THEIA Simple Scene Simulation Tutorial: Example 1

Thank you very much for your interest in the project.

In this tutorial, you will set up THEIA to simulate a simple 3D scene consisting of 2 texturized triangles. This is the final output for this example:

Summary

Number of triangles	2
Resolution (pixels)	200x200
Textures	Bi linear filter
Behavioral Simulation Time	Less than 15 minutes *
Shaders	Default Shaders in ROM

For simplicity, this tutorial uses the default algorithms stored in THEIA's internal ROM. In the next tutorials I will show how to write and load your own Shader code and also general your own scenes using *BLENDER*.

Step 1 – Download and the Simulation environment.

1.1 Download the 'theia_gpu_latest.tar.gz' file from Download section of the project web page.

1.2 Un-compress the tarball.

1.3 Please refer to the 'readme.txt' document under the 'test_bench' folder for instructions on how to setup the XILINX ISE project.

1.4 Assume the following paths:

SIM_DIR: project directory created by ISE Project Navigator, this is where all the verilog files are located.

SRC_DIR: folder that gets created after you unzip 'theia_gpu_latest.tar.gz'. Contains a

copy of the sources, doc,examples,etc.

Step 2 – Download and copy the input files.

2.1 Copy the input files (*.mem) from the SRC_DIR/examples/scenes/example1 to SIM_DIR/
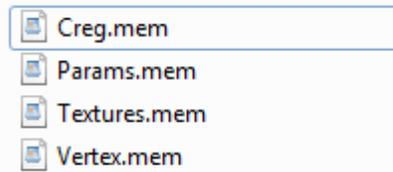
Creg.mem: has control register options (more on this in the documentation).

Params.mem: Scene configuration such as camera origen, light, Axis Aligned Bounding Box position, etc. (more on this in the documentation).

Textures.mem: binary representation of the texture memory (more on this in the documentation).

Vertex.mem: Binary representation of the triangle primitives (more on this in the documentation).

Step 3 – Configure the simulation.

3.1 Once the project has been created. Select Behavioral simulation under the 'source for' drop down menu:
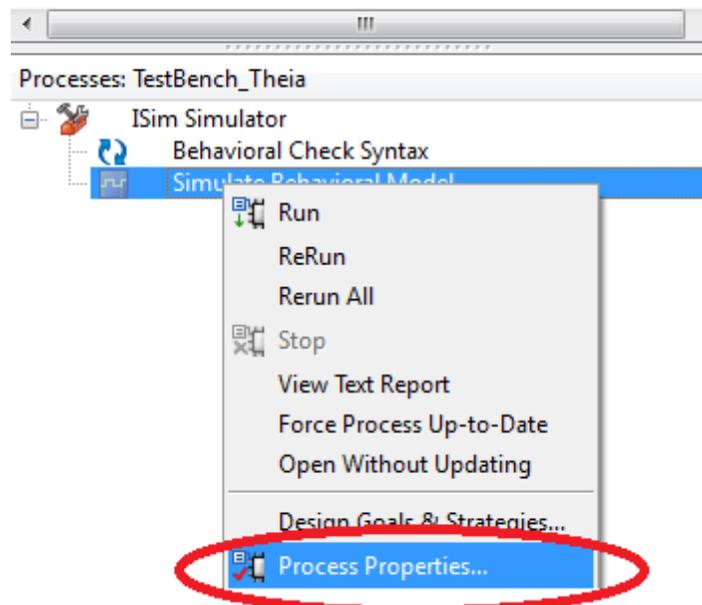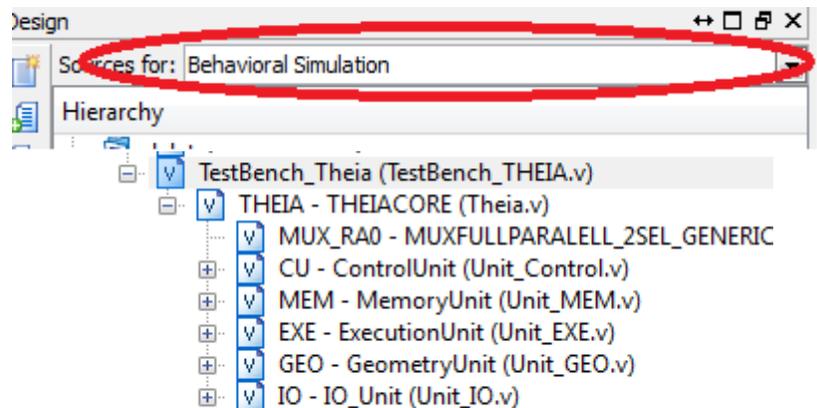
3.2 select the 'TestBench_Theia' file under the 'Hierarchy' tree control. Then right click on the Simulate behavioral model icon and select 'Process Properties'.**3.3** (optional) Make sure the 'advance' option is selected and add the 'DEBUG=1|DUMP_CODE=1' flags in into the Macro option.

This switches will tell the THEIA simulation executable to create extra debug information log files including a code dump.

Step 4 – Run the Behavioral Simulation.

Click on the Simulate Behavioral model to start the simulation. You can also run the simulation from DOS or Linux command line (this way is a little faster).
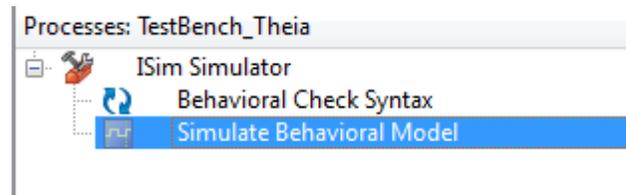
While the simulation runs, it will print some dot characters and the current row line that is rendering, this way you can see it is running.

Optional: You can also look at the code dump file while the simulation is running

>tail -f SIM_DIR/Code.log

Step 5 – Verify results and analyze the log files.

The easiest way to verify the results is by simply comparing the file 'Output.ppm' against the file 'Reference.ppm'

You can look at those files using **Gimp** or **XnView** under windows.

Happy Simulation!

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