

## 6.004x Jade Frequently Asked Questions and Tips

### Avoid having multiple browser windows open for the same jade problem

Sometimes, you may find yourself having more than one window open with the same jade problem. If you make some changes on one window and then go on to work on another window and complete your design and save it by checking it. If you then go to try to close the other browser window, your browser will ask you if you are sure you want to close the window because you have unsaved changes. If you choose to save those changes, then that will overwrite your recently saved completed design. The easiest way to avoid this problem is to just have the problem open in a single browser window. If you really want multiple windows, then make sure you only make edits in one of them so that the browser does not ask you to save the wrong page.

### Labeling nodes in your circuit

Input ports can be used to identify signals that are coming from outside of your design. For example, your circuit may have two inputs A and B, and an output F. Sometimes you want to use the same input multiple times. To do this, you can either connect wires from one input location to the other, or you can add a wire coming out of your second input, click on the wire and name it the same as your input port. This will automatically make the multiple locations that are connected to the same input, say A, be connected to each other. Note that adding a text label, or naming a component with the label A is not the same as adding a **signal name** to a **wire** component.

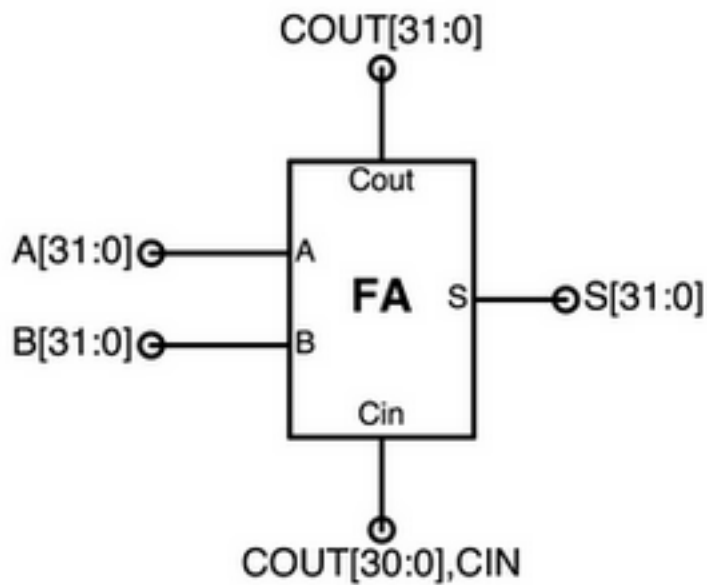
### Comments in jade

You can use `//` to make anything from the `//` on be a one-line comment.  
`/*` Multi-line comment `*/` can be used for multi-line comments.

### Replication in jade

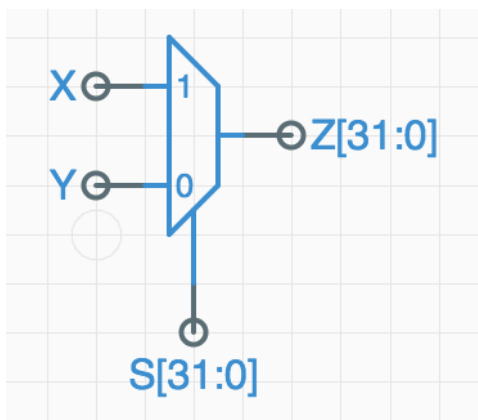
In addition to the notes provided in lab 4 about replicating modules in jade, students may find this hint helpful as well.

To create 32 Full Adder (FA) modules without copying the module 32 times, you can do the following:



Note that each port has 32 bits coming in or out of them.

Another example of module replication is shown here:



This creates 32 2-input muxes where the 0 input is always Y and the 1 input is always X. The selector S[31] is used to produce the output the Z[31]. Similarly, S[30] selects the output for Z[30], and so on.

## Debugging your circuit

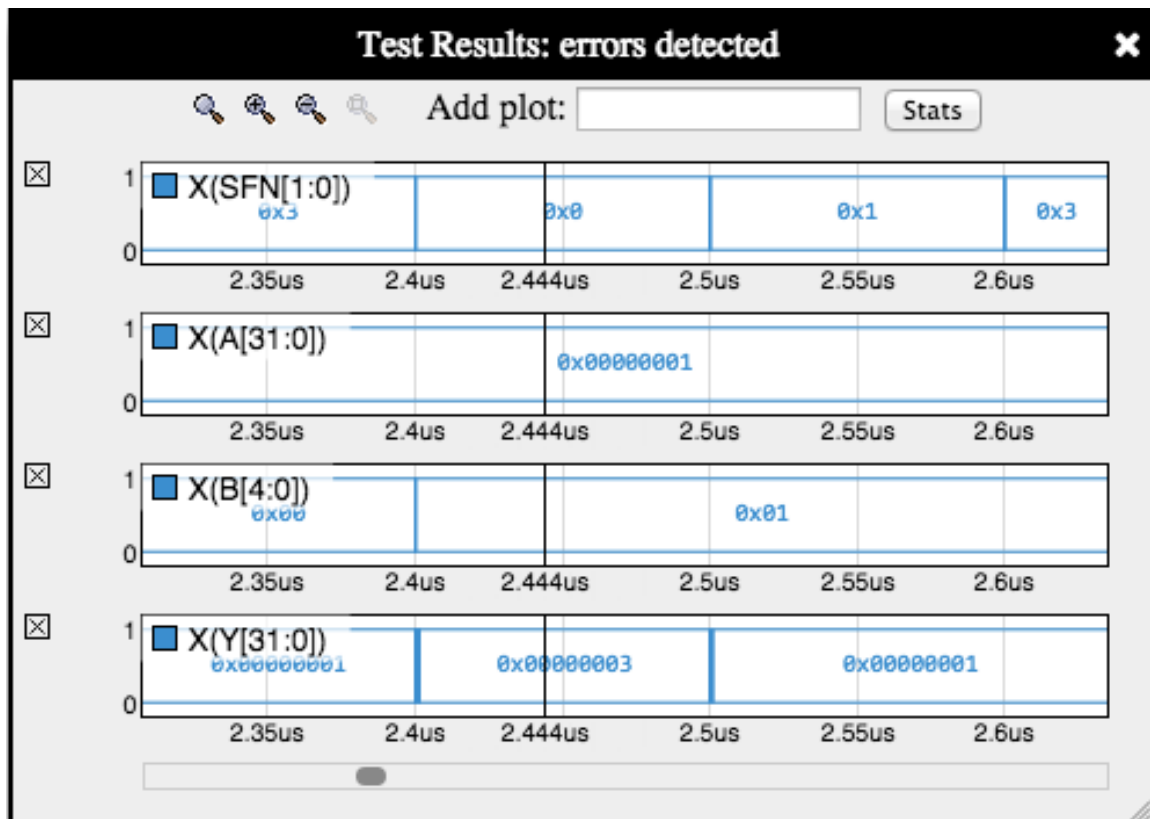
To test your circuit, you want to click on the green check button in jade. It's the one at the top of your jade window and comes between the following symbols:



If your design fails one of the test vectors, you will be given a message specifying the time of the error. You can double click on the plot several times until you zoom in enough to actually see the details of the signal values at that time. Note that the time specified always refers to the end of the test that just failed, so you want to look at the values just to the left of that time. For example, suppose that you got the following error message:



This would tell you to take a closer look at time 2.5us. Here is a zoomed in plot at that time:



It shows that  $SFN[1:0] = 0x0$  so you want to perform a shift left operation.  $A = 0x1$  (the number you want to shift).  $B = 0x1$ , the number of bits by which you want to shift  $A$  to the left. Looking at  $Y = 0x3$ , we see that somehow you ended up with a 1 in both the bit1 and bit0 positions instead of only the bit1 position as expected.

To further debug this, you want to take a look at some intermediate values along the path that produces your output Y. The way to plot these intermediate values is as follows. If you name a wire (e.g., A) or bus (e.g., B[31:0]) in your design, then you can plot the value of that internal signal for additional debugging information. To do this, after getting the initial plots from clicking on the green check mark, your plot window has a small window at the top that says: "Add plot:". To add a 1 bit signal, you would just type A (the name of your wire) followed by return. To add a multi-bit bus, you want to type X(B[31:0]) followed by return. This will add a plot of your 32 bit bus named B and show you its value in hexadecimal. Note that you may need to scroll down in your plot window in order to see these additional plots.