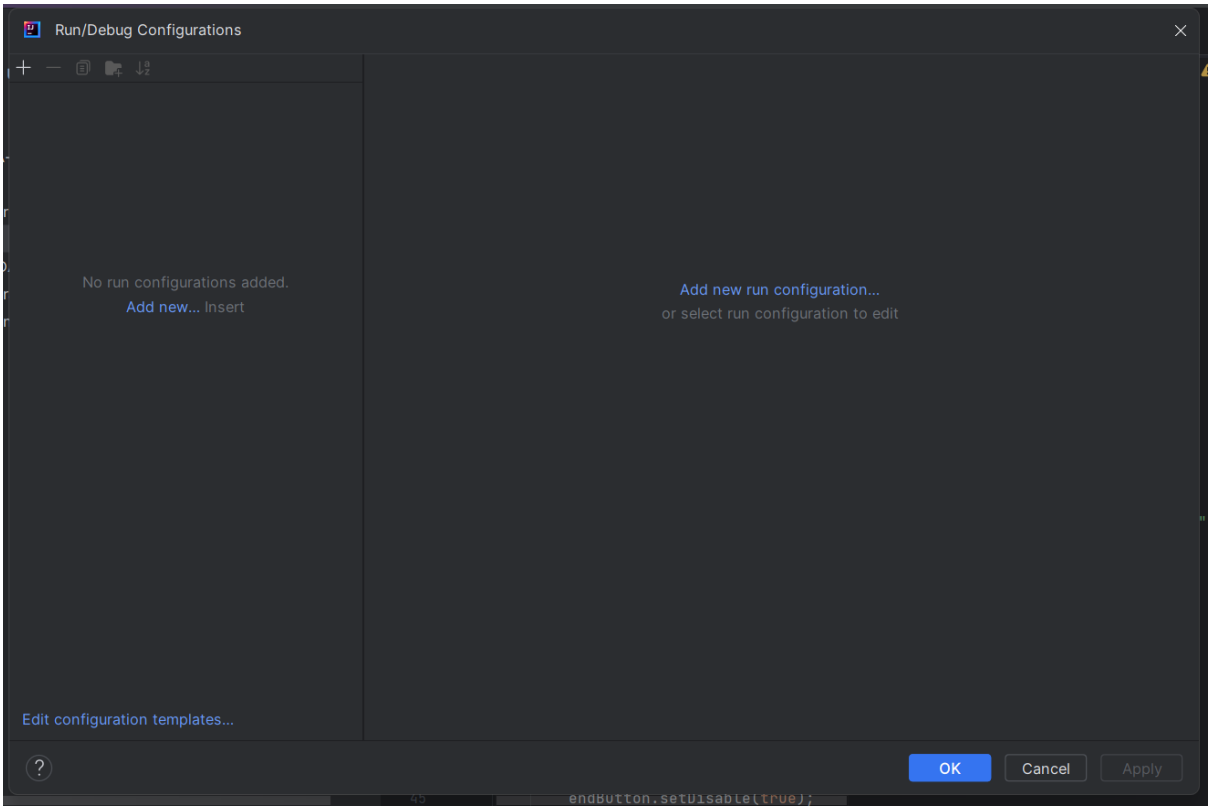


Click the “+” sign then click Java. Find the unzipped file for JavaFX we installed earlier in the downloads folder (or wherever you decided to put in your system if you already had it installed) and click, then choose lib

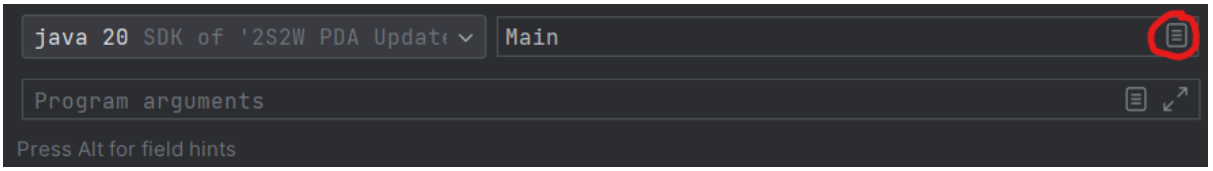


Click OK, then OK again. After this, click Apply at the bottom right then OK. After you do all this, all the red errors should now be gone. We can’t run it yet however, there is one more thing we need to do.

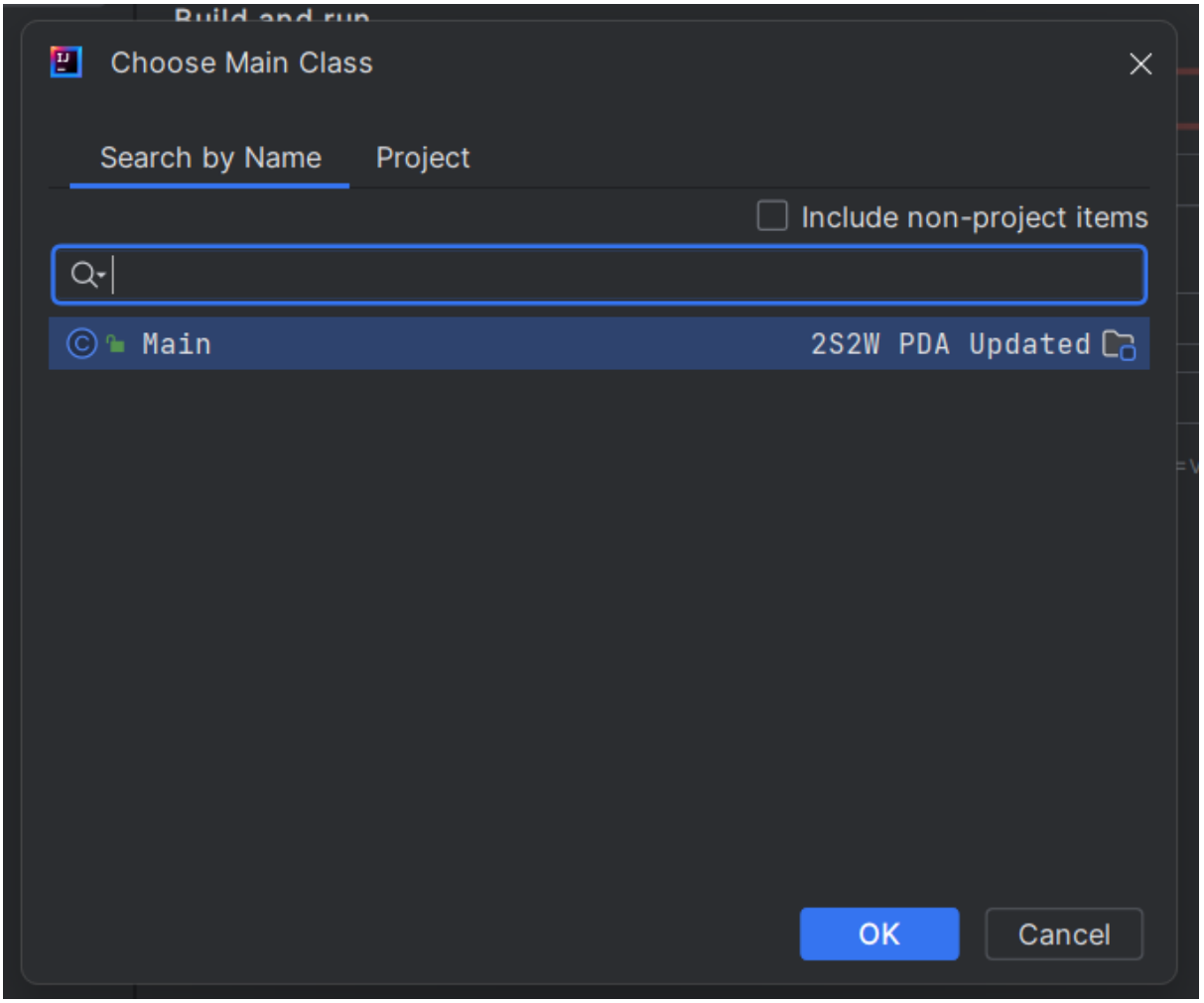
Now, go to Run > Edit Configurations. You should be on this screen



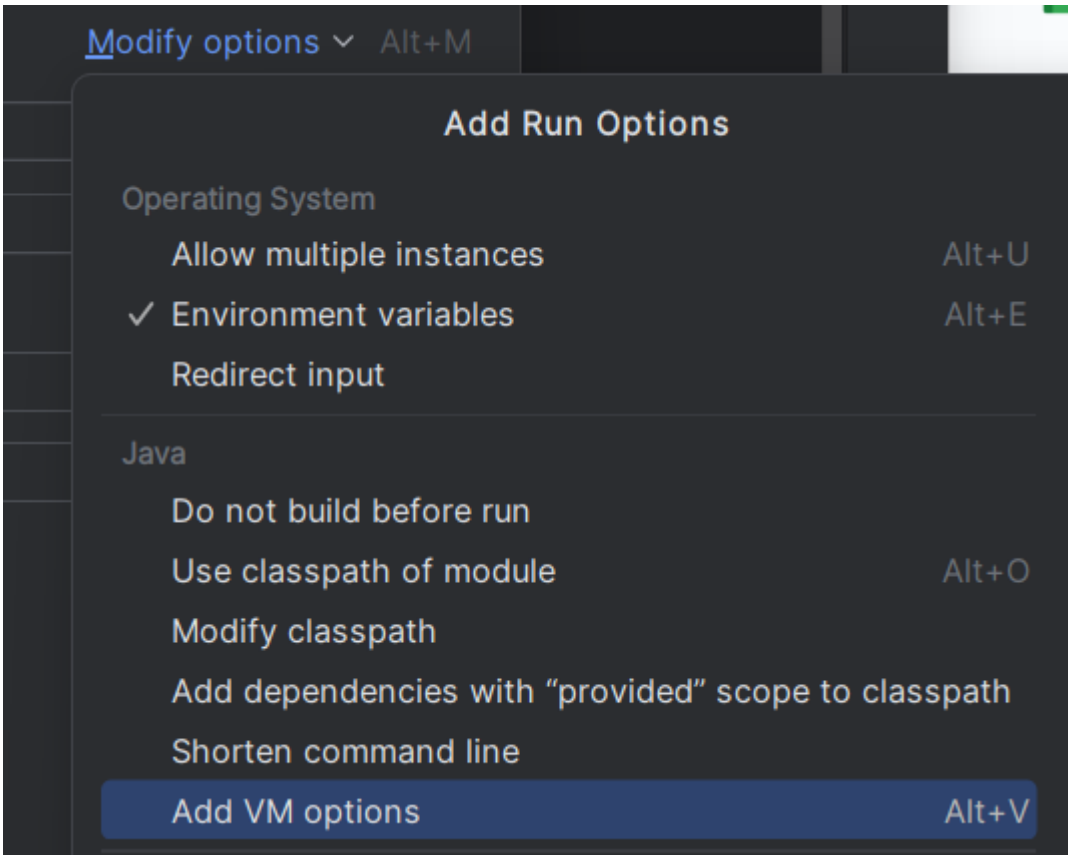
Click Add new… and choose the Application option. You can name it whatever you want, but for this tutorial it will be named “Main”. You will now have to choose a main class, click browse option at the right



There is only one main class you can choose, click it.


Choose Main Class
Search by Name
Project
Include non-project items
Main
2S2W PDA Updated
OK
Cancel

After this, click the Modify Options > Add VM Options

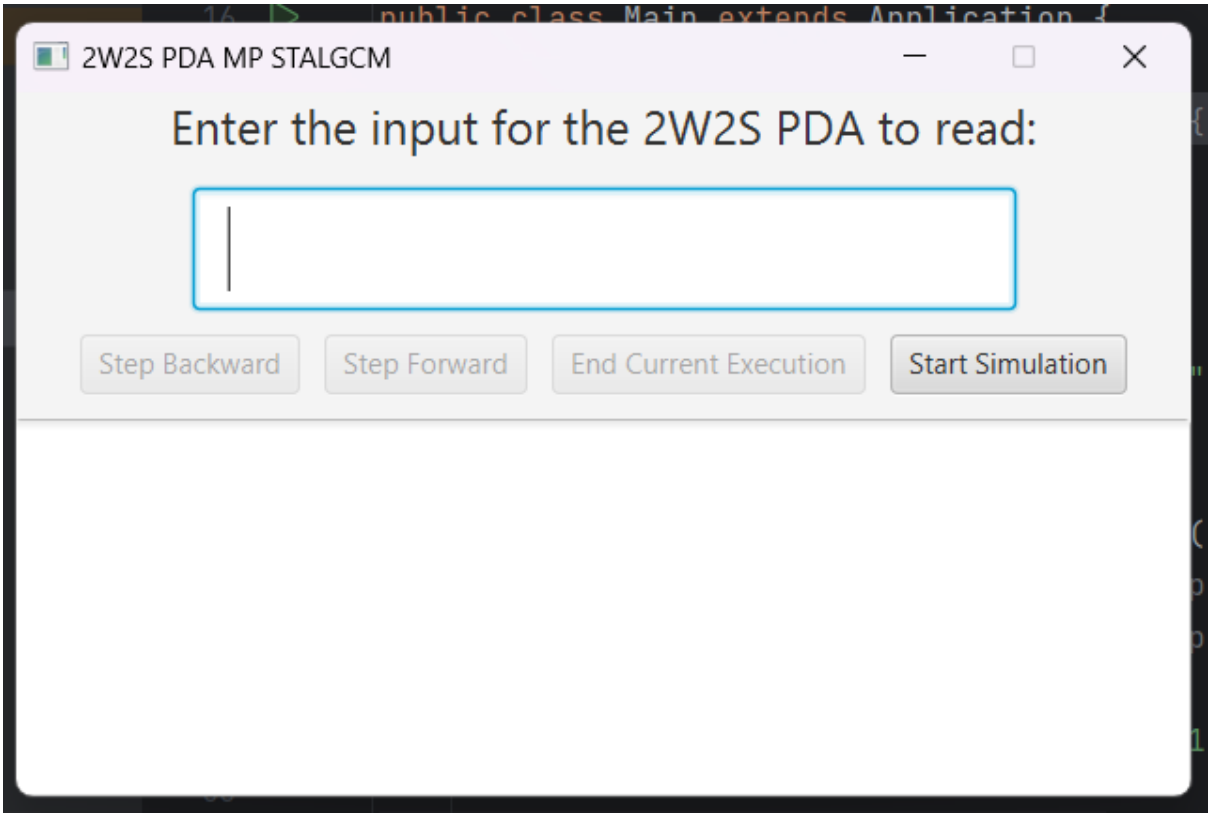


Now, in the VM options text box, copy this code

--module-path /path/to/javafx-sdk-XX/lib --add-modules javafx.controls,javafx.fxml

Make sure to replace /path/to/javafx-sdk-XX/lib with the actual path to the lib directory inside the unzipped JavaFX SDK folder.

If you have done everything correctly, You can now run the application by clicking the Run button (it should be a play button) and the application will pop up.



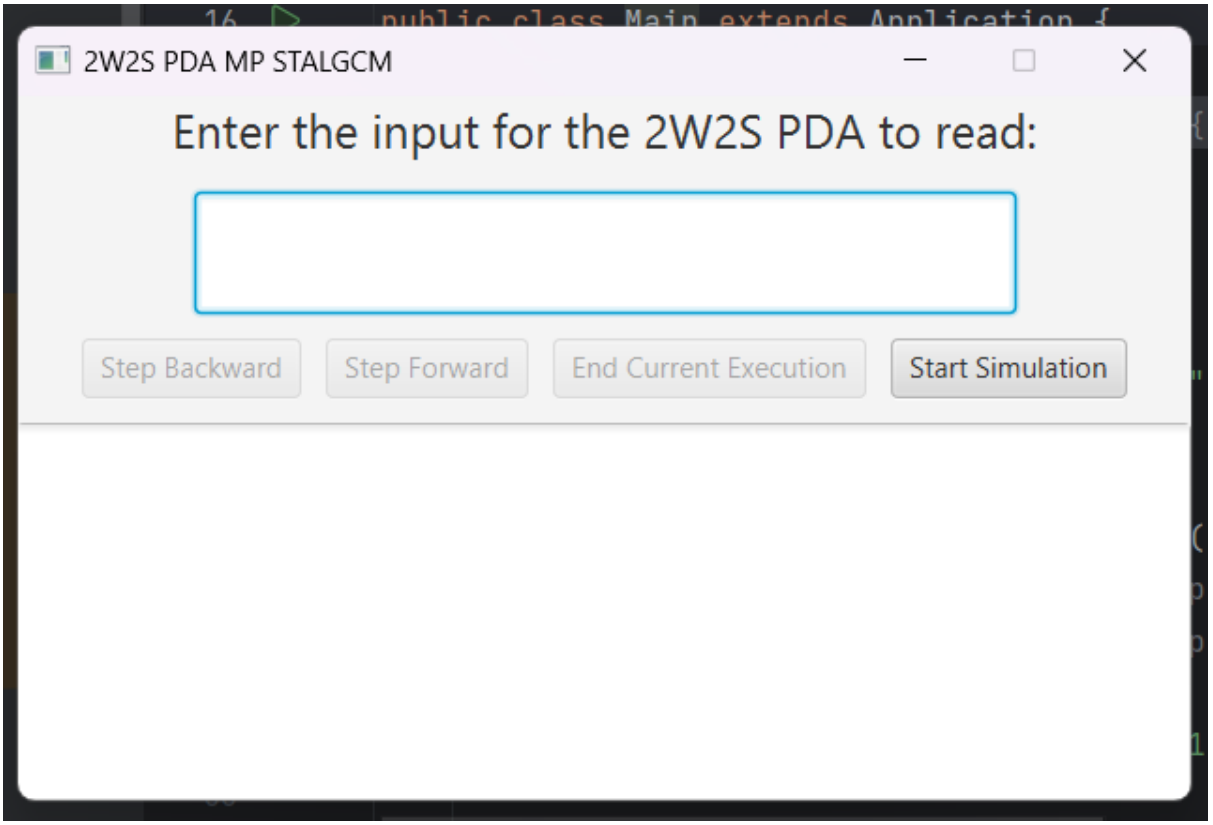
TOREAD.TXT

In the unzipped project folder for the Two-Way Two-Stack Pushdown Automata, there is a text file named “toread.txt”. This contains the machine definition. The parameters for this are as follows

A B /*list of states*/
4 /*number of transitions*/

Transitions:
/*Current State Input Pop Stack 1 Pop Stack 2 Next State Push Stack 1 Push Stack 2 Direction*/
A 0 null null A 1 null RIGHT
A 1 1 null B null null RIGHT
B 1 1 null B null null RIGHT
B null Z Z B null null RIGHT /*state to pop Z from the stack*/
A /*initial state*/
B /*final state*/

HOW THE APPLICATION WORKS



The application has 4 buttons: Step Backward, Step Forward, End Current Execution and Start Simulation.

To start, you first enter the input, then click Start Simulation. Once the simulation starts, it will read the machine definition file for transitions (toread.txt). You can trace the steps with Step Backward and Step Forward. If everything goes correctly, the string input will be accepted. Otherwise it will be rejected. To do another input, you must click End Current Execution.