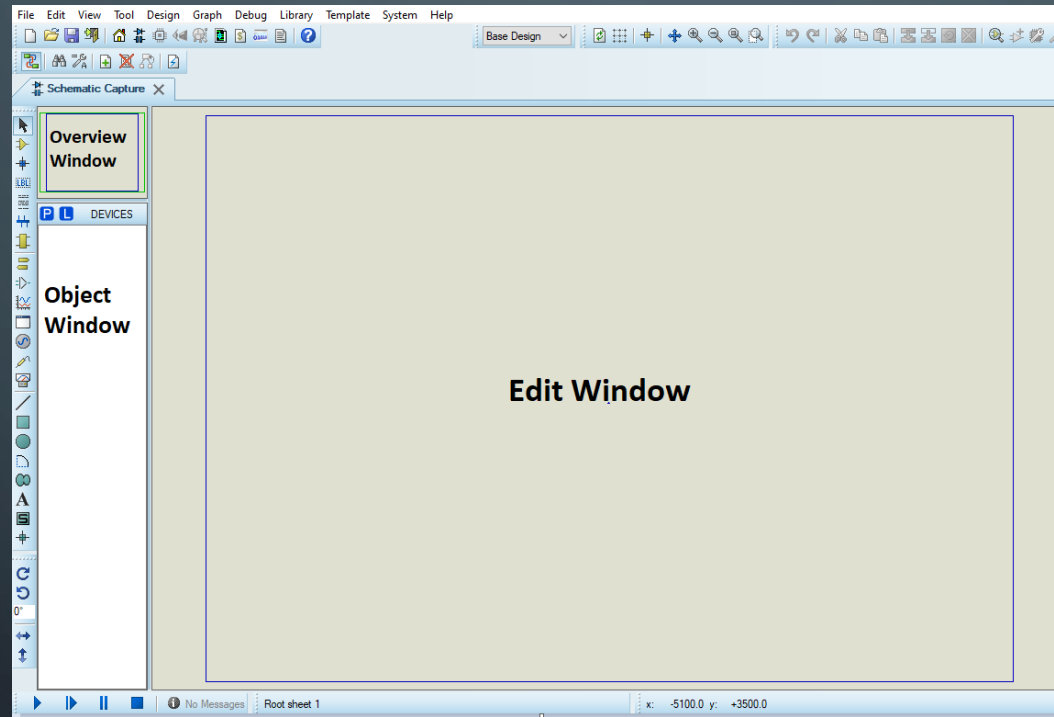# ECE-298 PROTEUS SCHEMATIC PRIMER

1) Download the proteus starter design for each lab from LEARN (ECE298_Labx.pdsprj) into a working directory of yours on the ECE N:Drive.

2) In that directory, double-click that file. This will launch Proteus and load the starter project. Below are some screen shots of the schematic capture tool.
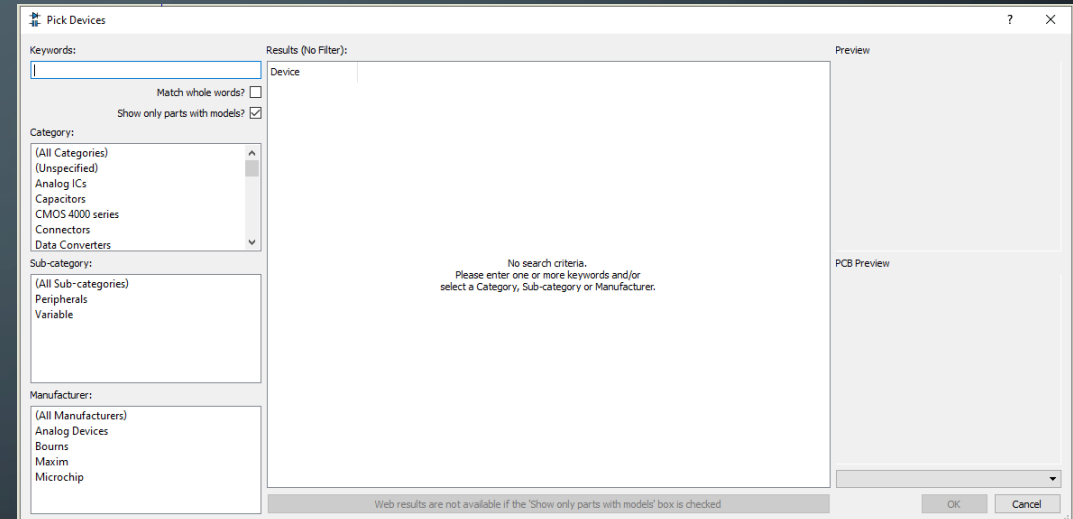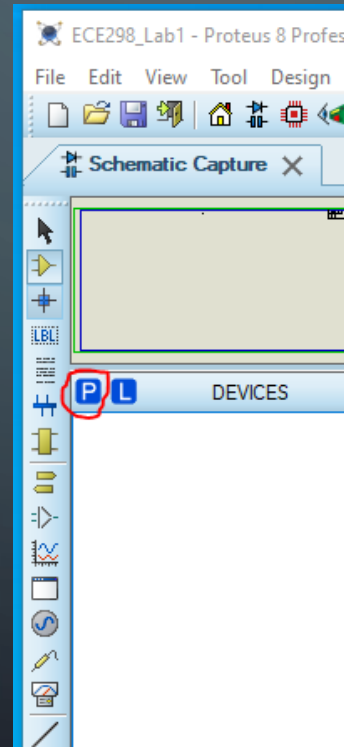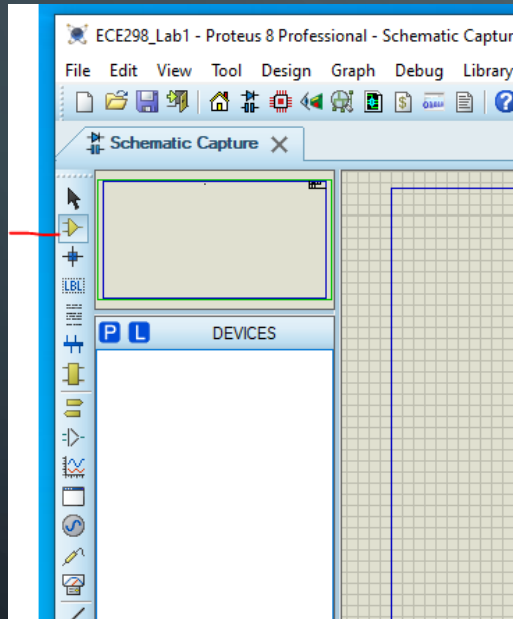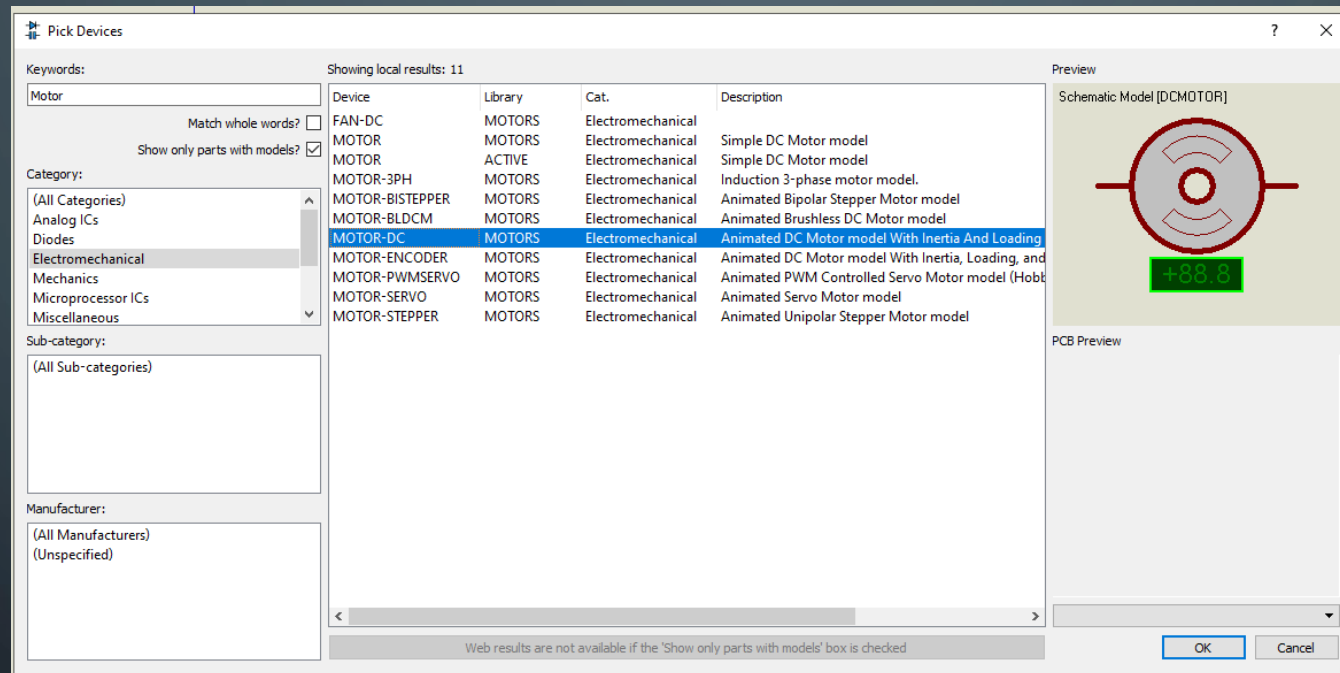
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After looking at the Project details you will explore the various components in the Proteus Libraries that may suit the requirements for your sensors/actuators/user I-O.

Let's illustrate this through an example.

With the Object Selector Window in Component mode (yellow OP-Amp symbol on the Left) , CLICK on the 🅿 icon. A Pick Devices window will appear.

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Let's say your project will require a simple motor of some kind for an actuator. Type the word "motor" in the Keywords field. A number of categories and sub-categories will appear as well as some devices. Such as motors, motor drivers etc. Let's constrain the range of searching by selecting the "Electromechanical" category. Various kinds of motors will become visible. Let's select the MOTOR-DC device for our example. Click OK.
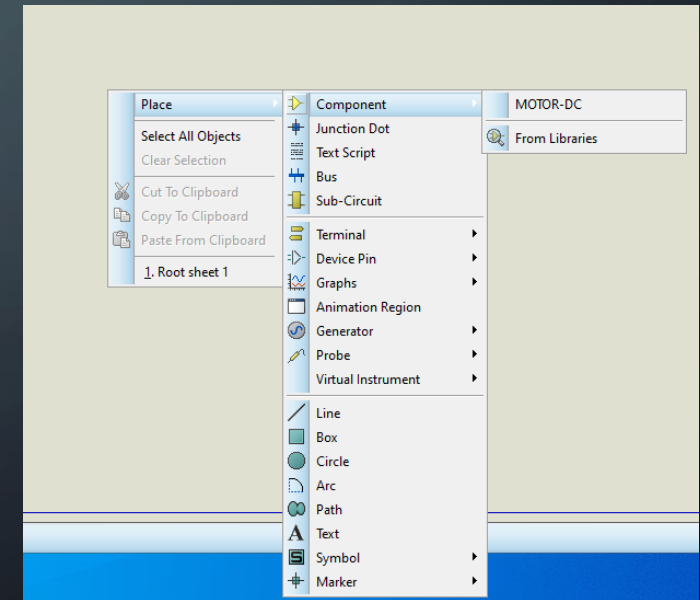
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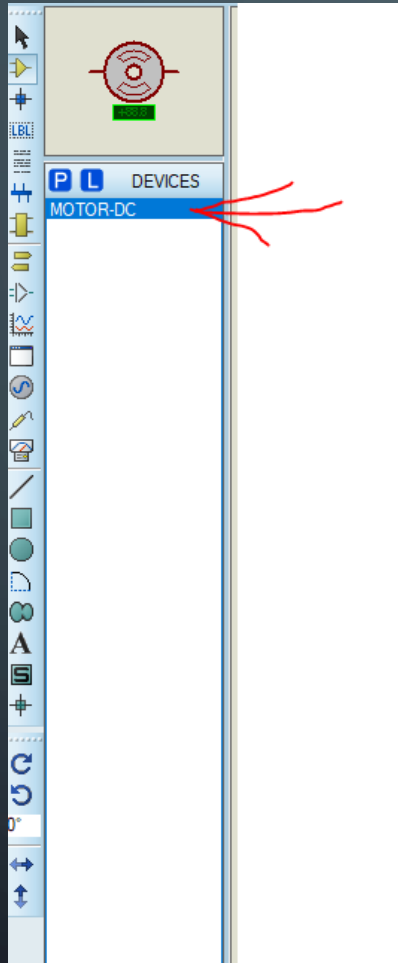
This device is now "picked" from the libraries and is copied to the Object Selector window. As you select more parts from the Library this list will grow.
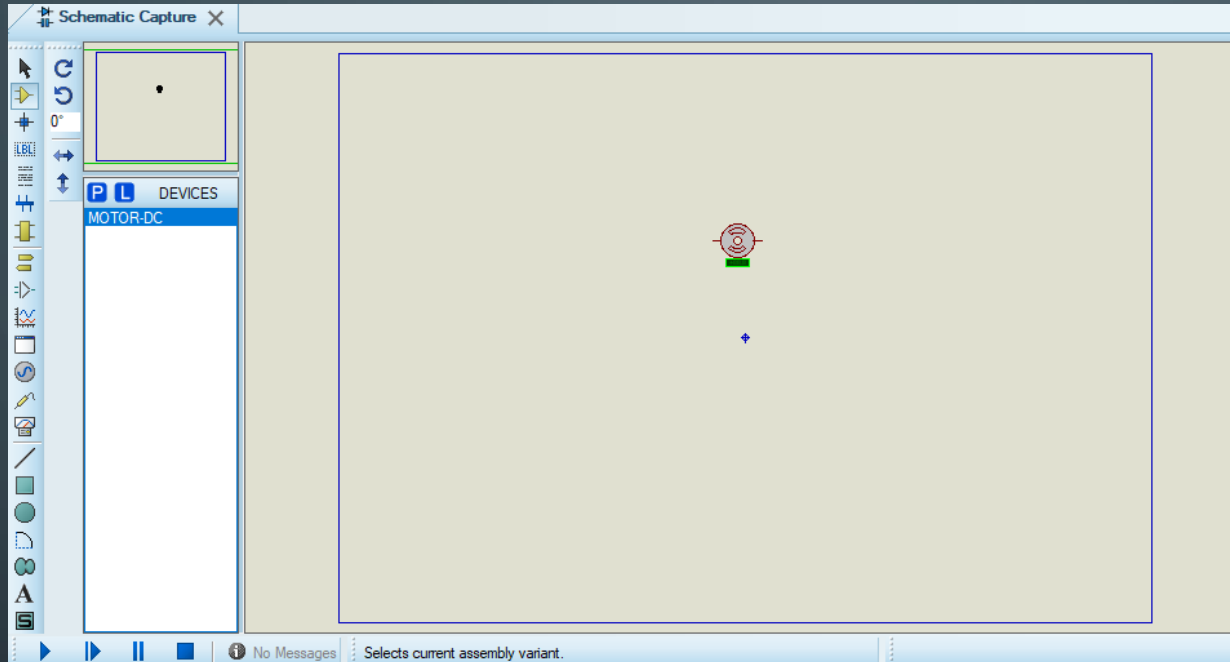
The device in that window is currently selected (highlighted in BLUE while in Component Mode).

With the Mode in Selection Mode (Arrow icon [icon] on the Left Column) go to the EDIT Window , Right-Click the mouse and select Place>Component> Motor-DC   option

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Your DC Motor symbol is now placed in the Edit Window.

If you hover the mouse over the DC Motor symbol it will become enclosed with a transparent RED box. Double-Click the mouse and the "Edit Component window for the device will appear. Observe the Nominal Voltage (12V).

We will now want to experiment with this device to see how it can be controlled.

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With the Mode in Selection Mode (Arrow icon [arrow] on the Left Column) go to the EDIT Window , Right-Click the mouse and select Place>Terminal> GROUND option. A GND icon will no be in the edit window.

Hover the mouse over the pin on the GND symbol. A small red square will highlight the end of the pin. Now you can click the mouse and connect GND to the Right-most pin on the motor.
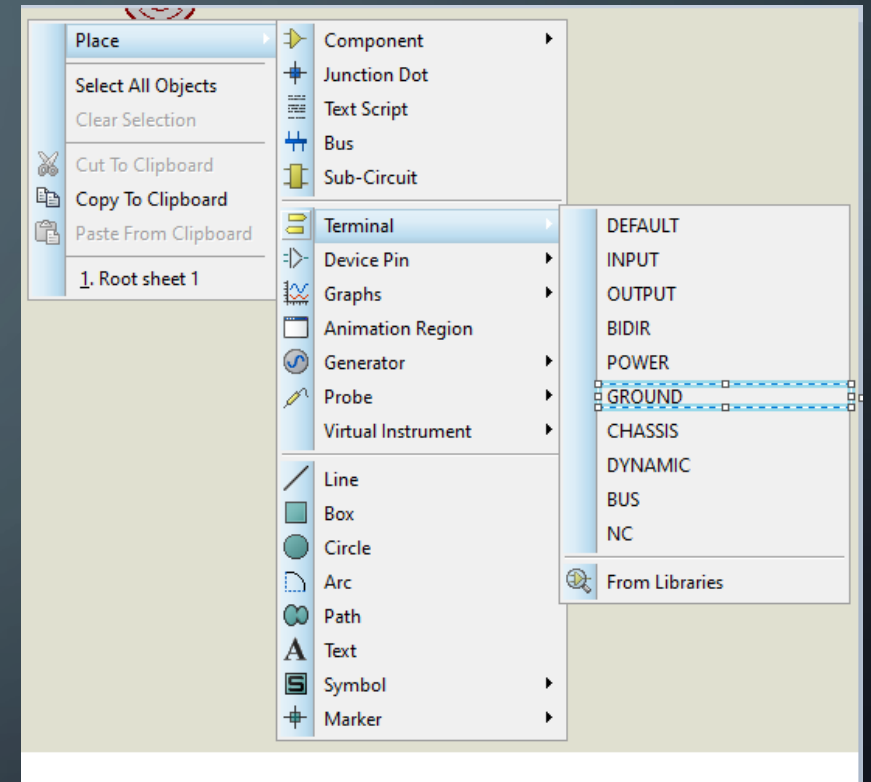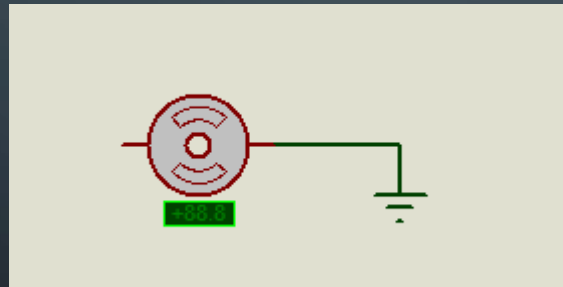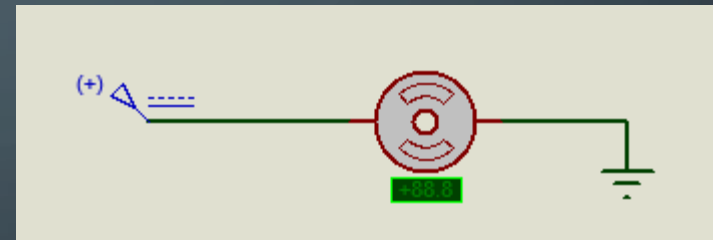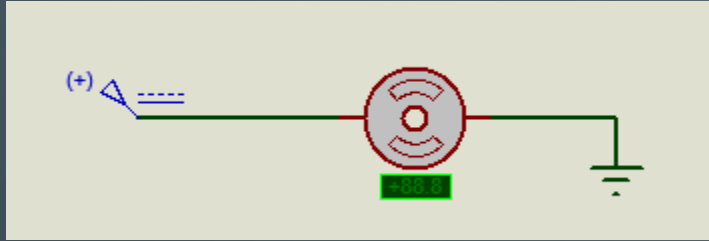
ECE-298 PROTEUS SCHEMATIC PRIMER
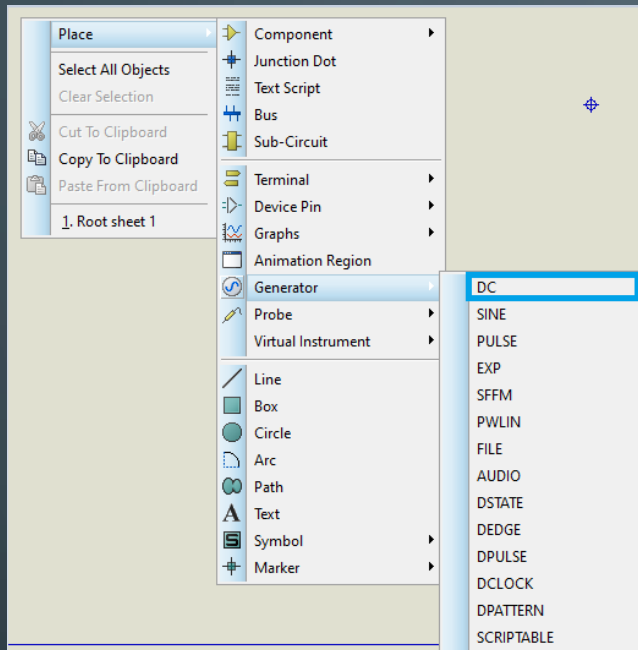
Now we want to provide some source (Virtual) of energy to the device to test it.

Go to the Edit window and add a virtual "DC GENERATOR" by Right-Clicking the mouse and select Place>Generator>DC   option then connect a wire between it and the left-most pin on the motor as shown.
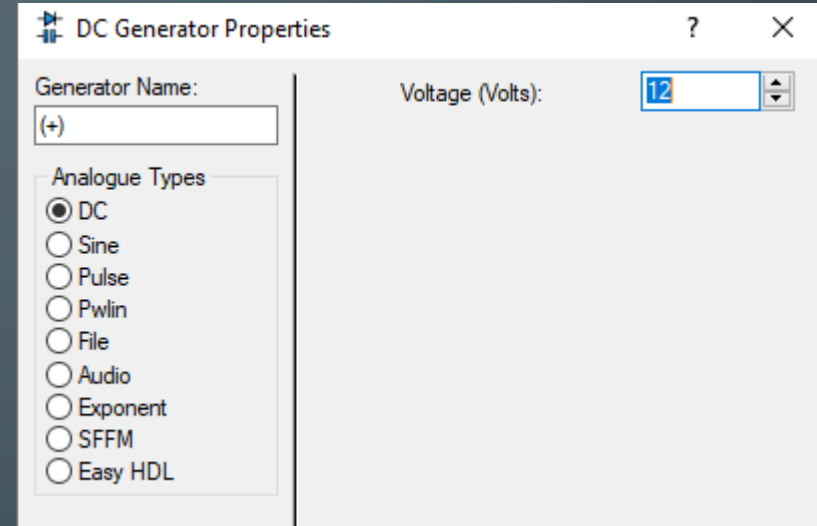

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Hover the mouse over the Generator symbol, Right-Click and then edit the DC Voltage property of the DC Generator. Set it to 12V. Click OK.

In the Lower Left of the Proteus Frame notice the SIMULATION Icons. Click on the PLAY Icon and observe the animation.
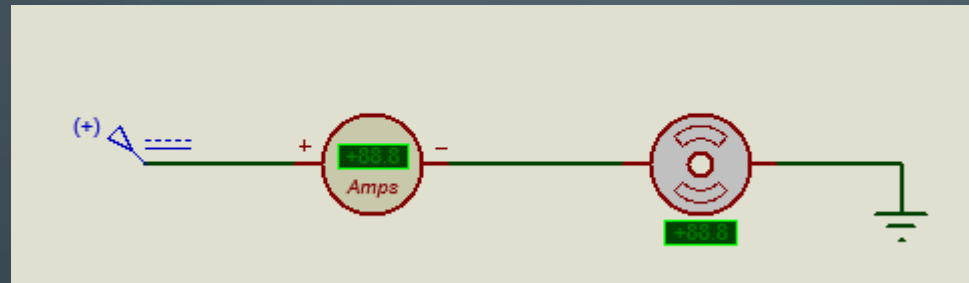

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Now stop the simulation by clicking on the Simulator Square button.
Go to the Edit window and add a current meter" by Right-Clicking the mouse and select Place>Virtual Instrument> DC Ammeter option. Place it between the DC Generator and the DC motor (in series).

Click on the Simulation PLAY Icon and observe the animation again. Watch how the motor gradually increases to an RPM limit of 500 and also how the current shown on the Ammeter gradually decreases after its initial high value to around 0.5 amps.

Next you can try running with lower values of voltage from the DC Generator and observe the RPM's and motor current. E.g.: For 8VDC: RPM's=333; I(motor) = 0.33 Amps

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Now stop the simulation by clicking on the Simulator Square button again..
Go to the Edit window and add a current probe by Right-Clicking the mouse and select Place>Current Probe option. Place it **on the wire** before the DC motor (see below).
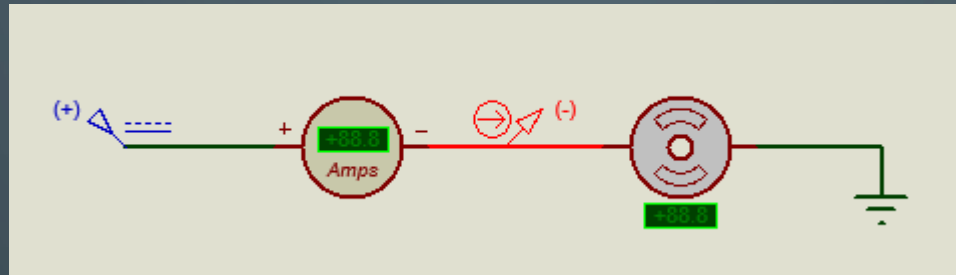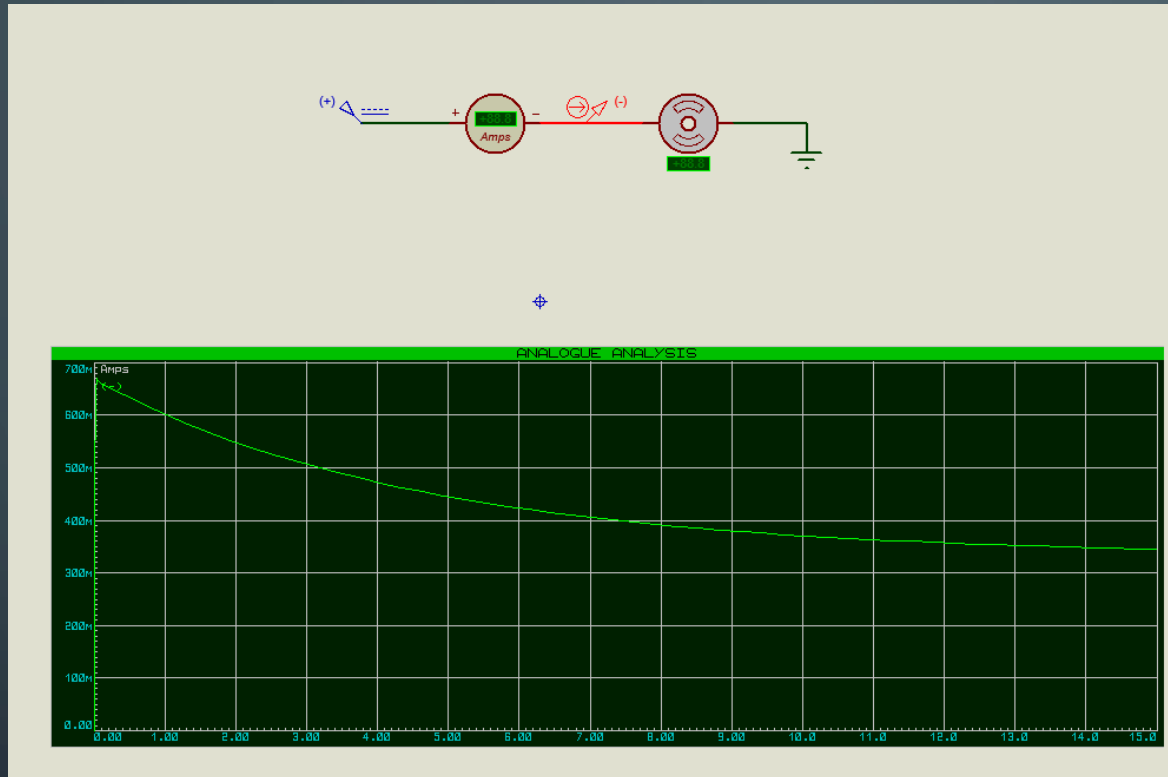

Go to the Edit window and add an ANALOGUE GRAPH to the Edit Window by Right-Clicking the mouse and select Place>Graph option. Then draw the rectangular limits in the Edit window for the graph.
Select the Current Probe Icon and then Drag it over on to the GRAPH
The Current Probe will now be able to send its measurements to the graph !!
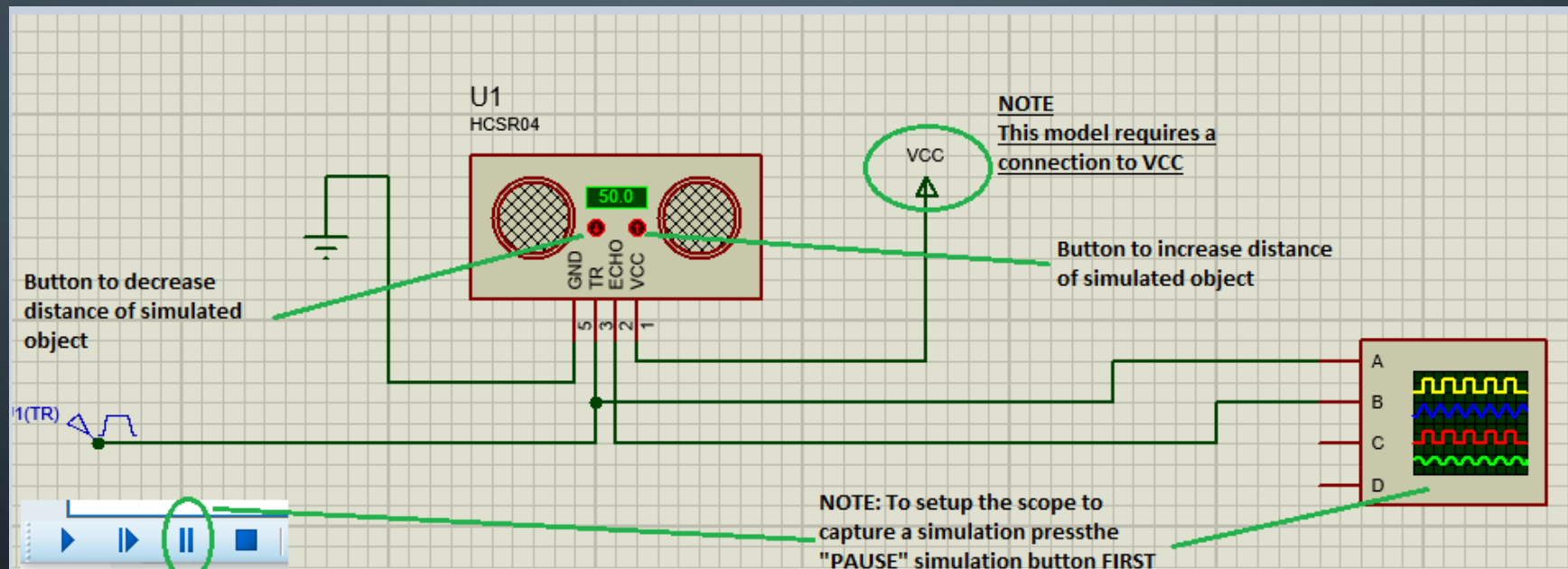
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Before the simulation is run set the Graph STOP TIME to about 15 seconds (Select the graph, Right-click and edit properties).

For Graphs, the simulations are invoked by hovering over the Graph, Right-clicking and select the Simulate Graph option. It will complete after a few seconds. In the graph notice how the motor current eventually reduces to around 0.33Amps (like the meter reading earlier).

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Here is an example of a functional module for simulation. Notice the small round Toggle buttons on the module. Clicking on them adjusts some module properties for simulation. Also note that this module needs a connection VCC (not +5.0V) for this module to operate. Hovering over the module and Right-clicking on it you can select "Display Datasheet" option (not available for every module however). An oscilloscope can be used to capture the simulation activity.

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Make sure that your oscilloscope setup is done properly so that when the simulation runs the waveforms will show important information. More details on this can be found in Proteus Help.