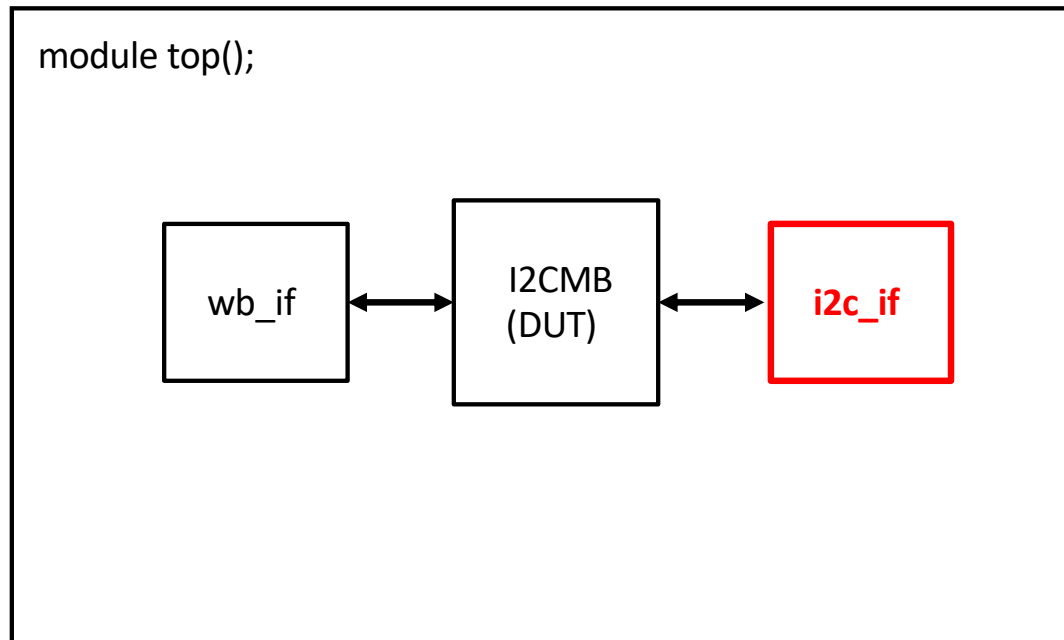


# ECE 745

## ASIC Verification

# Project 1 Assignment – I2CMB Interface



# Provided in Assignment

- Directory structure and files from Lab 1

# Project Instructions - Setup

- In the project\_benches directory:
  - Copy your lab\_1 project directory to proj\_1 directory
- In the verification\_ip/interface\_packages directory:
  - Make an i2c\_pkg directory
  - Create a src directory under i2c\_pkg
  - Create an i2c\_if.sv file under the i2c\_pkg/src directory
  - Create a Makefile under i2c\_pkg that compiles the i2c\_if.sv
    - Similar to Makefile under wb\_pkg directory
- In the project\_benches/proj\_1 directory
  - Include the i2c\_pkg/Makefile in the sim/Makefile
  - Add the compile target for i2c\_if.sv to the sim/Makefile as a dependency to the comp\_bench target
- Run 'make debug' to compile and run the bench
  - Simulation should run as in lab\_1

# Project Instructions – i2c\_if Creation

- Study the I2C specification
- Implement the following tasks within the i2c\_if interface that models an I2C Slave which
  - Waits for and captures transfer start
    - task wait\_for\_i2c\_transfer ( output i2c\_op\_t op, output bit [I2C\_DATA\_WIDTH-1:0] write\_data []);
  - Provides data for read operation
    - task provide\_read\_data ( input bit [I2C\_DATA\_WIDTH-1:0] read\_data [], output bit transfer\_complete);
  - Returns data observed
    - task monitor ( output bit [I2C\_ADDR\_WIDTH-1:0] addr, output i2c\_op\_t op, output bit [I2C\_DATA\_WIDTH-1:0] data []);

# Project Instructions – i2c\_if Instantiation

- Place an instance of i2c\_if within top.sv with an instance name of i2c\_bus
- Connect i2c\_bus to the DUT
- Create an initial block named monitor\_i2c\_bus within top.sv that
  - Calls i2c\_bus.monitor task
  - Displays the observed values
    - I2C writes should start with the message: “I2C\_BUS WRITE Transfer:”
    - I2C reads should start with the message: “I2C\_BUS READ Transfer:”

# Project Instructions – i2c\_if Verification

- Write 32 incrementing values, from 0 to 31, to the i2c\_bus
- Read 32 values from the i2c\_bus
  - Return incrementing data from 100 to 131
- Alternate writes and reads for 64 transfers
  - Increment write data from 64 to 127
  - Decrement read data from 63 to 0
- Verify i2c\_bus operation using messages in transcript from i2c\_bus.monitor task
- Note:
  - All operations done through DUT via wb\_bus
  - Project submission will be run by TA's to verify operation of these steps
    - Do not clutter up transcript with your debug messages

Clarity:  
I2C source  
Transcript

# Project Submission

- Submit by 11:59pm on Friday, February 24th
  - Midnight Friday, 2/24
- Single tar file
  - Containing: ece745\_projects directory and all sub-directories
  - Named: <unityld>\_p1.tar
  - Execute 'make clean' in sim directory before creating tar file





