Intro To Verilog - Installation & Execute Instructions

21.08.2021

Introduction:

- iVerilog is a command-line compiler for Verilog HDL. Generally, Verilog codes are written with some modules for each component, for example, let's take a 2x1 MUX. Each of its inputs, outputs, function, etc., is written in this module and this module can be used in all further code places, wherever needed.
- Testbench is a set of examples (test cases) for testing your code. In general, it is all 2^n possible options if you are dealing with n input bits, if that turns out to be very high, you can specify your own cases.
- For multiple files, there is usually a top-level module that uses all the other modules and a testbench is defined for the top-level module (Let's say we are making a 4x1 MUX using 2 2x1 MUXes, then we write the testbench for the 4x1 MUX which automatically tests working of 2x1 MUX).
- GTKWave is a waveform visualizer that lets you examine the input and output signal states at various time instants.

Installation:

For Debian based operating systems like Ubuntu:

- To install iverilog:

  sudo apt-get install iverilog

- To install GTKWave:

  sudo apt-get install gtkwave

For mac users:

- To install iverilog:

  brew install icarus-verilog

- To install GTKWave:

brew install gtkwave

For Windows Users:

- Install Icarus Verilog from the given link:- [Icarus Verilog for Windows (bleyer.org)]
    - Download the v-11 version (any subtype among the v-11 is fine)
    - Once downloaded , Run the file as administrator
- Once you run the setup file
    - Accept the license agreement.
    - Select both the Components given (MinGw and GTKwave)
    - Remember the destination of the installed file (cause you will run the programs from there)
    - In the last step , select the check box which says "Add executable folder(s) to the user PATH.

The above Setup comes with GTKwave so you won't be required to download it separately.

- Once Installed, you need to include the path in the environment Variable
    - Open the iverlog folder where you have downloaded.
    - Copy the path of the bin folder.
    - Search for "Systems" in the windows search bar. Open the Systems.
    - Select Advanced System Setting. Click on Environment variables.
    - Click on New. Give any name to the Variable name (example: Iverilog) and paste the path of the bin folder path(which you have copied in earlier steps mentioned) in variable value.

File Formats:

- Modules and testbenches must have the extension (.v).
- Dumpfiles should have the extension (.vcd)

Execute:

- To compile the written code, just type

iverilog <fileName> <names of any included modules>

- To execute the compiled code, as usual run

  ./a.out

- To check the waveforms on GTKWave, use the command

  gtkwave <dumpfileName>

- To observe waveforms on GTKWave, select the module name in the left side section, then drag whichever variable you want to observe.

Sample Codes:

- Clone the repository - Run this command on Ubuntu Terminal

  git clone https://github.com/Sasanka-GRS/Verilog-Session

- Open the files in the directory, make necessary changes and run them