User's Manual

State Table Generator (NextState)

Machine Problem 2

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BS COMPUTER SCIENCE

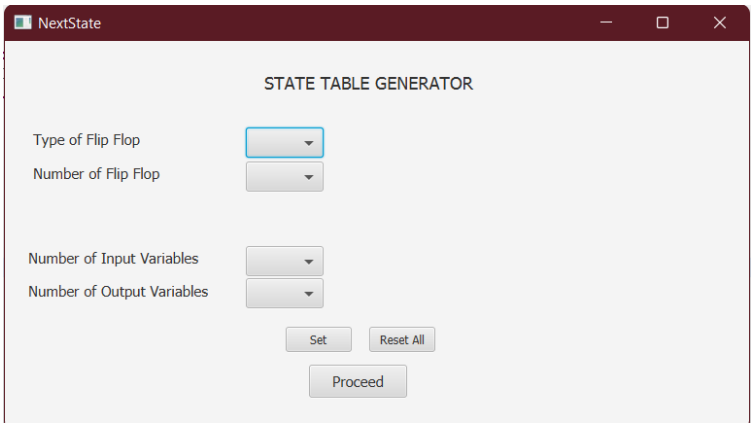
Introduction

What is a State Table?

A **state table** is a table that shows how sequential circuits behave for the input variables and state variables. This table shows how the inputs, outputs, and flip-flops are connected and describes the relation of the current state and next state. The data obtained from this table can be used in creating the state diagram of the sequential circuit.

What is NextState?

NextState is an application that generates a state table of a sequential circuit with a given inputs, output, and flip-flops.



Features:

Here are some of the features of the application.

1. Users can select the flip-flop type. The selection includes T, D, RS, and JK flip-flops.
2. Users can choose the number of flip-flops, from one to two.
3. Users can also choose the number of input and output.
4. Users can customize the variable assignments of the states, inputs, and outputs.

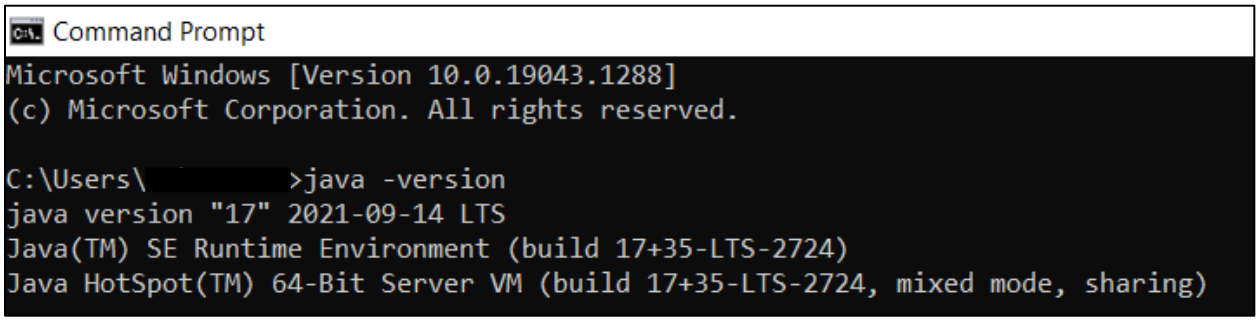
Getting Started

Requirements:

1. Java

To run NextState, you need to have ***Java*** installed at your computer.

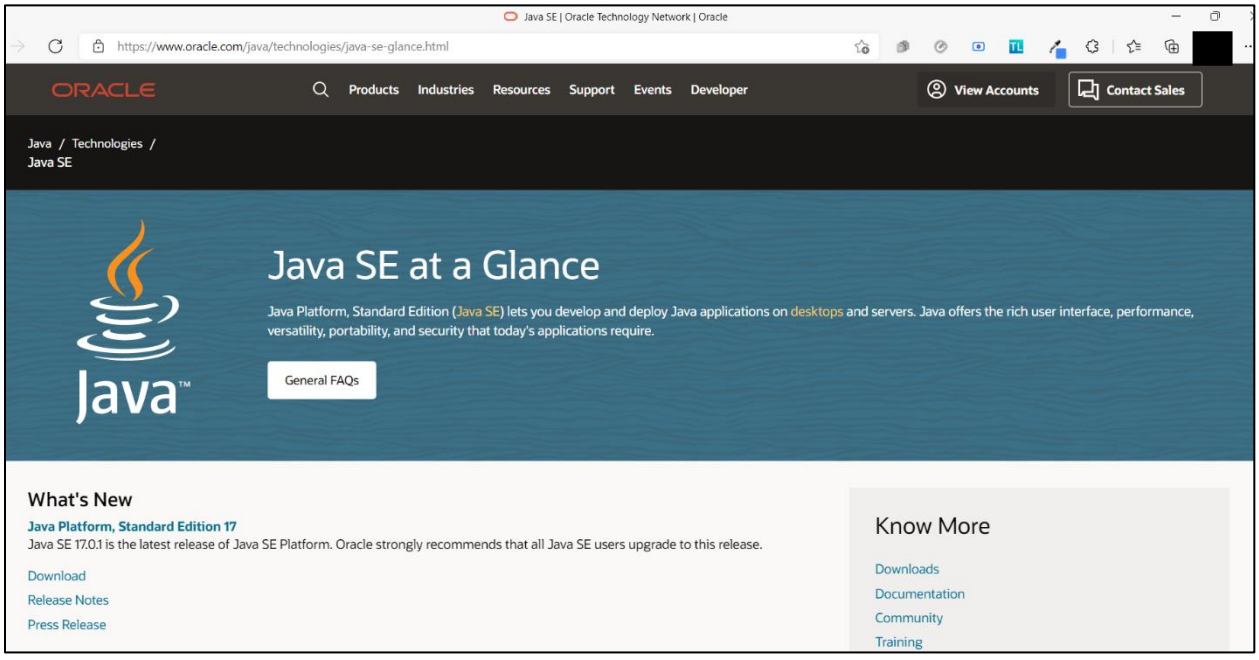
To check if it is installed, type ‘java -version’ in Command Prompt (for Windows).



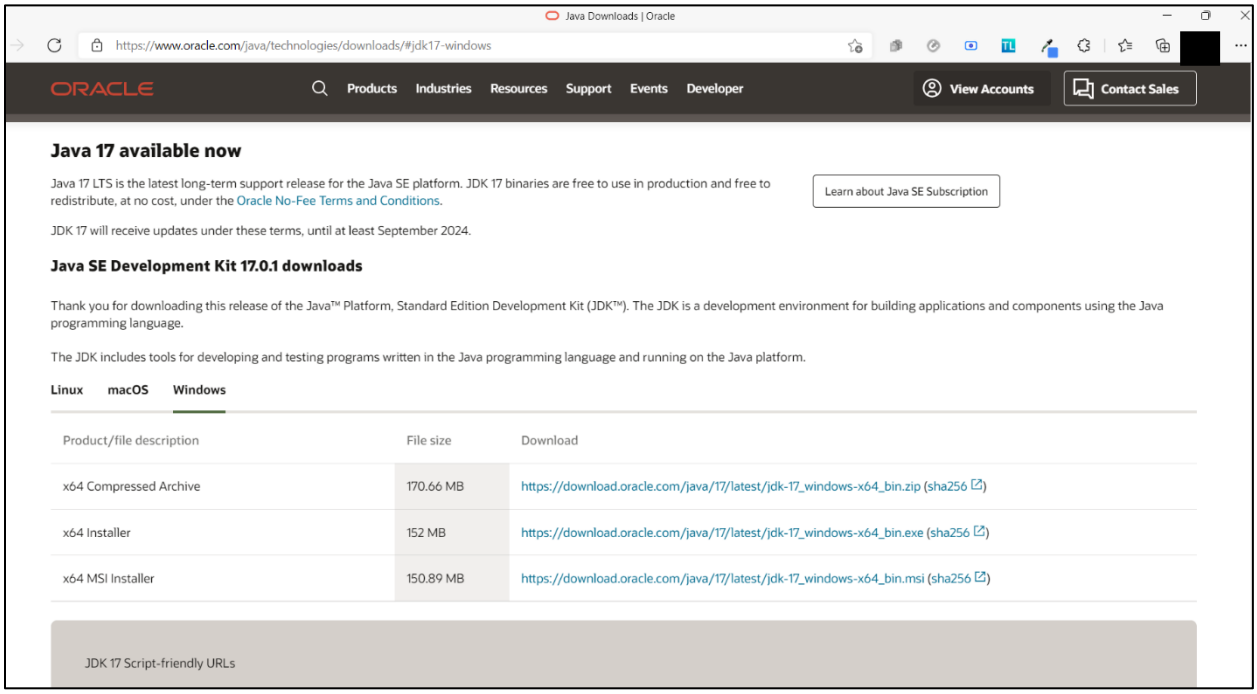
To run the program, you need to at least have Java 8.

If it is already installed, you can proceed to the next phase. If not, follow the steps below:

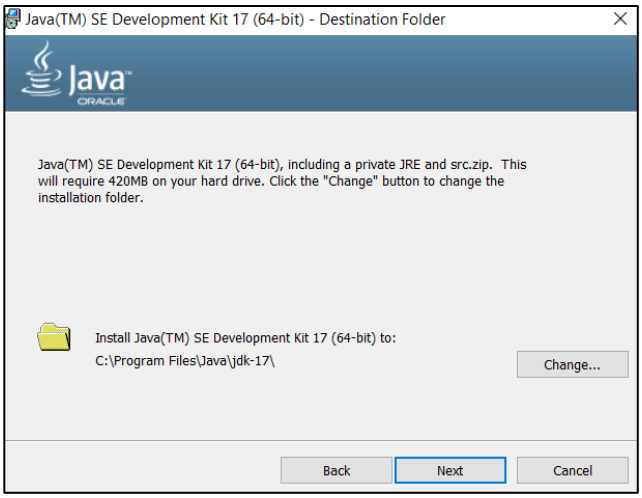
1. Go to https://www.oracle.com/java/technologies/java-se-glance.html



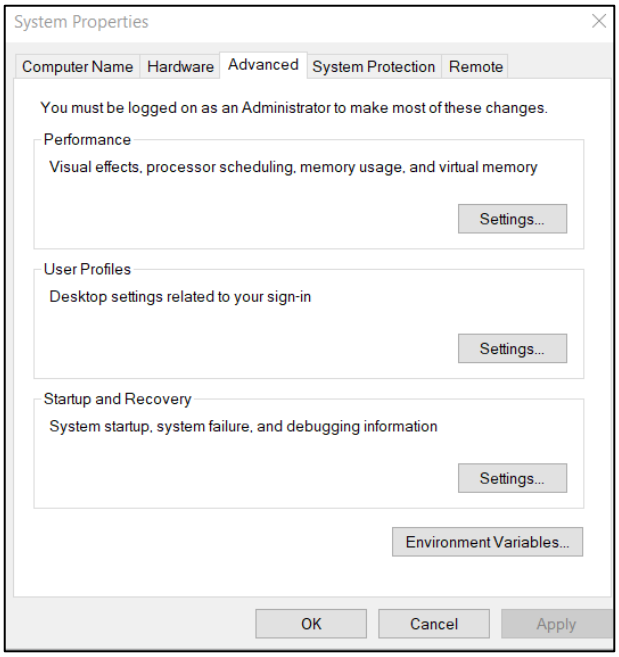
2. Click ‘Download’. You should be redirected to the download page.



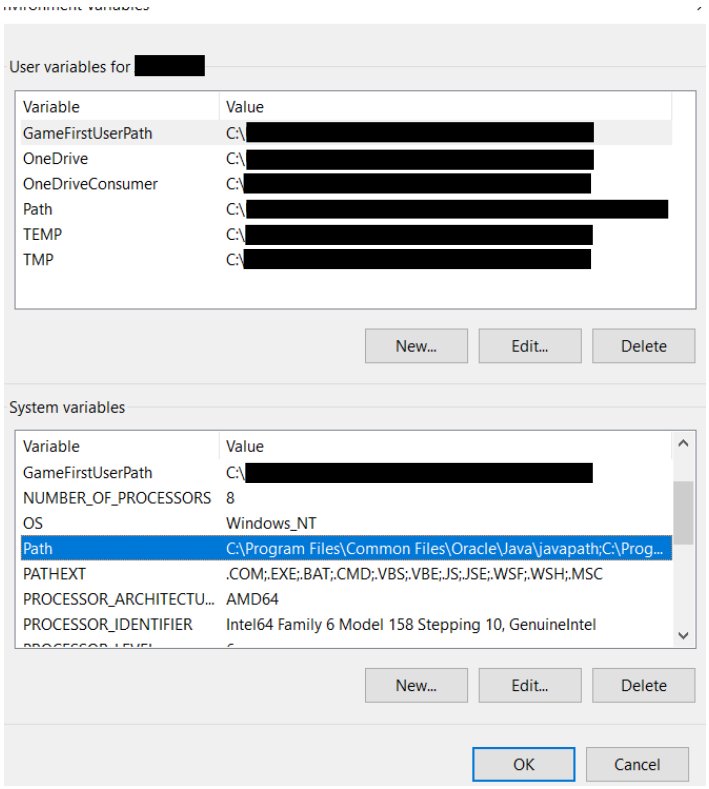
3. Select the OS and download the ‘x64 Installer’ (in Windows) by clicking the link.
4. After downloading the installer, install the ‘jdk-17_windows-x64_bin’.
5. Follow the instructions in the installer.



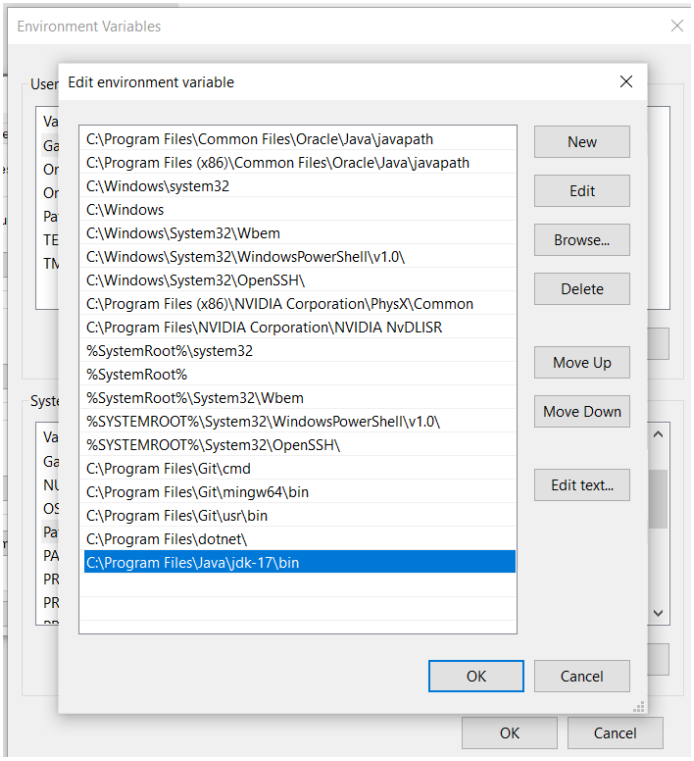
6. After installing, go to 'System Properties' (Can be found on Control Panel > System and Security > System > Advanced System Settings).



7. Click ‘Environment Variables’.



8. Click ‘Path’ under ‘System Variables’ (the highlighted one). Then, click ‘Edit’.


Environment Variables
Edit environment variable
C:\Program Files\Common Files\Oracle\Java\javapath
C:\Program Files (x86)\Common Files\Oracle\Java\javapath
C:\Windows\system32
C:\Windows
C:\Windows\System32\Wbem
C:\Windows\System32\WindowsPowerShell\v1.0\
C:\Windows\System32\OpenSSH\
C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common
C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\Git\cmd
C:\Program Files\Git\mingw64\bin
C:\Program Files\Git\usr\bin
C:\Program Files\dotnet\
C:\Program Files\Java\jdk-17\bin
New
Edit
Browse...
Delete
Move Up
Move Down
Edit text...
OK
Cancel
OK
Cancel

9. Click ‘New’. Then enter ‘C:\Program Files\Java\jdk-17\bin’ (the directory of the installation of Java with ‘\bin’).
10. Press ‘OK’.

Note: To check if the installation is successful, go to Command Prompt and enter ‘java -version’ to check if it is installed. Refer to the first picture in ‘Getting Started’.

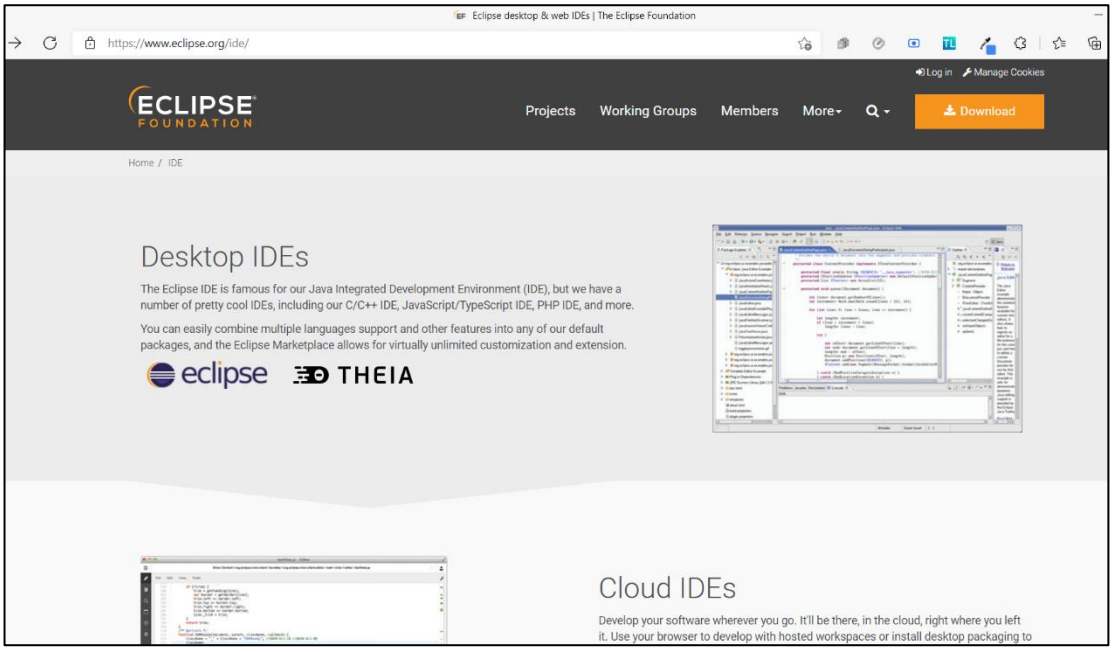
2. Java IDE - Eclipse

Since the program used JavaFX for the UI, you need to install JavaFX. For this, you need to download **Eclipse** so you can use **e(fx)clipse**, which is a tool used for JavaFX applications like NextState. Although, it is not really required to download the tool, it is advisable to download one since FXML is involved.

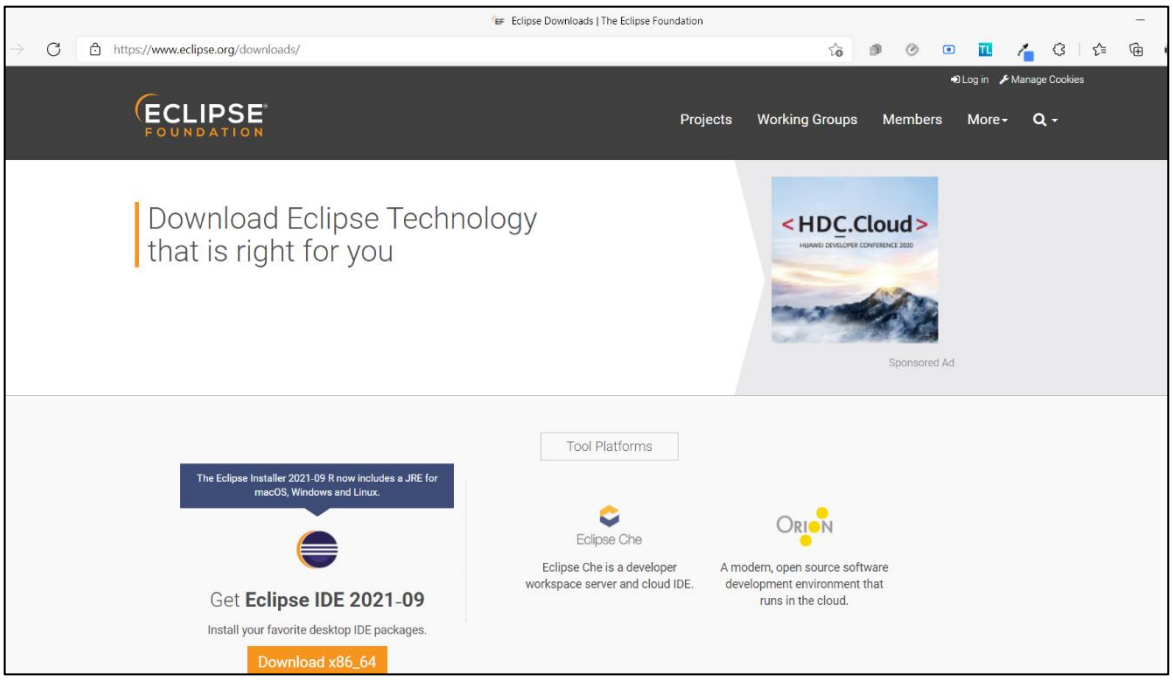
If you want to install Eclipse, follow the steps below. Else, proceed on the next part of this guide.

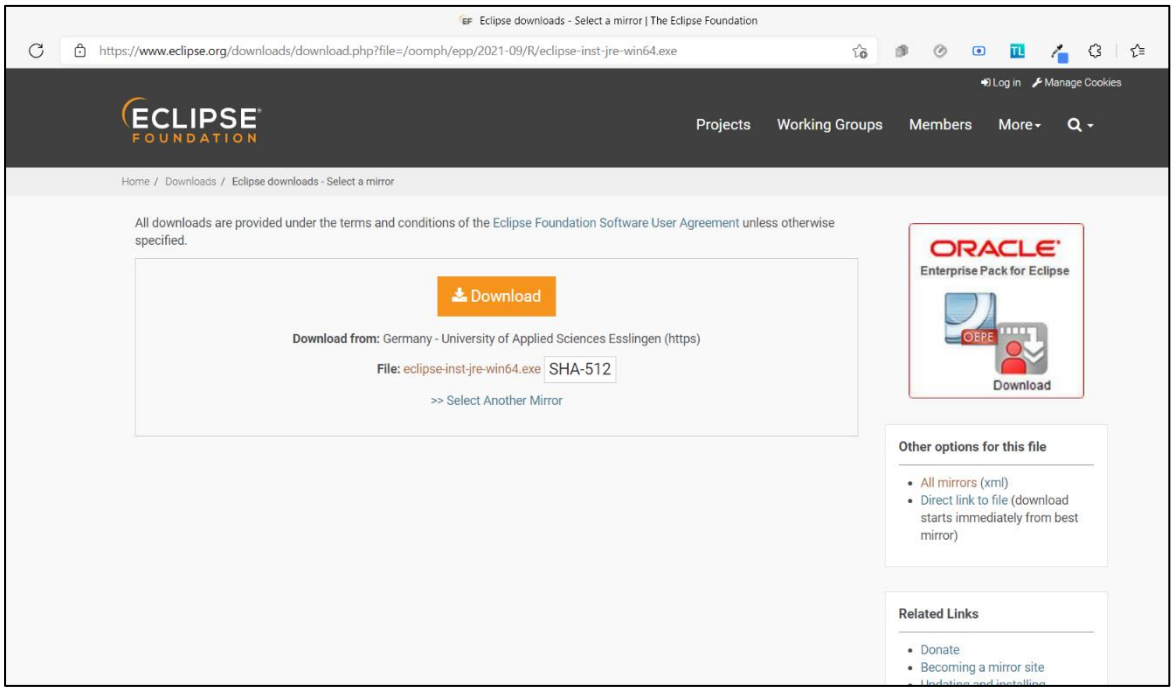
Installing Eclipse IDE

1. Go to https://www.eclipse.org/ide/

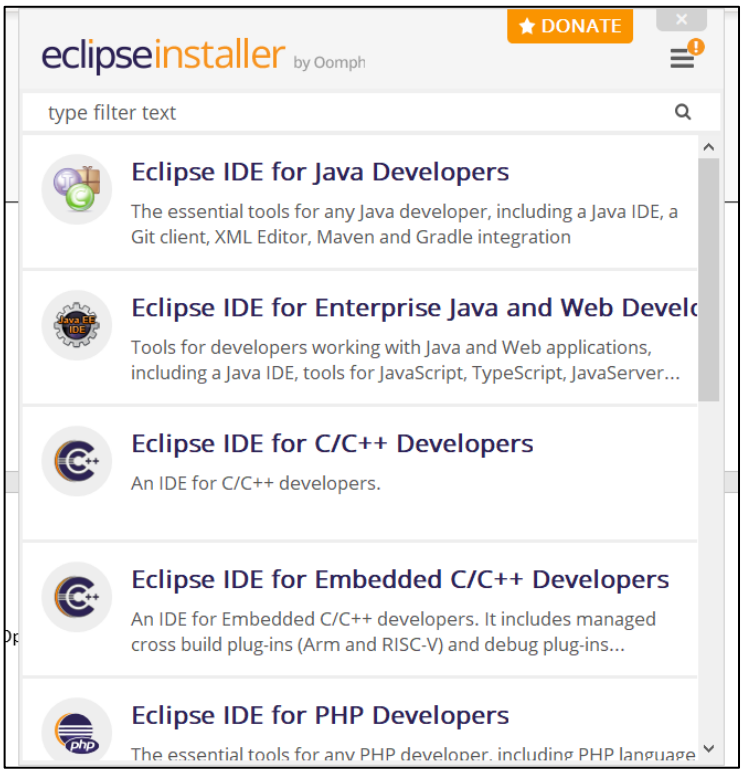


2. Click ‘Download’. This will redirect you to another site. Then, click ‘Download x86_64’. After that, click ‘Download’.





3. Open ‘eclipse-inst-jre-win64.exe’

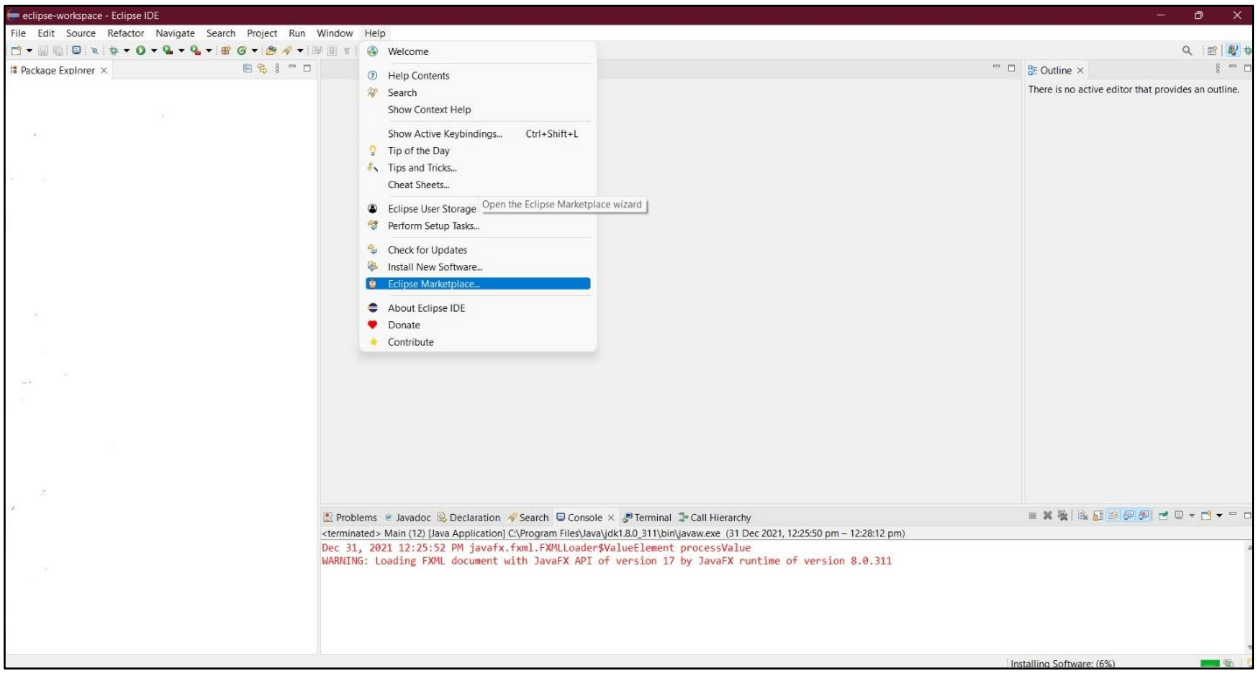


4. Click ‘Eclipse IDE for Java Developers’. Then, click ‘Install’. After that, you are done.

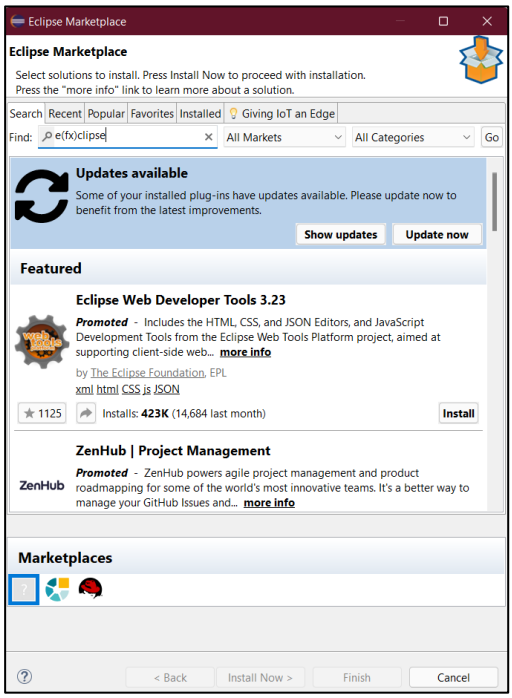
Installing E(fx)clipse

After installing Eclipse, follow these steps to download E(fx)clipse:

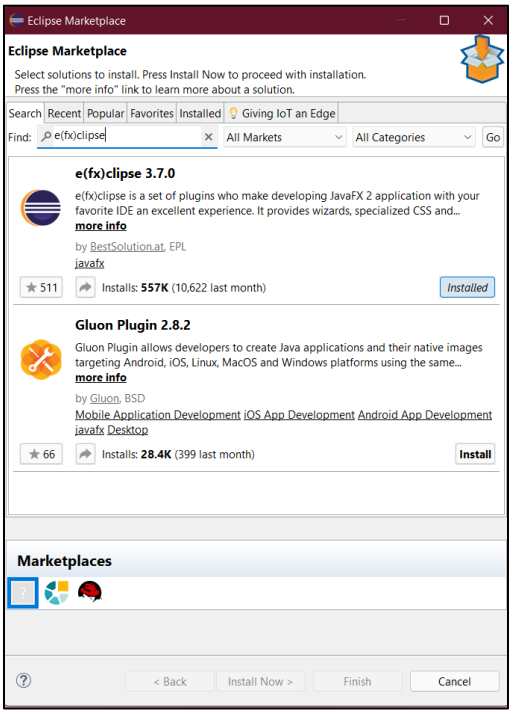
1. After opening Eclipse, click ‘Help’.
2. Click ‘Eclipse Marketplace’.



3. Search for ‘e(fx)clipse’.



4. Install the tool.



5. Restart Eclipse.

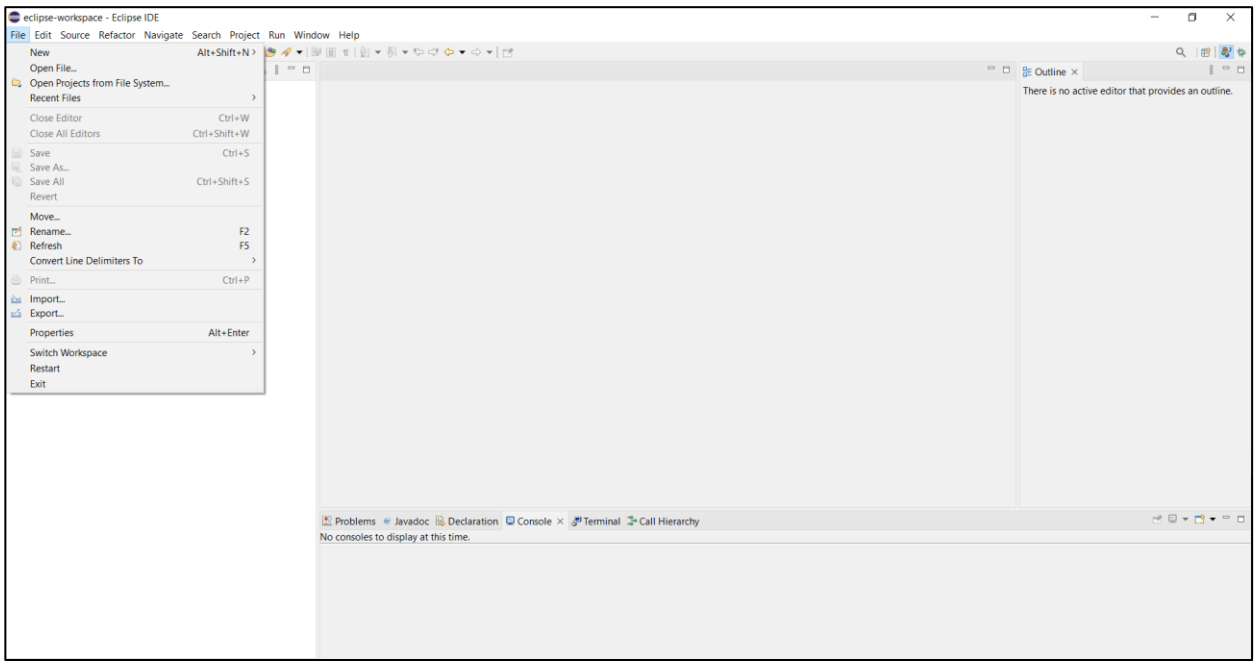
Running the Program

You can run the program by using Eclipse.

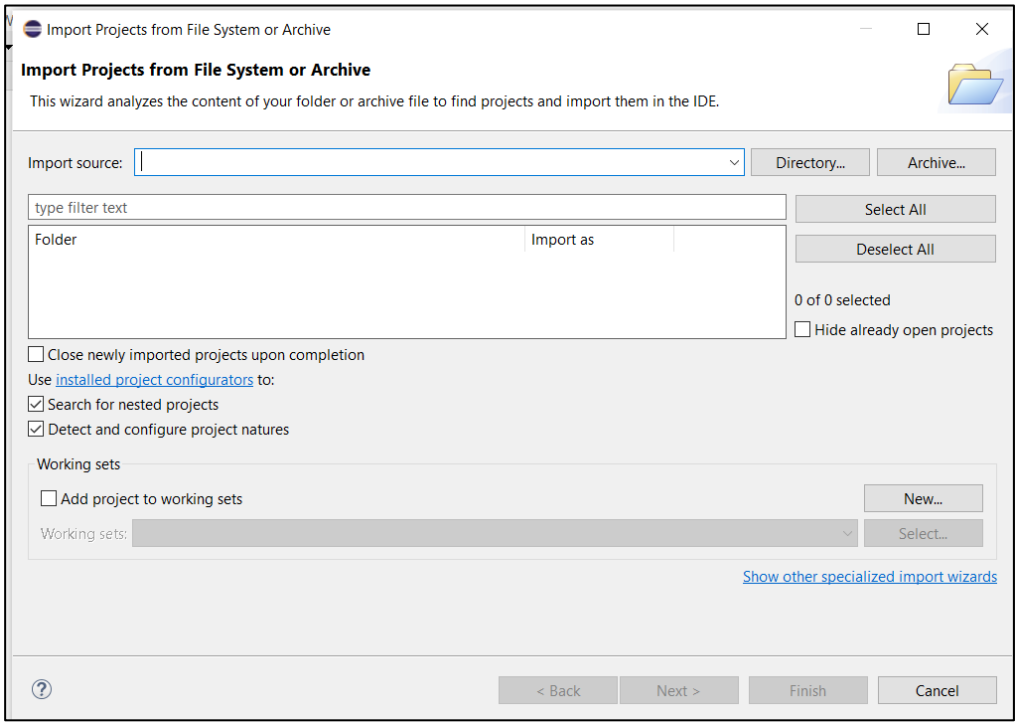
Running NextState in the IDE (Eclipse)

You can run the program in the IDE by following these steps:

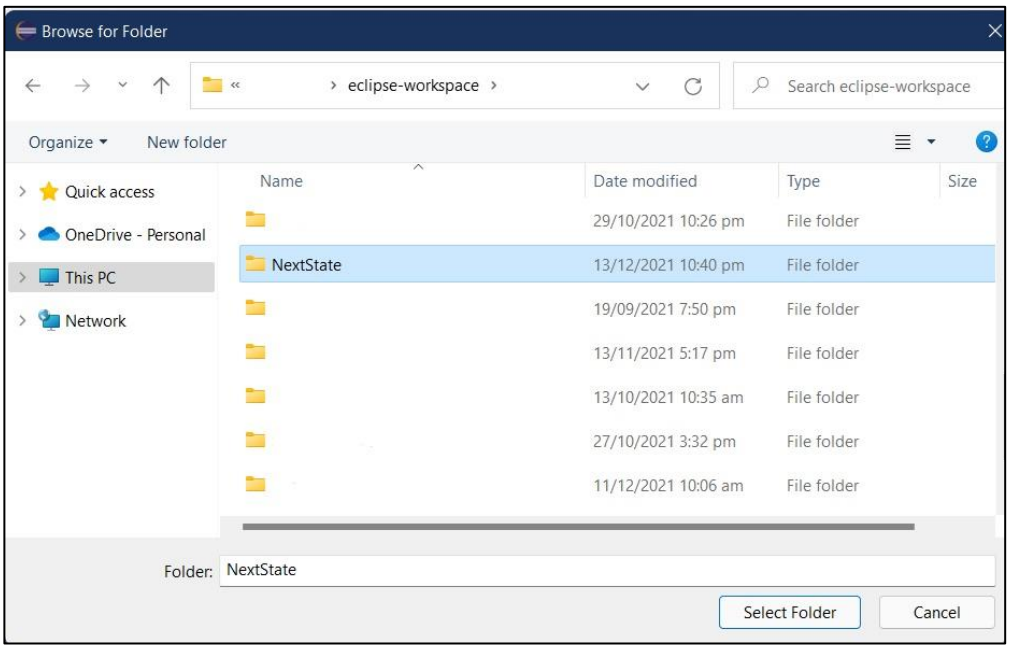
1. Open Eclipse IDE.
2. Click ‘File’



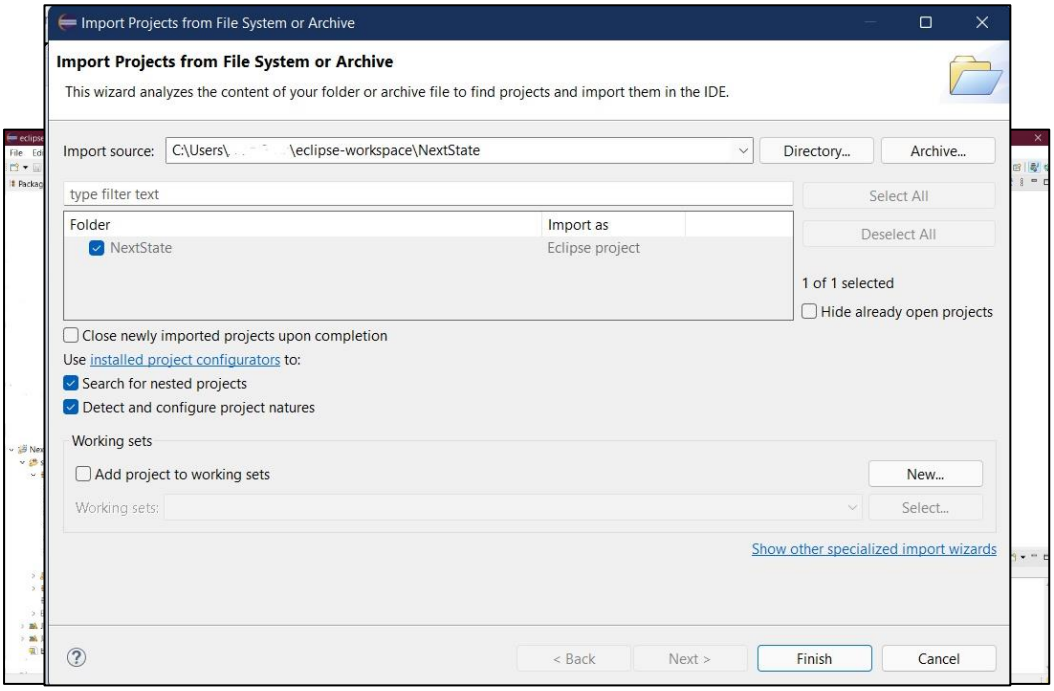
3. Click ‘Open Projects from File System’.



4. Click ‘Directory’ and find the folder ‘NextState’ and select that folder.

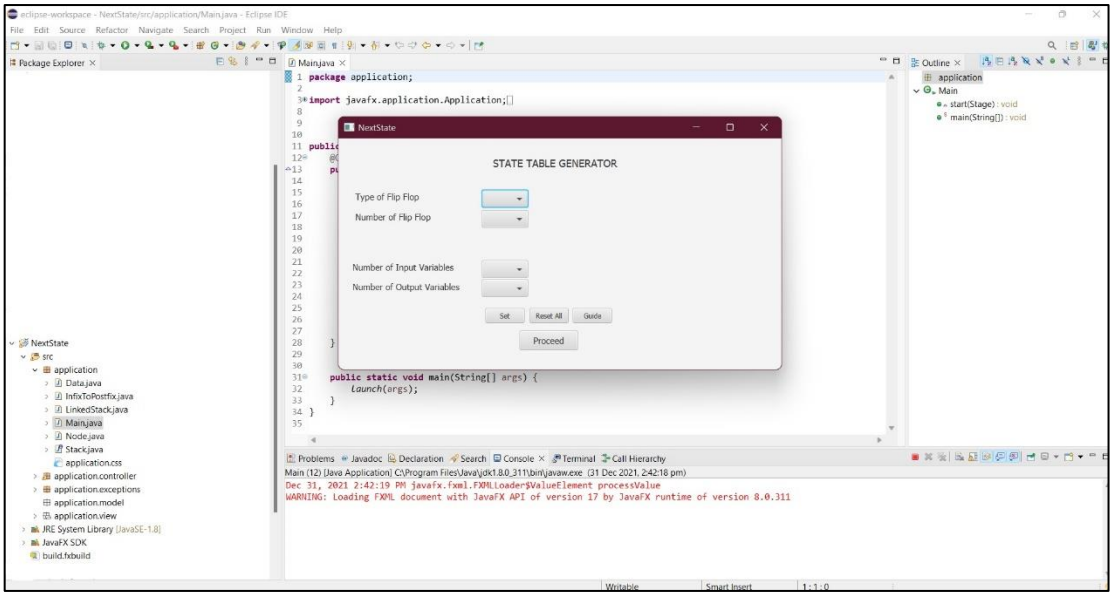


5. Click ‘Finish’



6. The folder should be visible now on the ‘Package Explorer’. Now, click the following: Boolean Expression Minimizer > src > application > Main.java.

7. Click ‘Run’ > ‘Run’. Alternatively, you can click ‘CTRL + F11’ to run the program. The program will be accessible through the console below.

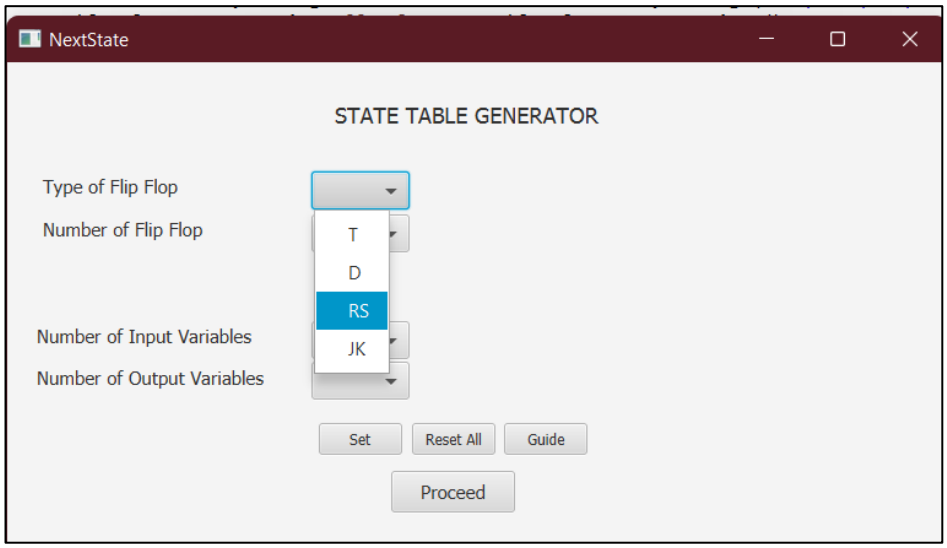


How to Use NextState

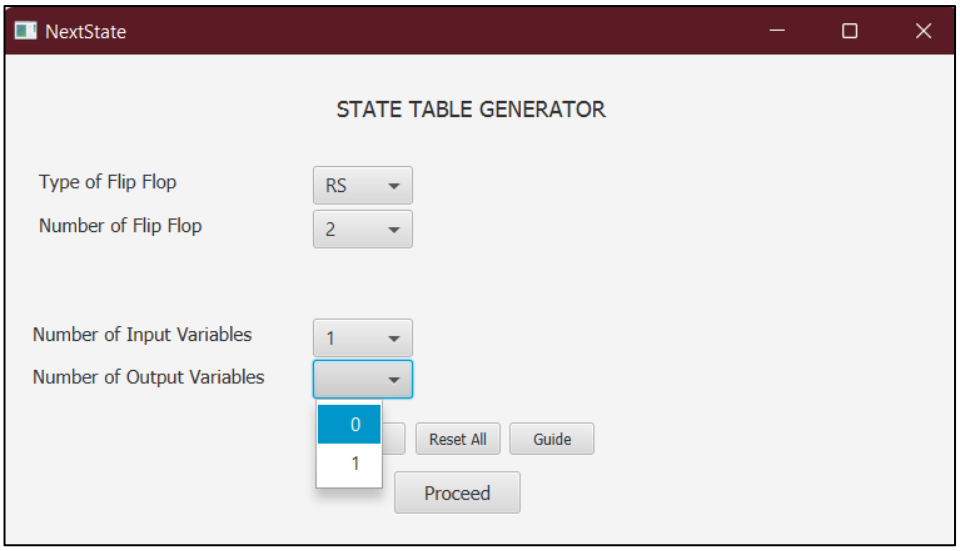
After knowing the different ways to run NextState, you can now use the program. This part of the guide will teach you how.

Steps:

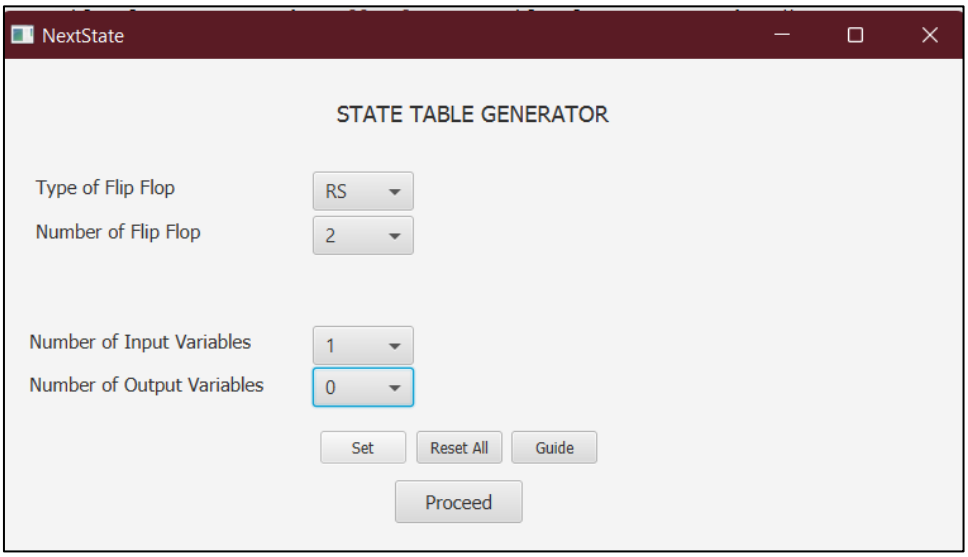
1. Select the flip-flop type by clicking the dropdown.



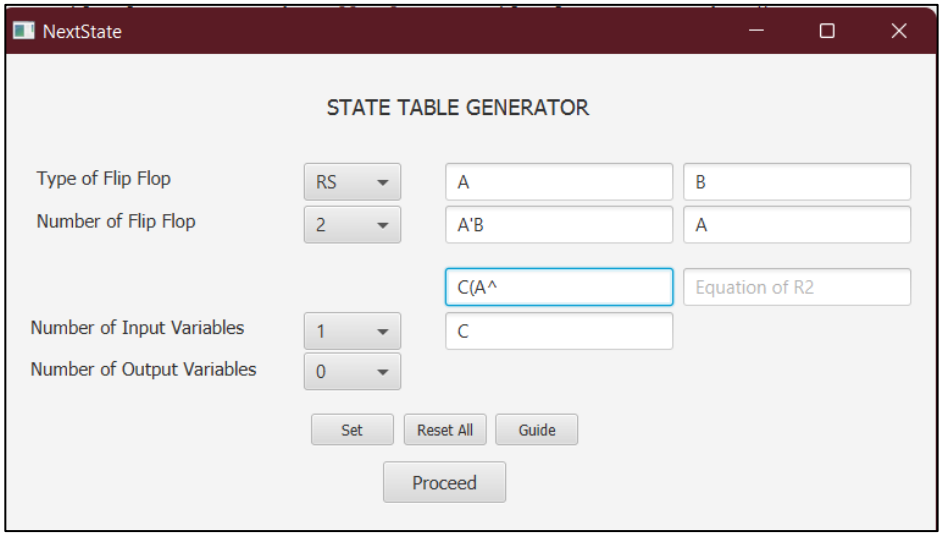
2. Repeat for the flip-flop count, input count and output count.



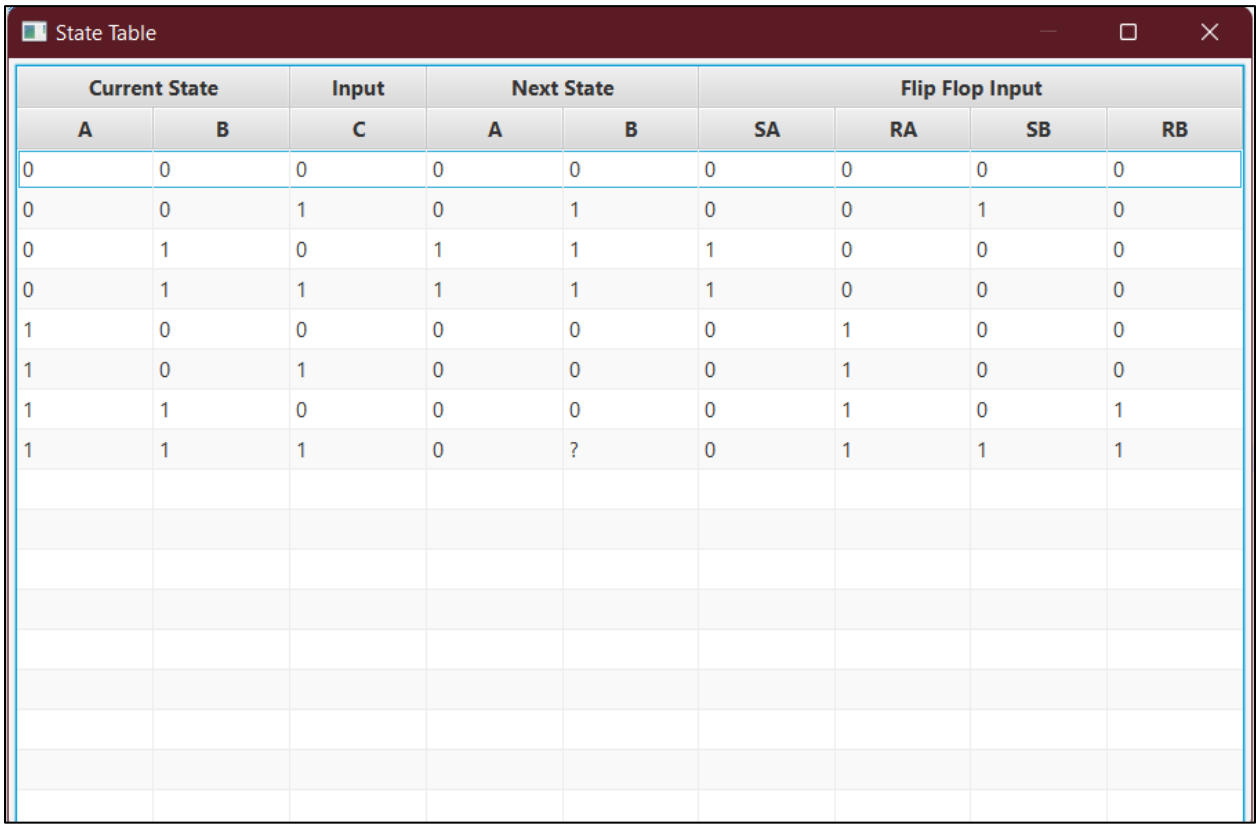
3. Press ‘Set’. The fields that required to field up would show up on the right side.



4. Fill in the fields. For the variables, it can be any single alphabetic character, uppercase or lowercase. For the equation, the operators available are the following: AND (symbol: *), OR (symbol: +), NOT (symbol: ‘), XOR (symbol: ^). The equation can also be set to 1 or 0.



5. After filling in all fields, press ‘Proceed’. The table should pop-up after.



Current State		Input	Next State		Flip Flop Input			
A	B	C	A	B	SA	RA	SB	RB
0	0	0	0	0	0	0	0	0
0	0	1	0	1	0	0	1	0
0	1	0	1	1	1	0	0	0
0	1	1	1	1	1	0	0	0
1	0	0	0	0	0	1	0	0
1	0	1	0	0	0	1	0	0
1	1	0	0	0	0	1	0	1
1	1	1	0	?	0	1	1	1

There is also a guide within the application. Just press the ‘Guide’ button. If you want to reset all of your input, press the ‘Reset’ button. With that, you are done. You can now use the program. To know more about the State Table, the program, and how it works, you can read the Technical Manual that comes with this User’s Manual. Thank you for using NextState!