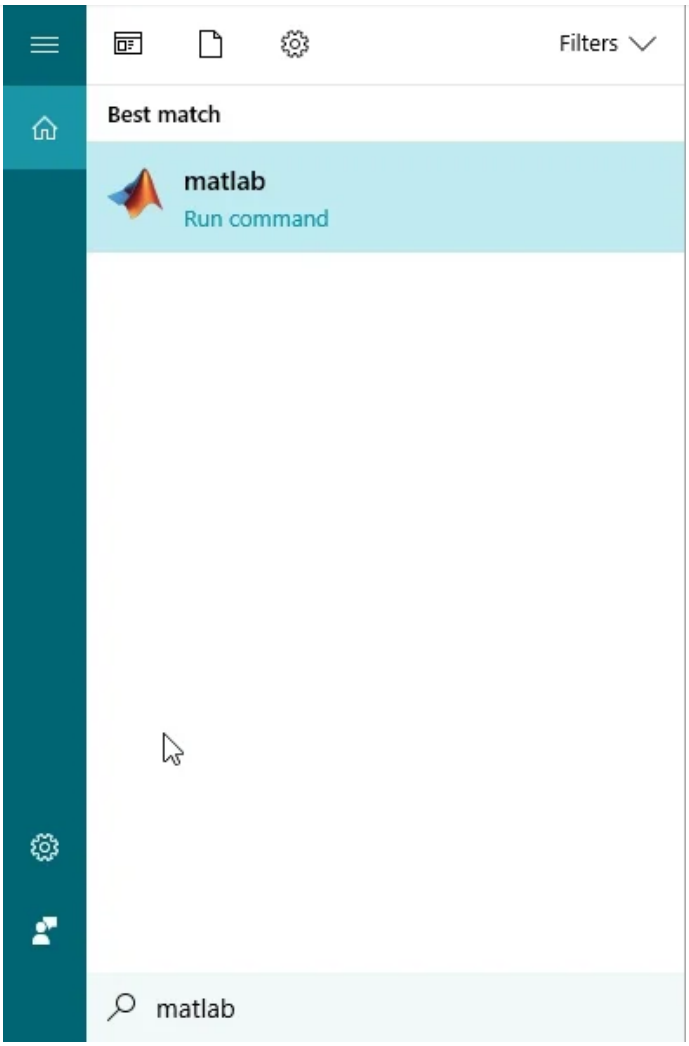
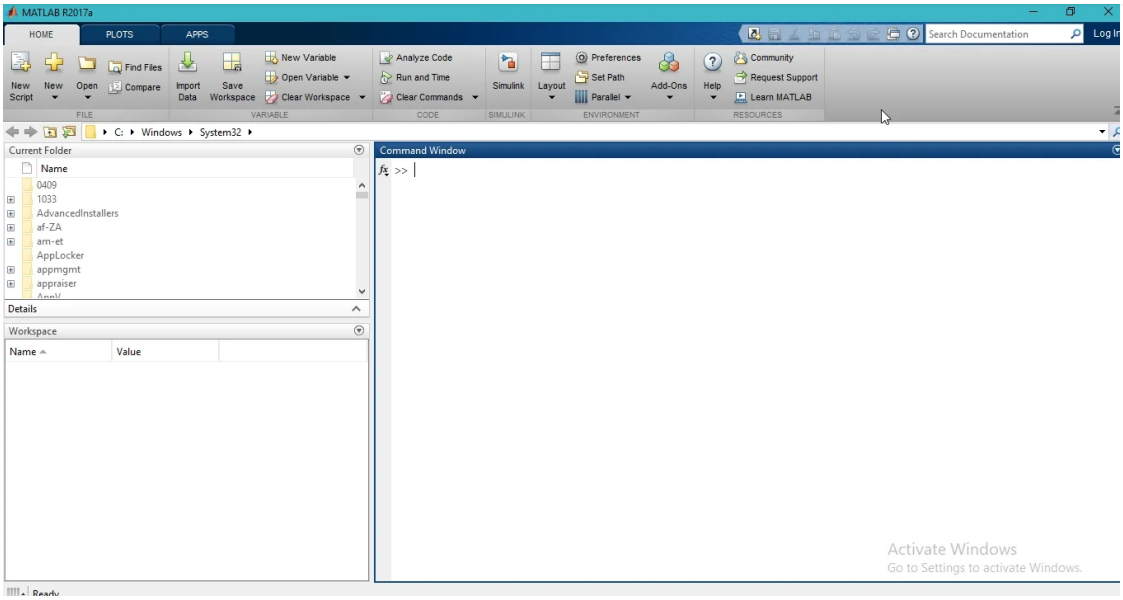
Chapter 5: Getting Started with Simulink

To start with this tutorial, let's first open MATLAB and then Simulink. In the search bar of the system, type "matlab" (if installation is present on the computer). We will see the icon pop up as shown in the figure below.



Opening MATLAB

It takes some time to open this program, and after opening, the following window will appear as shown in the figure below.



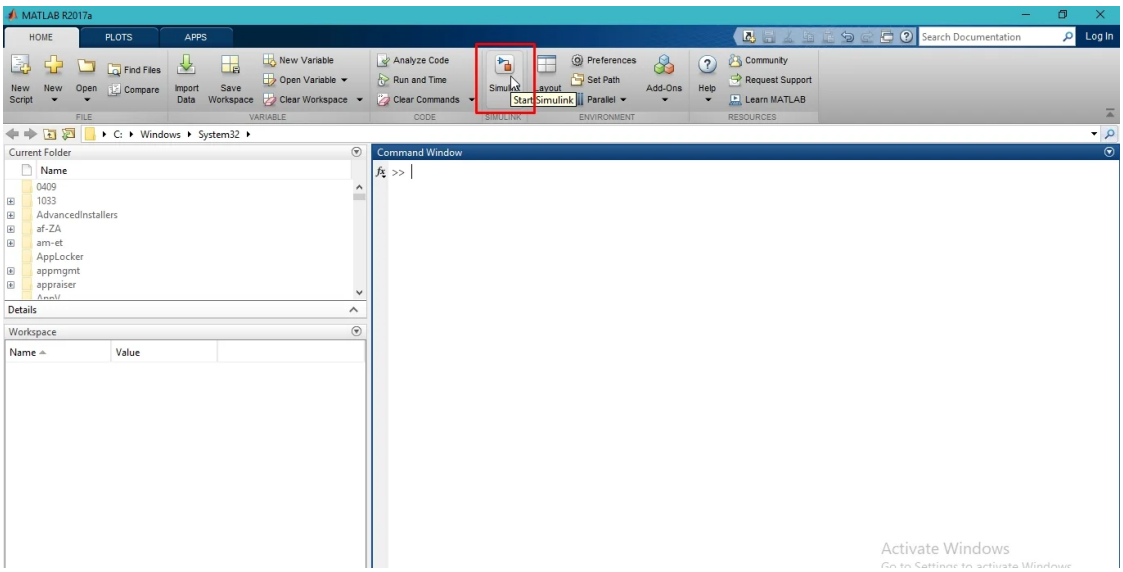
MATLAB starting window

Opening Simulink

Now, the next step is to open Simulink. We can open it by writing "Simulink" in the command window of MATLAB, similar to the figure below.

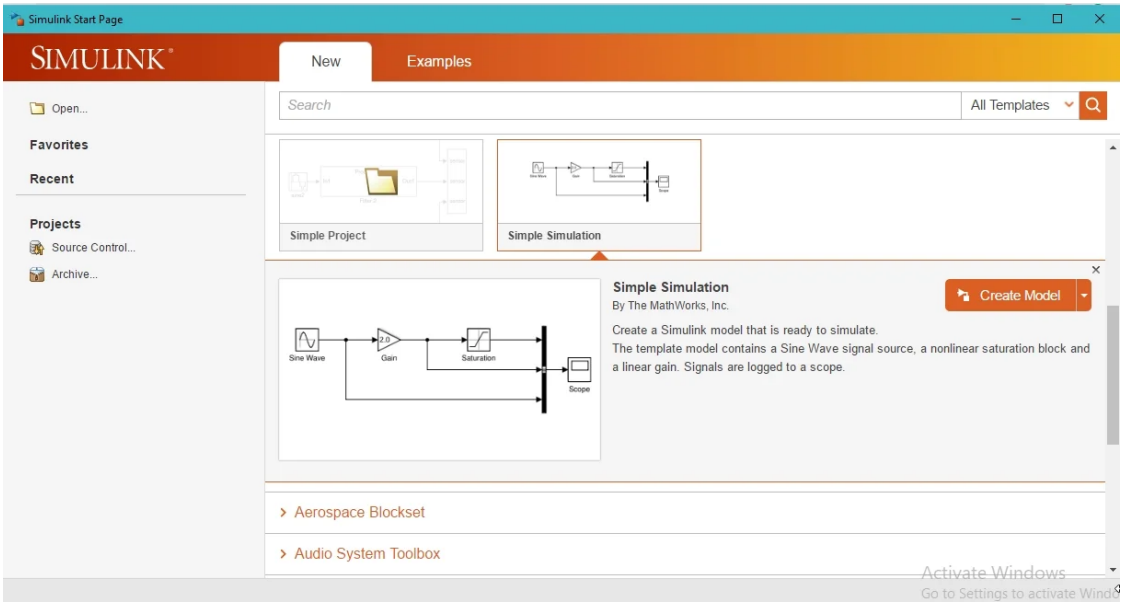
Simulink from command window

Another way to open it is by using the icon present at the top of the home panel of MATLAB, as we can see in the following figure.



Simulink's icon

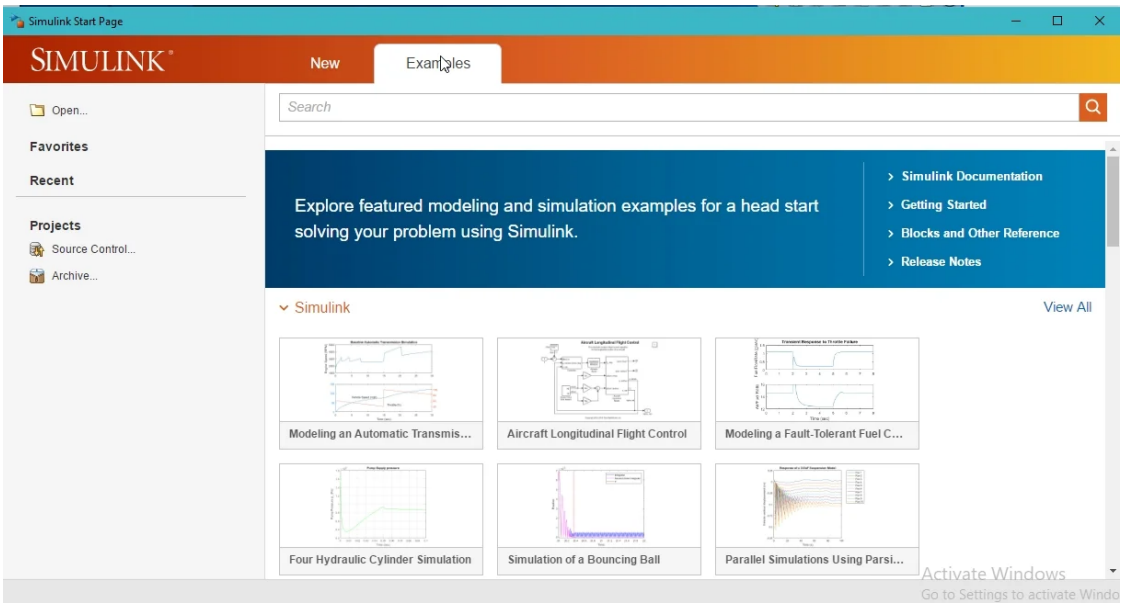
Opening Simulink also takes quite a lot of time because it is heavy software. Once Simulink is open, it will show a start page, as we can see in the following figure.



Start page

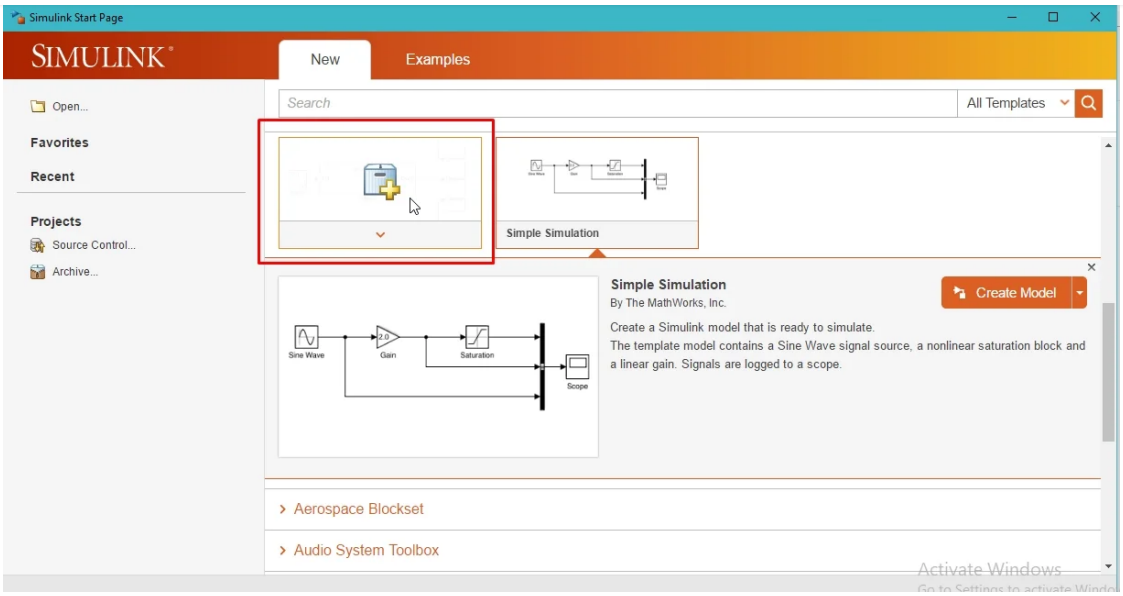
Simulink Examples

There are also a number of built-in examples in it. So that we can run them and learn about the workings of the different blocks present in Simulink. We can access them from the window at the top of the Simulink starting page. Refer to the figure below.



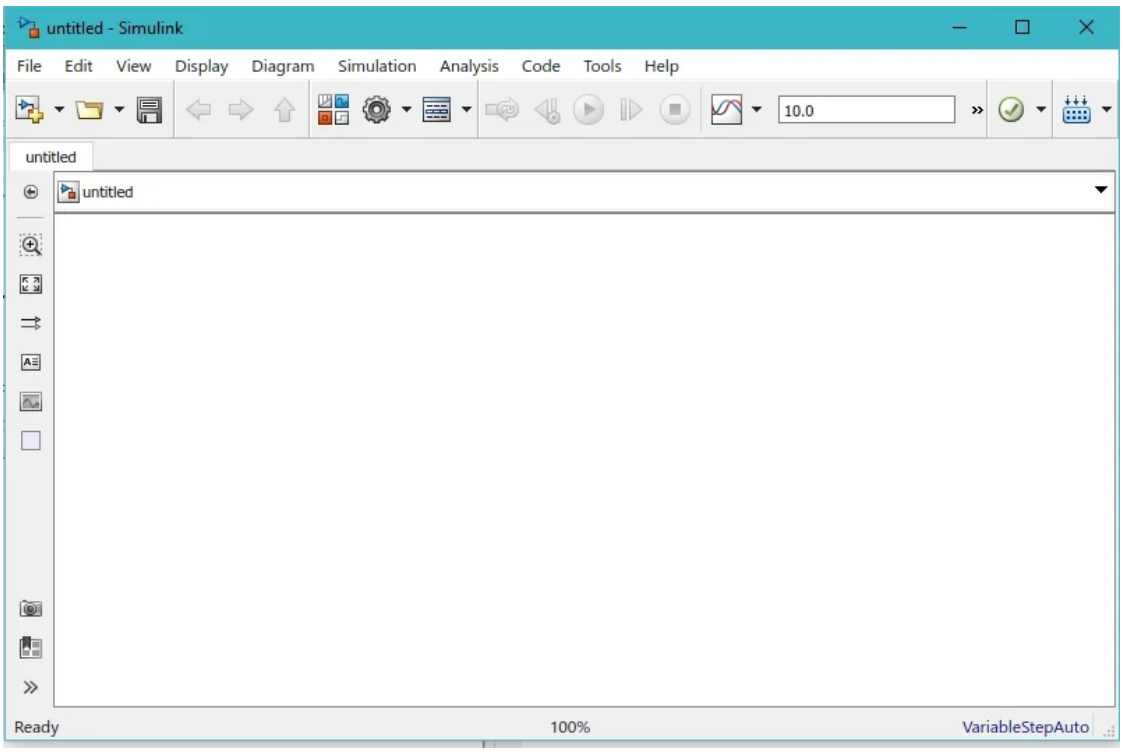
Simulink's built-in examples

These examples can be used as a head start to understanding the workings of Simulink as a beginner before directly jumping into the programming environment of Simulink. We will leave exploring these examples as an exercise for the students. Now let's create a new project and start working with Simulink. Click on blank project on the start page of Simulink. Refer to the figure below.



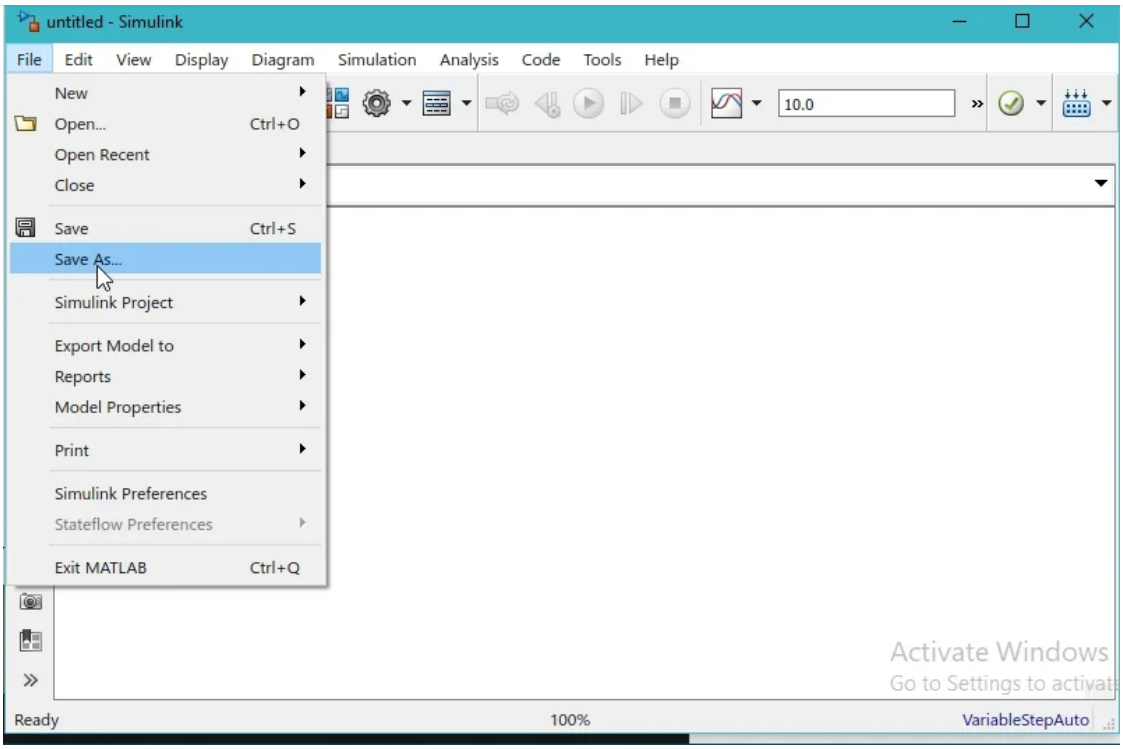
Creating a New Project

This will create a new blank project, as we can see in the following figure.



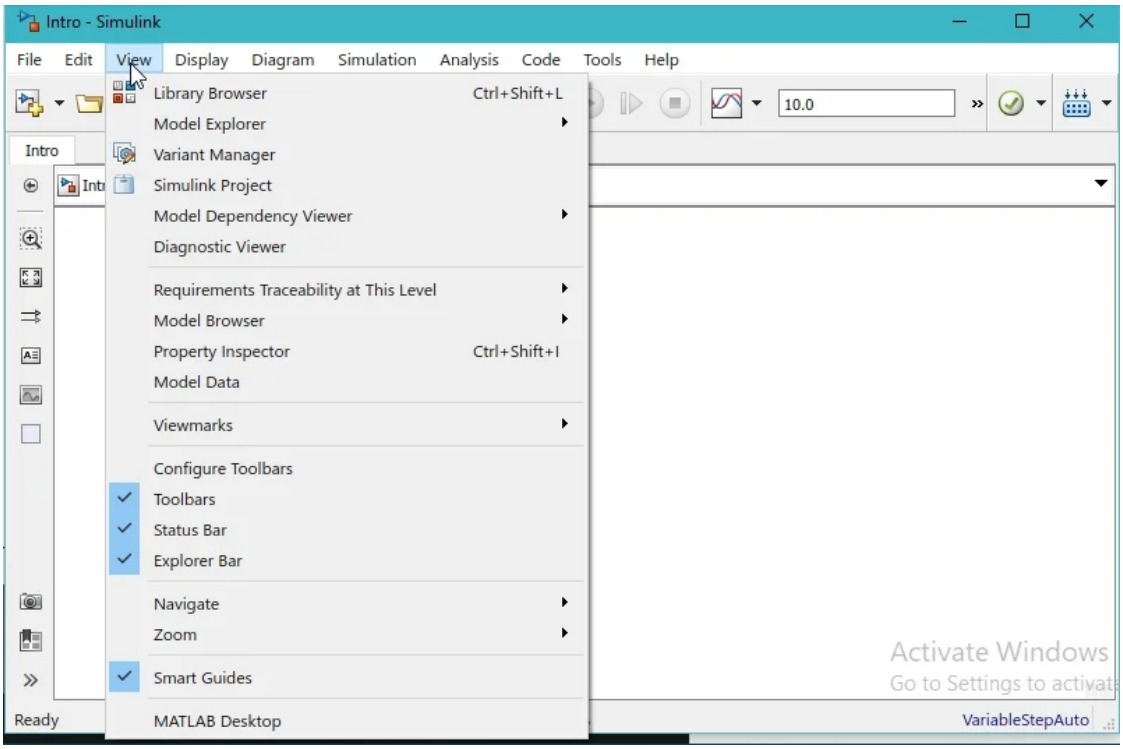
Blank project

This is an unsaved project, and the changes we make to it will go to waste. Therefore, first of all, we will save this project so that we can access it sometime later. Click on the file button and then click on “save as“, as shown in the figure



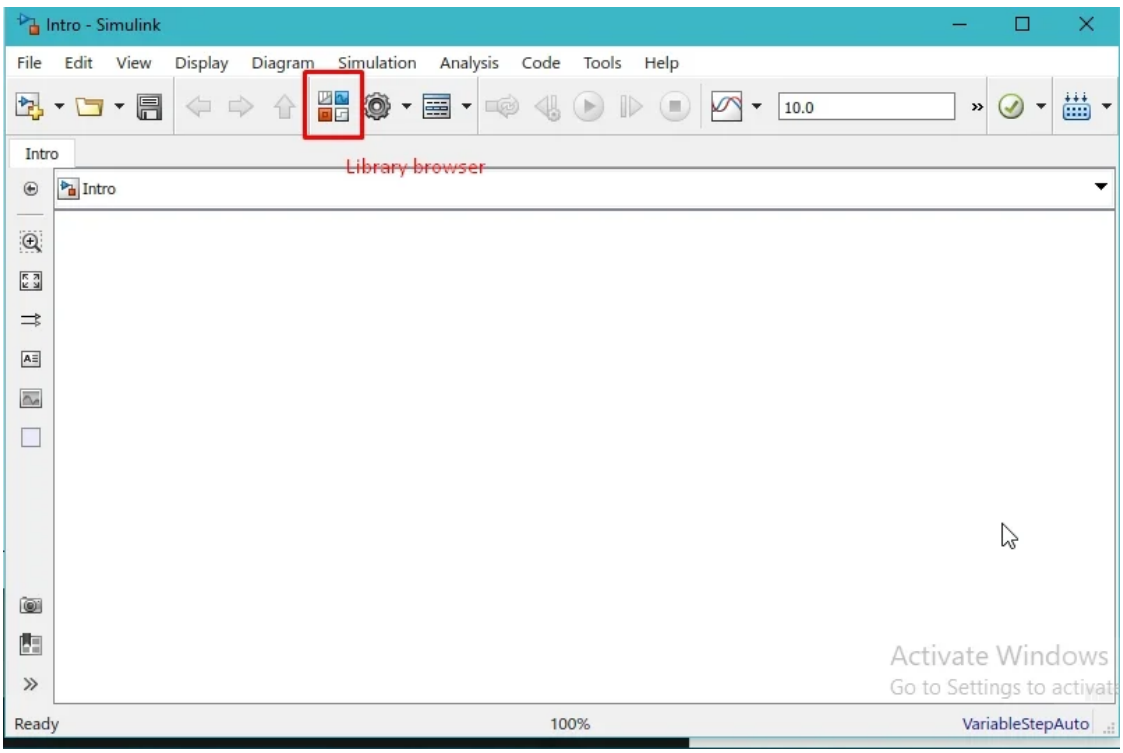
Saving the project

After saving the project in the directory of our choice, the next thing we will like to look at is the browsing library of Simulink. We can access the Library Browser by clicking on the VIEW button at the top of the list next to the file and then clicking on the library browser, as shown in the figure below.



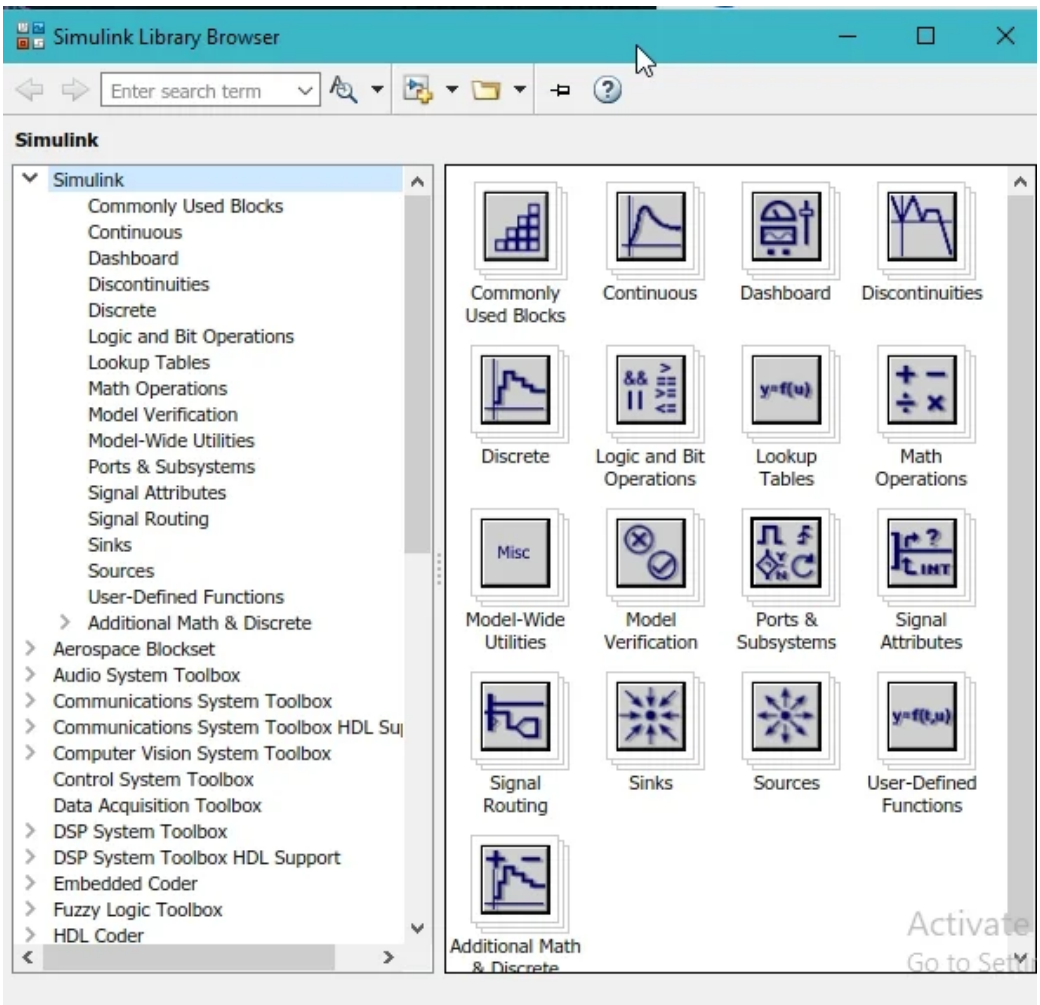
Library browser

Another way to access the library browser is by clicking on the library browser icon. Refer to the figure below.



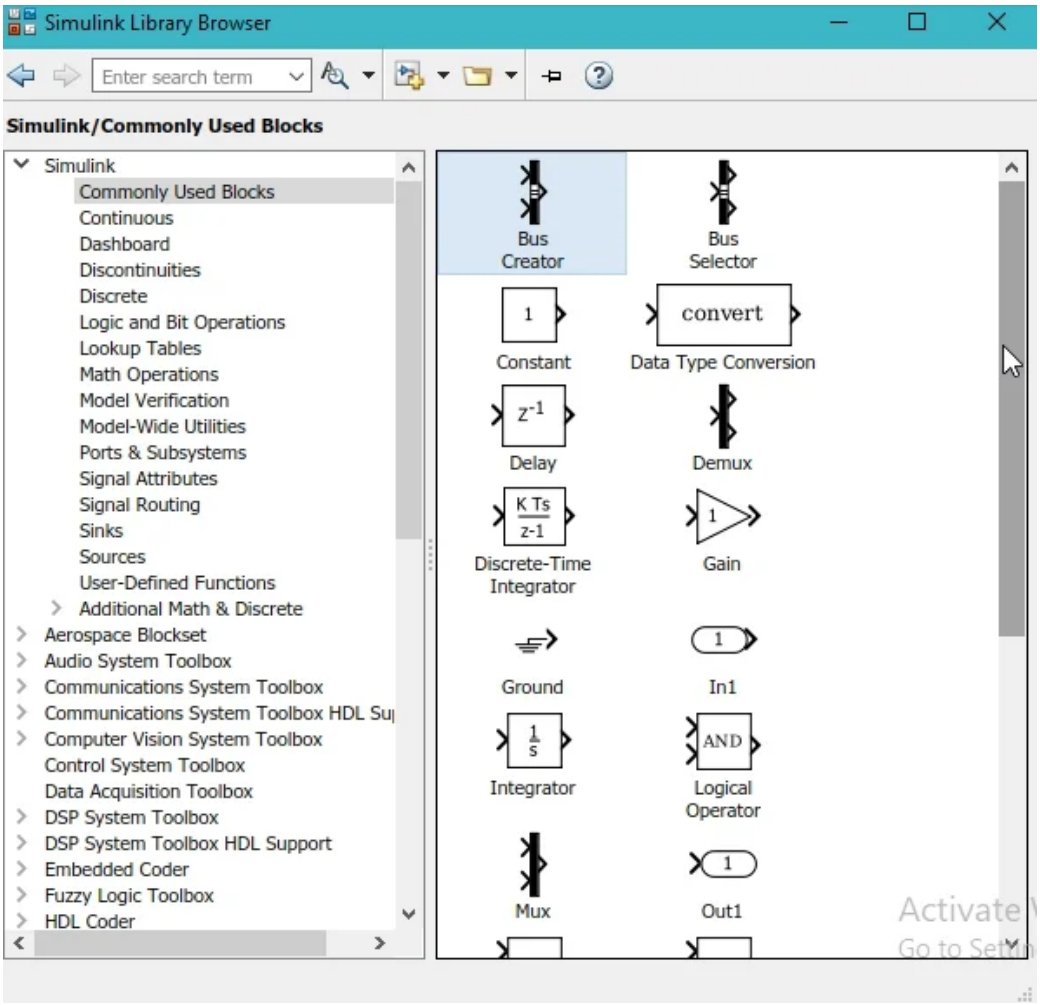
Library browser icon

The library browser window will open up after clicking on this icon. This window is shown in the figure below.



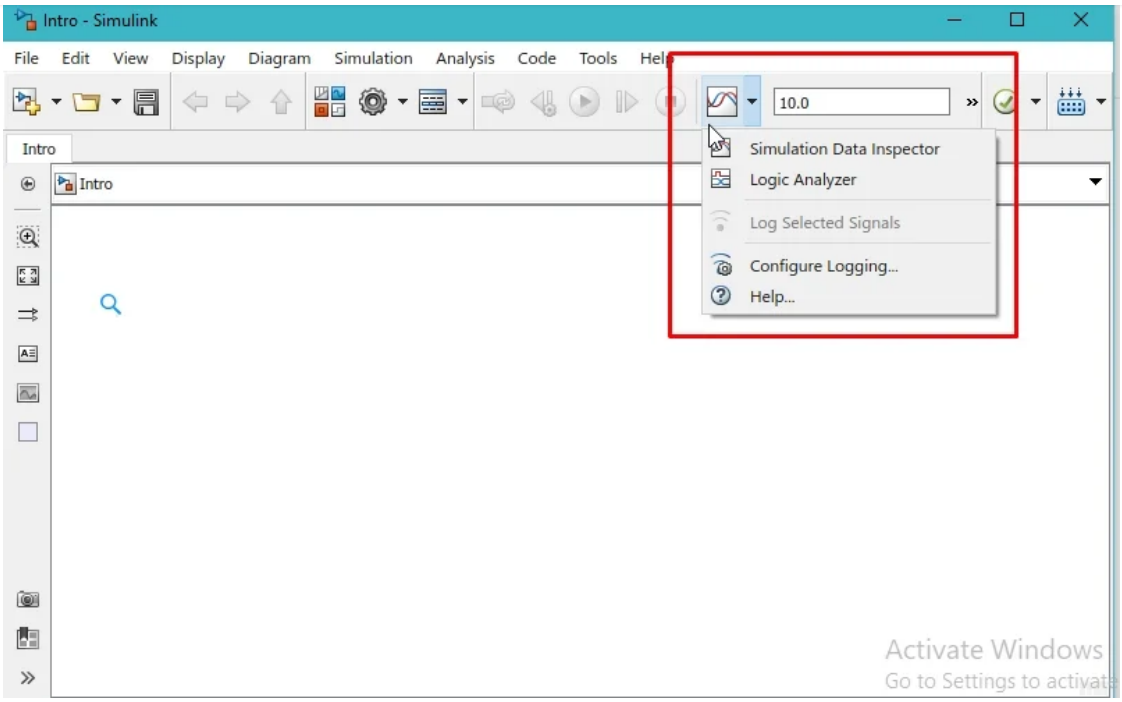
Library browser

This window contains almost all the blocks one can need to write a program, starting from a simple multiplication problem to the working of a motorcycle in the robotics section. The most commonly used blocks in Simulink are available in the Commonly Used Blocks subsection. Double-click on the subsection to have a look at the blocks, as shown in the figure below.



Commonly used blocks

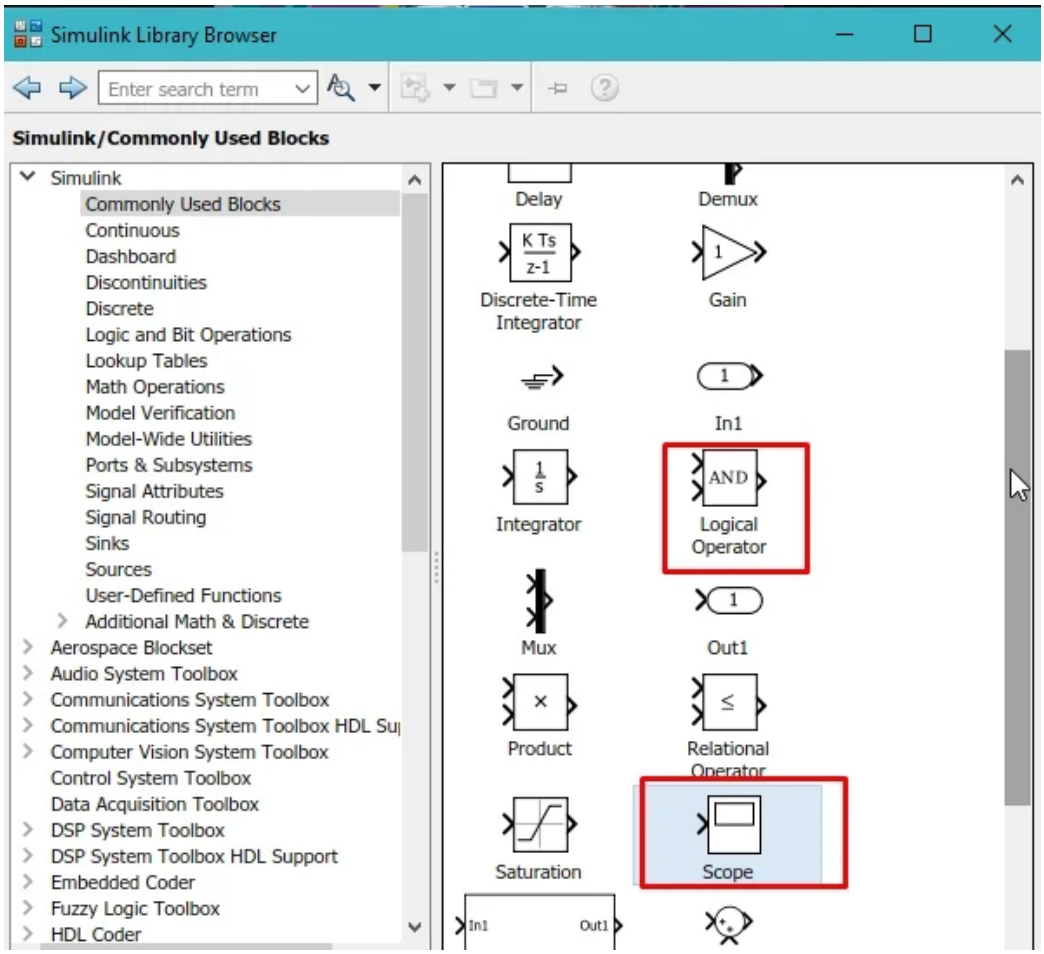
On the top bar of Simulink, there is an icon to provide a logic analyzer. As the name suggests, it is used to analyze the output of the block diagram system. Refer to the figure below to see the location of the logic analyzer in the Simulink window.



Logic analyzer

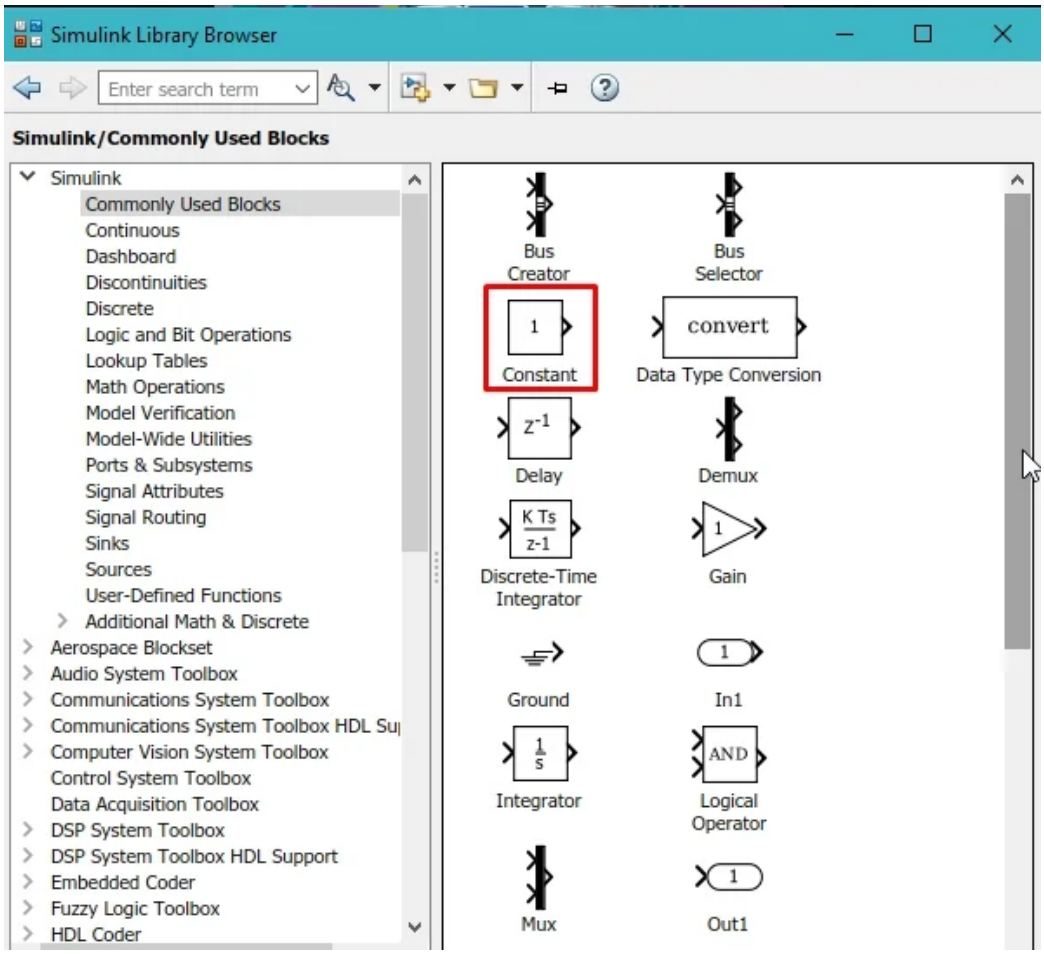
Making First Block Diagram with Simulink

Let's do a simple example to understand the workings of Simulink in a little more depth. Here, we will perform a simple AND operation and run the program. From the commonly used blocks, select the AND operator and also a Scope, which will act like an oscilloscope to analyze the output of the operation as shown in the figure below.



Logical operator and scope

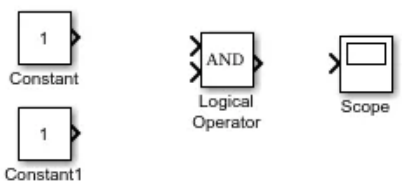
From the same library browser block, i.e., commonly used blocks, select a constant and place it at the input of the logical operator as shown in the figure below.



Constant

Placing Components

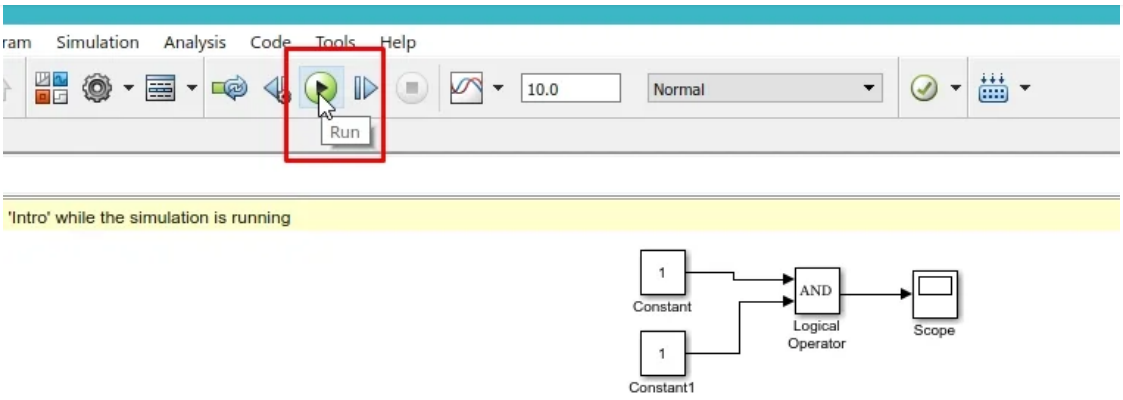
Place all the components as shown in the figure below.



Placed components

Simulink Model

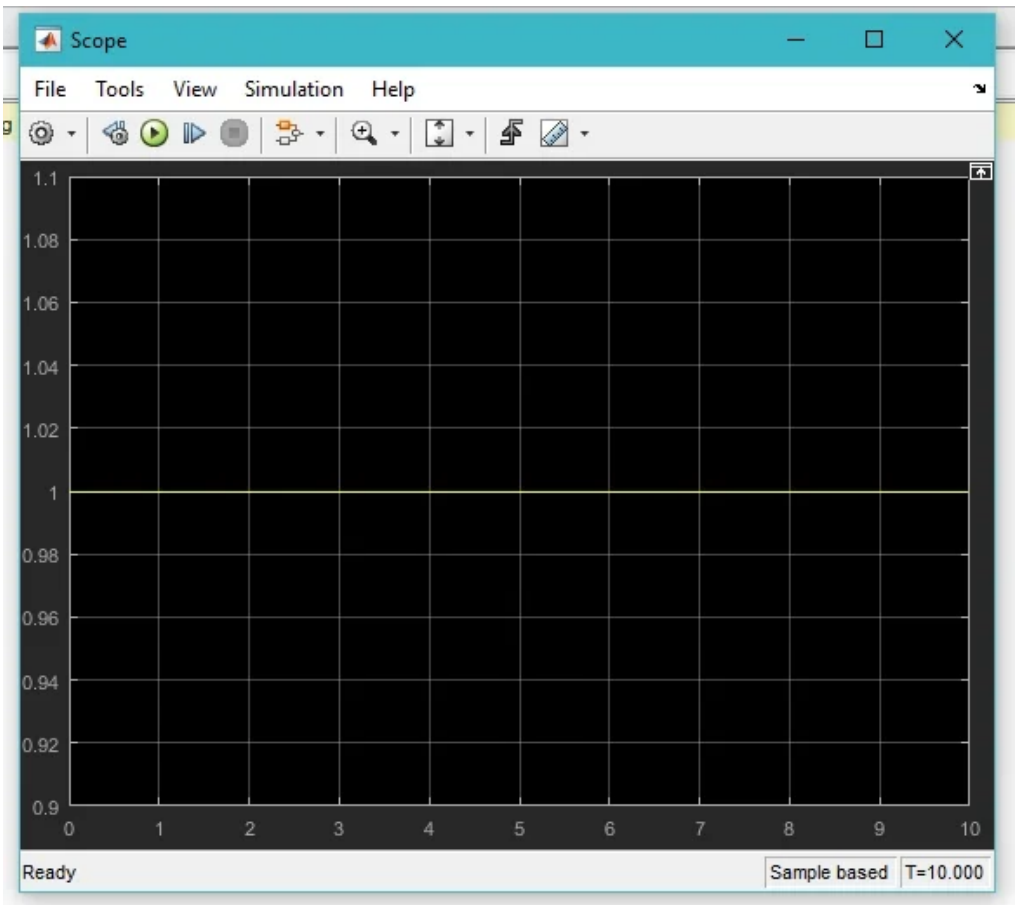
When we hover over the arrow head of each of the blocks, the pointer will convert to a simple cross and allow us to start the connection of the wire. Connect the constants at the input of the logical operator, and at the output of the logical



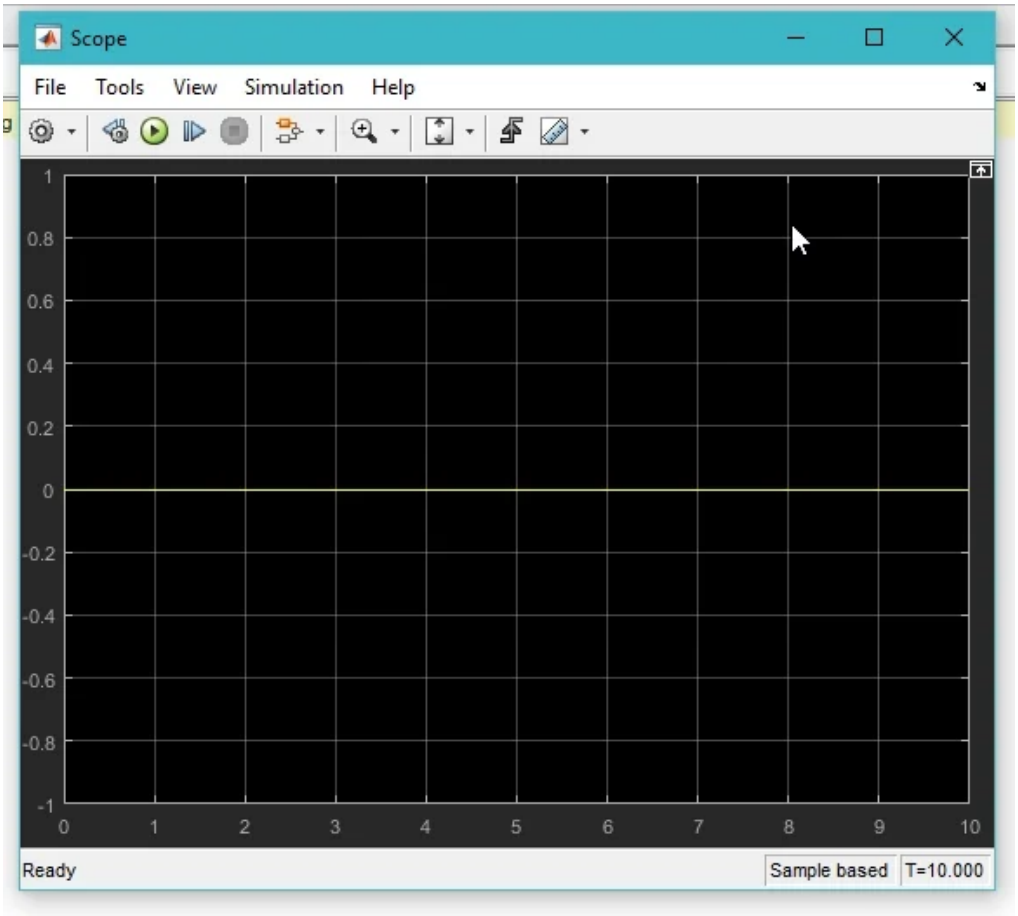
Running the program

Simulation

After running the program, double-click on the scope, and a window will appear showing the output of the operator in the form of a wave on the oscilloscope. Refer to the figure below.



Now we will test the program with different input values, i.e., 1 and 0. The output will change in accordance with the theory. It turns to 0 and shows expected results, as shown in the figure below.



Output when one input is 1