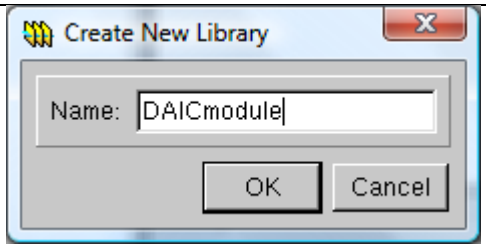
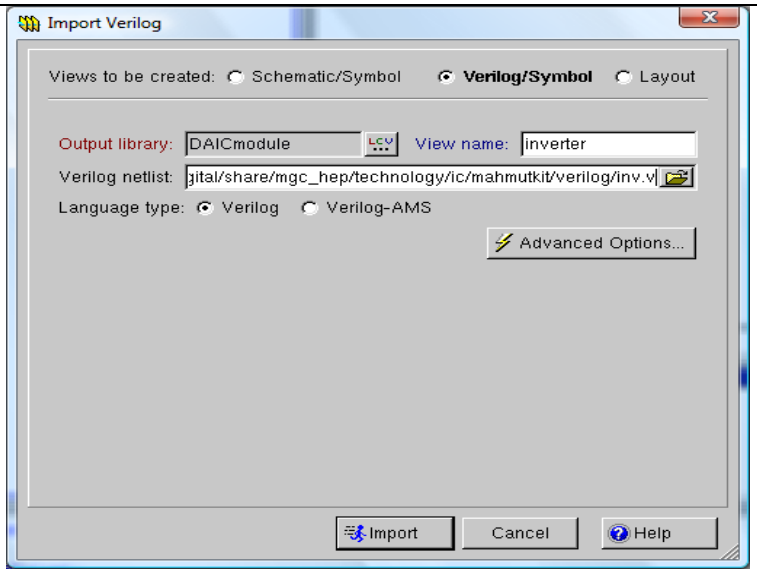
Inverter Design example with DAIC

This exercise will show you how to make a functional symbol and schematic for an inverter.

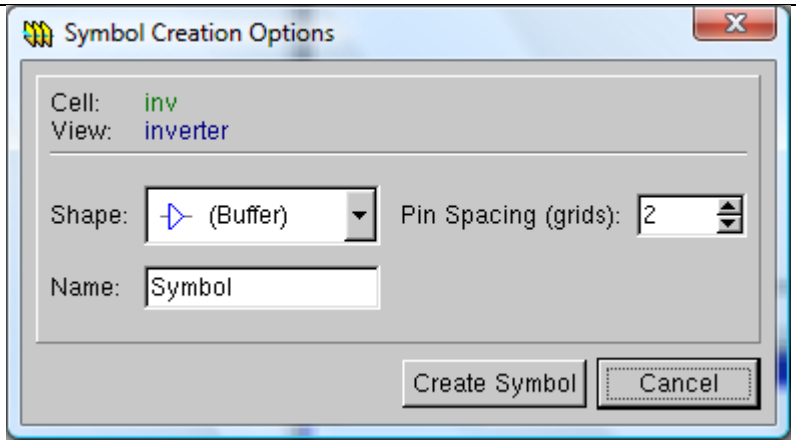
Step 1:

Description	Screenshot
1. Start ICstudio 2. Go to File→New→ Library 3. Enter DAICmodule for the name. 4. Click OK	

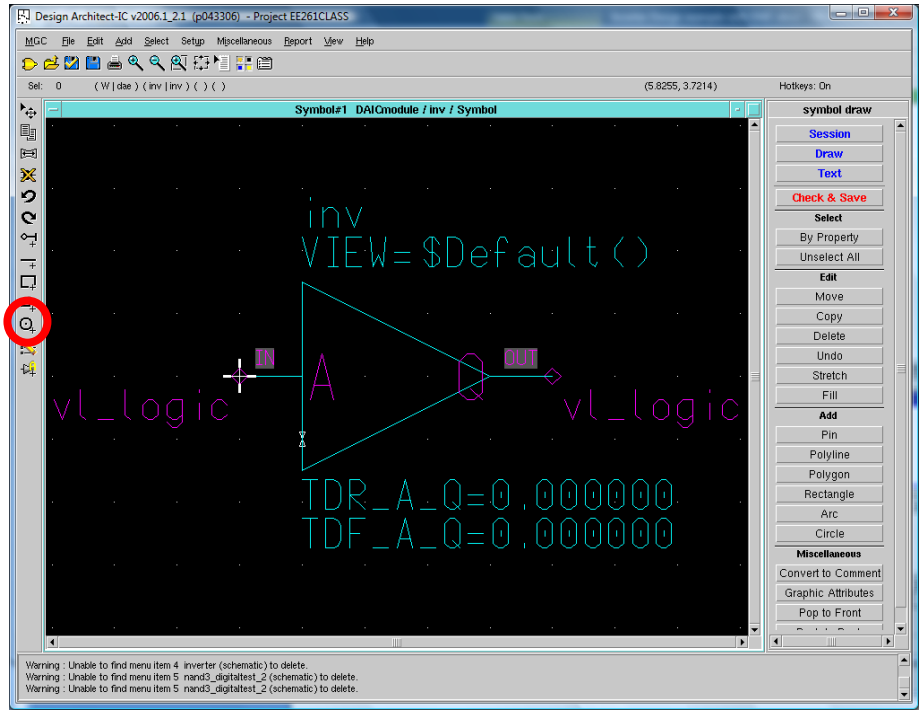
Step 2:

Description	Screenshot
1. Select the DAICmodule library and Go to File→Import→ Verilog 2. Select Verilog/Symbol and enter inverter for view name and enter the path /ece/digital/share/mgc_hep/technology/ic/mahmutkit/verilog/inv.v under Verilog netlist. 3. Click on “Import”	

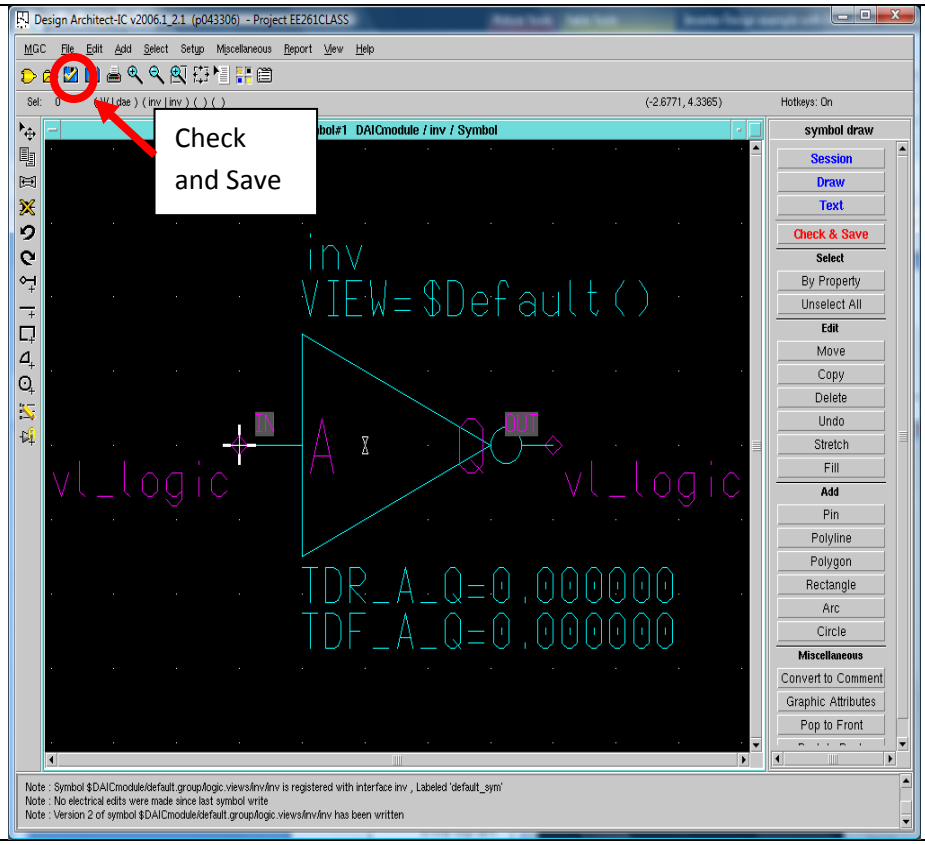
Step 3:

Description	Screenshot
1. Select Buffer when the Symbol window pops up. 2. Click “Create Symbol” 3. Double click on the symbol that appears in the view-pane	

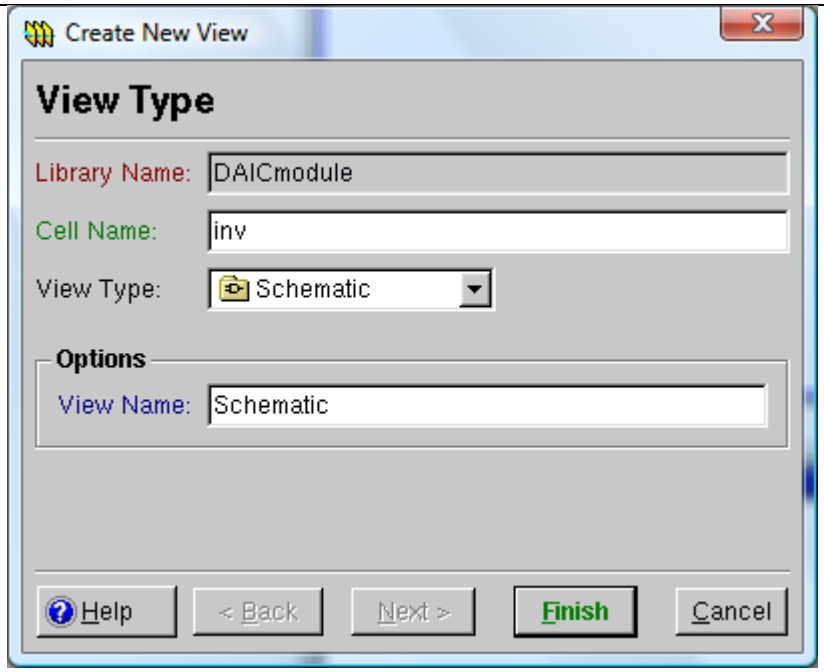
Step 4:

Description	Screenshot
1. Go to Setup→ Select Filter and click “Set All” 2. Press the circle button on the left to add a circle to the symbol.	

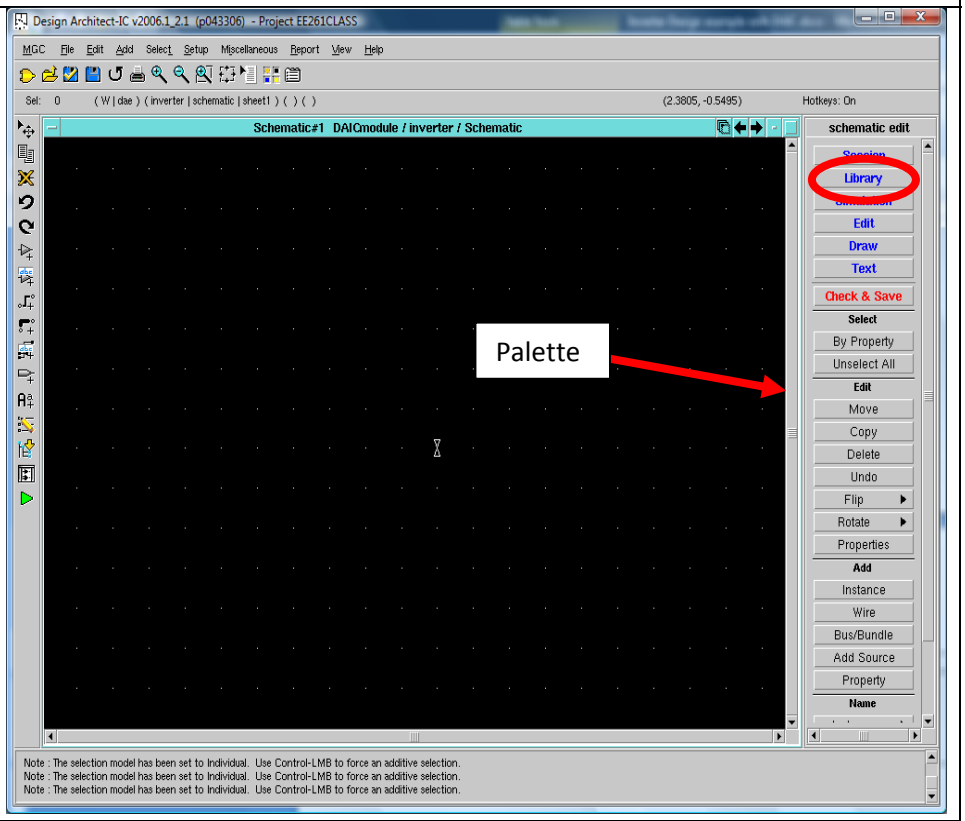
Step 5:

Description	Screenshot
1. Place the circle in between the pin and the symbol as shown. 2. Right click the pin and click stretch to shorten the pin. 3. Remember to keep the purple part of the pin all the way to the right. 4. Click on Check and Save for the symbol. 5. Close DAIC	

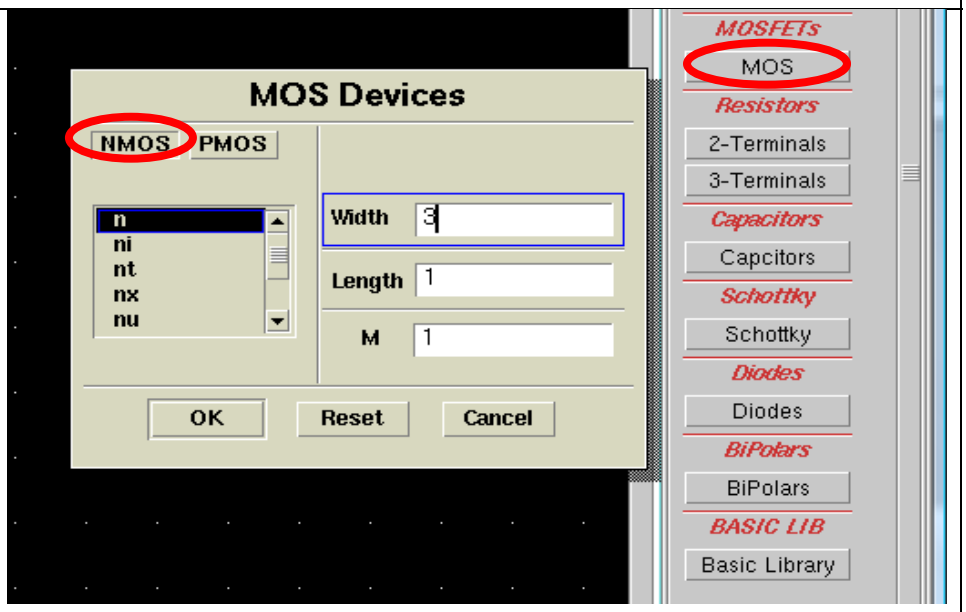
Step 6:

Description	Screenshot
1. Right-click the inverter verilog and select "Check HDL" to check for consistency. 2. Right-click on the view-pane and select New View 3. In the next window, use the following values: Cell Name – inv View Type – Schematic View Name – Schematic 4. Click "Finish" 5. DAIC will be opened.	

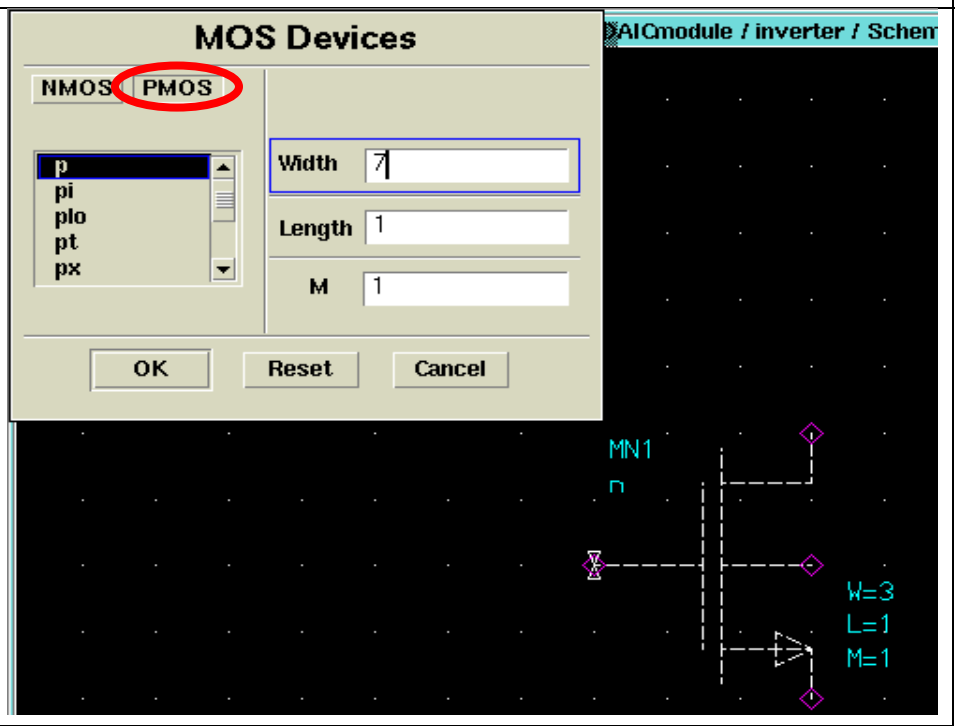
Step 7:

Description	Screenshot
1. Go to MGC→Setup and select “Show Palette 2. Then click “Library” on the palette.	

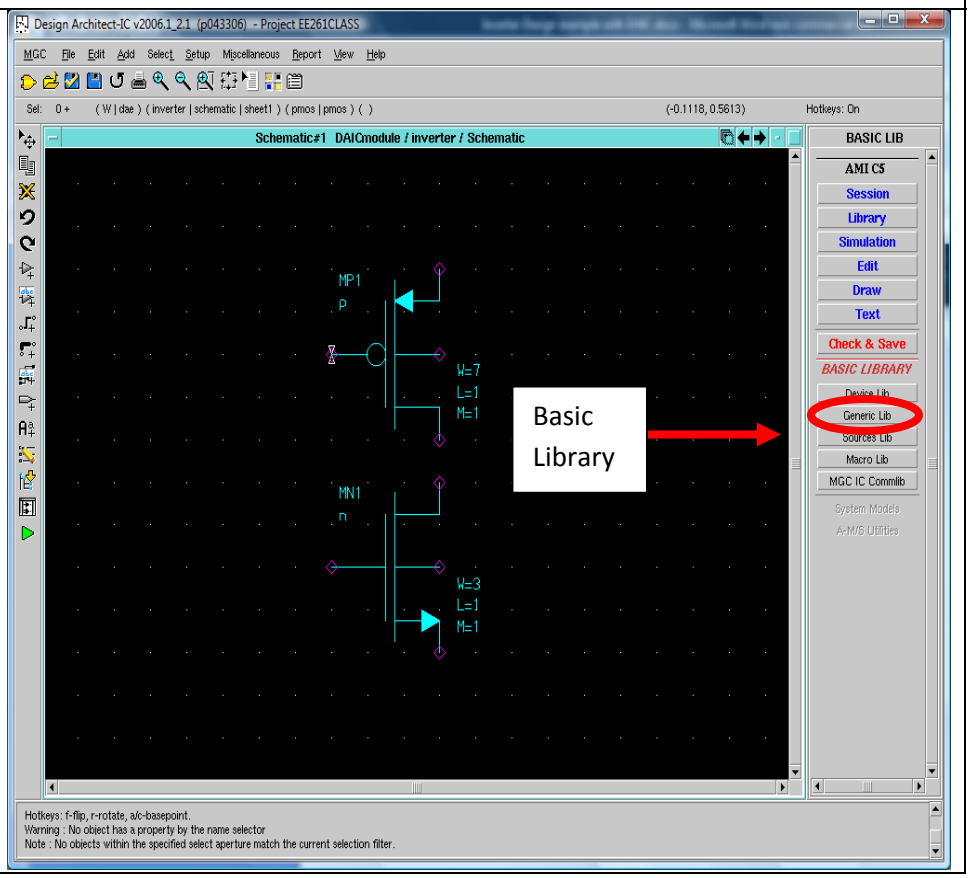
Step 8:

Description	Screenshot
1. Select MOS in the next palette menu 2. Select NMOS, select “n” and enter 3 for the width. 3. Click “OK” 4. Left-click to place the device.	

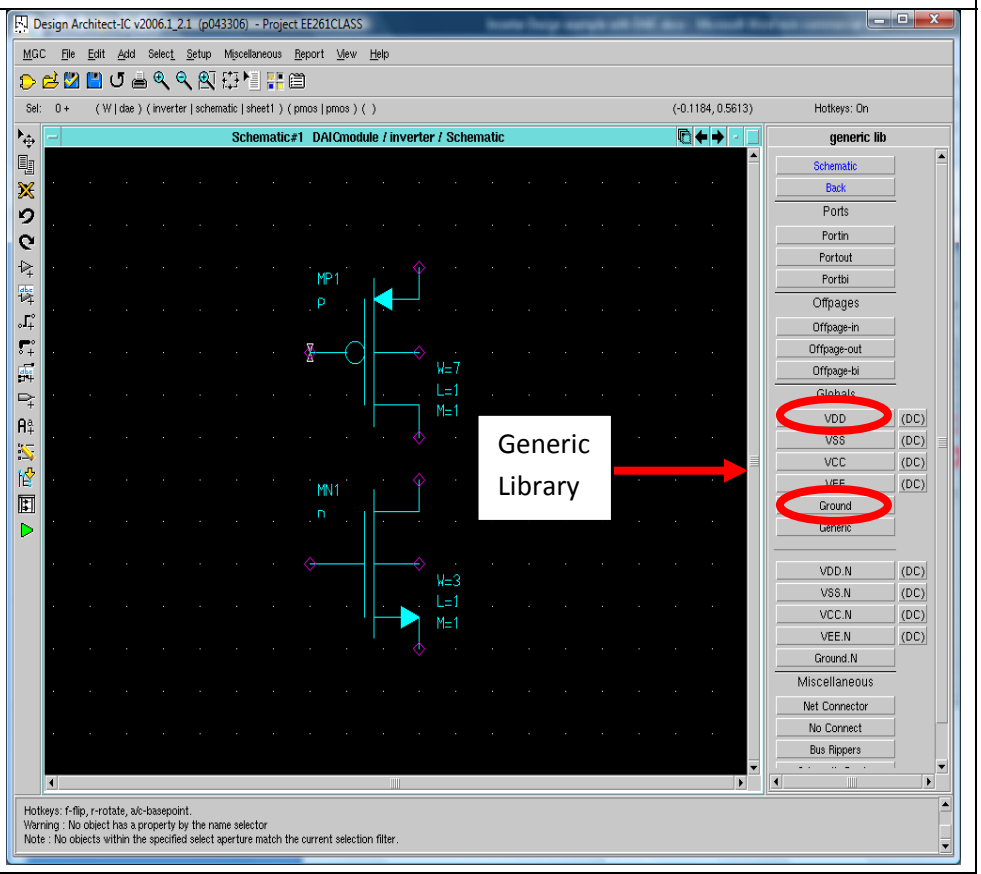
Step 9:

Description	Screenshot
1. The MOS window should pop up again 2. Select PMOS, select “p” and enter 7 for the width. 3. Click “OK” 4. Left-click to place the device. 5. Place the device directly above the NMOS device 6. Click Cancel on the MOS window when it pops up again	

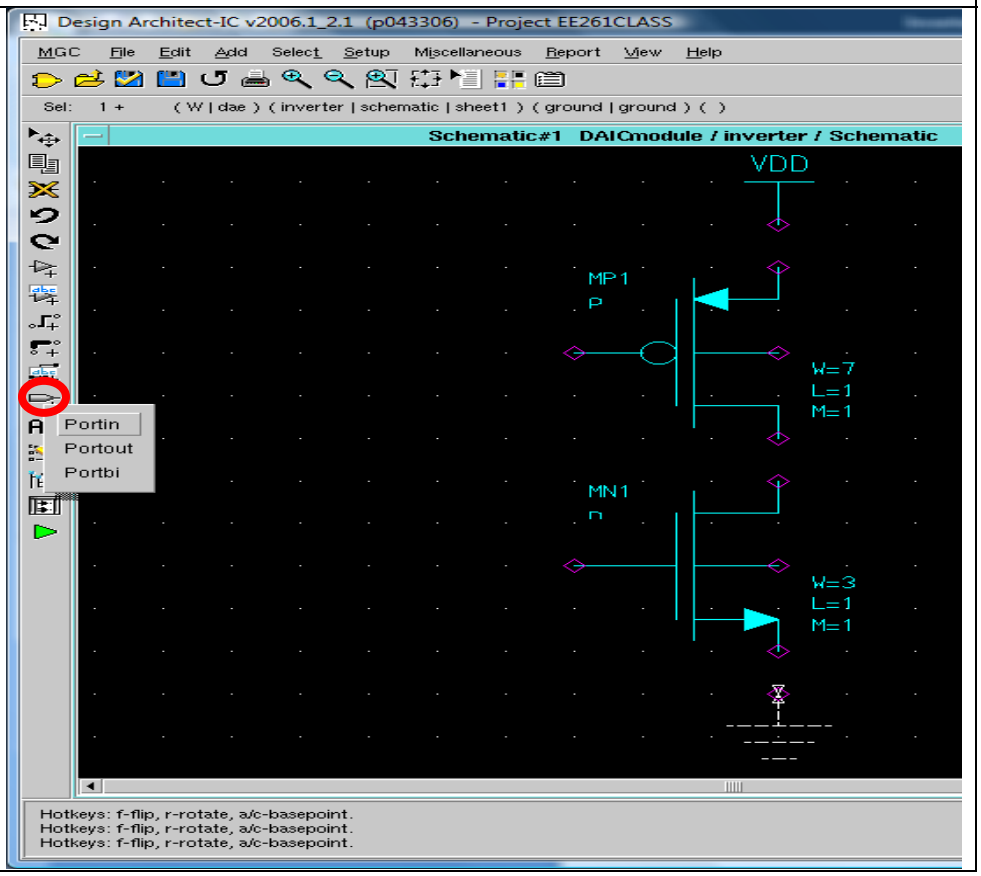
Step 10:

Description	Screenshot
1. Click “Basic Library” in the palette near the bottom. 2. Click “Generic Lib” in the next menu.	

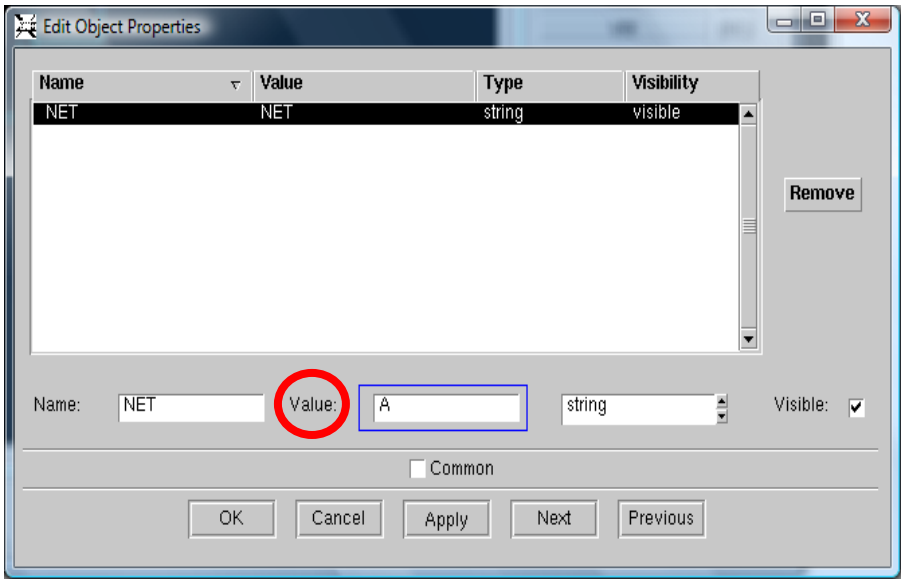
Step 11:

Description	Screenshot
1. Click on “VDD” and place the VDD marker above the PMOS device 2. Click on “Ground” and place the Ground marker below the NMOS device.	

Step 12:

Description	Screenshot
1. Click on the port button on the left side to place the input and output ports. 2. Place the portin to the left of the MOS devices and place the portout to the right of them.	

Step 13:

Description	Screenshot
1. Select each port and press “q” to edit their names. 2. Name the portin “A” and the portout “Q” by selecting the first row in the object properties box and typing those names in the Value box for each port. 3. Click OK when done.	

Step 14:

Description	Screenshot
1. Wire up the components in the inverter as shown by pressing “w” 2. Once “w” is pressed, click once to start a wire, click again to change direction and double-click to stop the wire. 3. Hit “esc” to end wiring mode. 4. Click “Check and Save” to check for consistency with the symbol. 5. You now have a complete symbol and schematic for an inverter.