

EECS 211
Advanced System Software
Winter 2008

Assignment 1

Posted: January 16, 2008 (Week 2)

Due: January 23, 2008 (Week 3)

Topic: Introduction to the Nachos system

Instructions:

The goal of this first assignment is to get familiar with the Nachos operating system that we will be using for this and the following assignments.

Task 1: Read the overview chapter about Nachos

To make you familiar with Nachos, read Appendix D of the text book. Note that this chapter is not printed in the book, but provided online at the author's web site: <http://cs-www.cs.yale.edu/homes/avi/os-book/os7/online-dir/Nachos.pdf>.

For your convenience, a local copy is available on the course web site in the resource section: <http://eee.uci.edu/08w/18410/resources/appd.pdf>

Hint: Read the chapter so that you get an *overview* about the Nachos system and the possible assignments (thus, you don't need to understand every single detail at this time!). We will structure the homework assignments for this course along the lines of the assignments outlined in the chapter.

Task 2: Setup the Nachos system

To get started, you need to install the Nachos system in a working directory for EECS 211, as follows:

- We will use the EECS department servers as work platform, namely `vivian.eecs.uci.edu` (or, as alternatives, `malibu.eecs.uci.edu` and `newport.eecs.uci.edu`). If you do not have an account on these machines, send an email to the course instructor and an account will be created for you.
- To work on the server, you will need to connect to one of them through a remote shell client. The secure-shell (SSH) protocol is necessary for this. Secure shell clients for all major operating systems exist for free, please refer to the resources page on the course web pages for details: <http://eee.uci.edu/08w/18410/resources.html>.

- Working with the Nachos operating system requires the use of two compilers, one for the native operating system (Sun Solaris 5.9 on SPARC), and one cross-compiler for the Nachos system which is simulated to run on a MIPS processor architecture. We will use the GNU C/C++ compiler version 2.95.3 in both cases.
- To ensure that you use the correct compilers, please add the directory `/users/faculty/doemer/eecs211/bin` to your execution path, i.e. `setenv PATH /users/faculty/doemer/eecs211/bin:$PATH`. This is probably best done in your setup files, i.e. file `.cshrc`, otherwise you will have to repeat this command every time you login.
- For your convenience, a setup script is also provided. You may simply use `source /users/faculty/doemer/eecs211/bin/setup.csh` (for `csh`) or `./users/faculty/doemer/eecs211/bin/setup.sh` (for `sh` or `bash`).
- Next, you obtain a copy of the Nachos tar-archive and install it. The following commands will create a new directory for EECS211 in your home directory, copy the tar-archive for this course over from the class directory, and extract the sources.
 - `mkdir eeecs211`
 - `cd eeecs211`
 - `cp /users/faculty/doemer/eecs211/nachos-3.4-patched4EECS211.tar.gz .`
 - `gtar xvzf nachos-3.4-patched4EECS211.tar.gz`
 - `cd nachos-3.4`
 - `more README`
- The file `README` describes the details of the usual setup process for Nachos. Note that most of the steps have already been applied to the patched tar-ball, so you don't need to worry about the system setup. However, it will be helpful to read some of the documentation files listed in this file (i.e. steps 4 and 5). In particular, the files `nachos.ps` and `doc/overview.ps` will be helpful at this time.
- The next step is to compile the basic Nachos system.
 - `cd code`
 - `gmake`
- This will compile the basic system and all the assignment sub-directories. If everything goes well (there should be no errors or warnings), you should have Nachos installed now.
- Test the installation by going into thread assignment sub-directory and start the system:
 - `cd threads`
 - `./nachos`
- This final step should show logging information about two threads running alternatively 5 times. After the threads exit, the system will halt the simulated machine, show some statistics, and then terminate.

- Submit the logging infos printed in the previous step as deliverable (see section Deliverables at the end of this text for details)!

Task 3: Understand the Nachos system

Before you now dig into modifying and writing code, it is very important that you *understand* the Nachos software. There is a lot of documentation provided and a lot of source code that you should actually read and understand, before you start coding yourself. So, take the time to read through it, understand it, and if anything is unclear, go back and read again. Keep in mind that this preparation will pay off multiple times later in reduced coding and debugging time!

The following is a suggestion on the items to read, and on the order in which to read them:

- **README** (see above)
- **nachos.ps** (overview, similar to the book chapter)
- **doc/overview.ps** (follow the suggestions at the bottom)
- **doc/thread.ps** (main document for the next assignment!)
- **code/threads/*.h** (header files, well-commented, very important)
- **code/threads/*.cc** (implementation sources, to be extended)

For reading the source code files, it is useful to follow the order suggested in the `doc/thread.ps` document.

Deliverables:

- Submit the logging infos printed when running the plain Nachos installation (see end of Task 2 above) as proof that your installation works correctly (just copy/paste the log text into your email).

Submission instructions:

To submit your homework, send an email with subject "EECS211 HW1" to the course instructor at doemer@uci.edu. For this assignment, please just paste the logging infos into the body of your email (no need for an attachment).

To ensure proper credit, be sure to send your email before the deadline: January 23, 2008, 11:59pm (before midnight).

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