**Workshop 01 - Nand2Tetris Project 01**

**Workshop 01**

This workshop is introductory and held in the first week. You are expected to read these questions in advance of this workshop (see details below) but, unlike future workshops, you are not expected to submit work in preparation. Just bring your notes and any preparatory electronic work.

The aim of this workshop is to familiarise you with some of the basic Nand2Tetris tools you will need for the first assignment.

**Note**: As with all work in this course it is **highly recommended** that you save any electronic resources you use in preparation for this course to your svn repository. This will make syncing the work you do at home and the work you do at university very easy.

**Also Note: You will need to get marked off for this workhop.** To do so go to:  
        <https://cs.adelaide.edu.au/services/pracmarker/>  
and navigate to this workshop. **Do not click** on "flag me for marking" until a supervisor is standing next to you and is ready to mark your work.

**Workshop Preparation**

You should do the following preparation:

Download the course materials into your account at university (you may also do so on your personal computer if you have one) these materials can be found at:

[http://nand2tetris.org/software/nand2tetris.zip (Links to an external site.)Links to an external site.](http://nand2tetris.org/software/nand2tetris.zip)

Read the first chapter of the textbook:

[http://www.nand2tetris.org/chapters/chapter%2001.pdf (Links to an external site.)Links to an external site.](http://www.nand2tetris.org/chapters/chapter%2001.pdf)

Then read (and practice) sections I, II, and  III  of the tutorial on the hardware simulator and the Hardware Description Language (HDL):

[http://www.nand2tetris.org/tuorials/PDF/Hardware%20Simulator%20Tutorial.pdf (Links to an external site.)Links to an external site.](http://www.nand2tetris.org/tutorials/PDF/Hardware%20Simulator%20Tutorial.pdf)

Note that page 26 contains some important notes about how the simulator searches for hardware definitions. Now, in preparation for the workshop do two things:

1. build and test a Not gate using just one or more Nand gates.
2. build and test an And gate (we will not be covering this explicitly in the workshopl but you will need to use this in the assignment so it good to try in preparation).

Come armed with any questions you may have.

**Workshop Activities**

1. Log in on linux and start up firefox.
2. Download and start the hardware simulator from the Nand2Tetris website. (**hint:** you may have to change the permissions on some script files to run it).
3. In the hardware simulator open up the nand2tetris/tools/BuiltInChips/And.hdl file.
4. Individually or in groups, do the following:
   * Test the And chip interactively. Does the And chip behave as expected?
   * Write a small test script and output file to test one combination of inputs to the And chip.
5. In the hardware simulator open up the nand2tetris/tools/BuiltInChips/Mux8Way16.hdl file:
   * Describe in words what do you think this chip does? Hint, the comments help a little.
   * The chip is 8-way but the selector input has only three channels (3 bits) how does this work.
   * Would it be possible to build an 8 way 32 bit mux? Explain your answer?
   * Would it be possible to build an 8 way 1 bit mux? Explain your answer?
   * Would it be possible to build a 1 way 8 bit mux? Explain your answer?
6. In a terminal, change to the nand2tetris/projects/01 directory.
7. Start editing the nand2tetris/projects/01/Not.hdl file in gedit, emacs or your preferred editor.
8. Load your Not.hdl file into hardware simulator.
9. In groups do the following:
   * What happens if you use a Not gate in your Not.hdl file? Write down what you think is happening.
   * Change your code back to your implementation of a Not gate using one or more Nand gates.
   * Test your implementation interactively. See slide 14 of the hardware simulator tutorial on the Nand2tetris site.
   * Edit the Not.tst script and the Not.out comparison file. Run the script to see what happens when the output is violated.
10. When you have finished let the tutor know you wish to be marked.

If you get stuck on hdl consult the [Hardware Simulator Tutorial (Links to an external site.)Links to an external site.](http://www.nand2tetris.org/tutorials/PDF/Hardware%20Simulator%20Tutorial.pdf) or the [HDL Survival Guide (Links to an external site.)Links to an external site.](http://nand2tetris.org/software/HDL%20Survival%20Guide.html) on the nand2tetris website.

**Assignment Practise**

If you have time it is a really good idea to experiment with setting up a directory in your svn repository and submitting something to the [web submission system](https://cs.adelaide.edu.au/services/websubmission). To let you do this we have created an extra assignment for this courses named **Assignment 0 - No Marks Awarded** that assumes that your work is in a directory in your svn repository named:

https://version-control.adelaide.edu.au/svn/<username>/<year>/<semester>/cs/assignment0

For the semester you should use *s1* for *semester 1*, *s2* for *semester 2* or *t2* for *term2* as appropriate.

Anything that you submit to this assignment will be tested using the Assignment 1 marking scripts but the *marks* will not be used anywhere else. You will also find a link to a logbook on the 'View Feedback' tab so that you can experiment with this too.

**Note**: this assignment is for experimenting only - all submissions may be deleted without notice.