

EECS 211: Advanced System Software Lecture 9

Rainer Dömer

doemer@uci.edu

The Henry Samueli School of Engineering
Electrical Engineering and Computer Science
University of California, Irvine

Lecture 9: Overview

- Assignment 2
 - Concurrency, Synchronization
 - Solution
- Memory Management
 - Virtual Memory

The Nachos System

- Overview
 - User code:
 - Cross-compiled C/C++ code
 - emulated by MIPS simulator
 - Kernel:
 - Compiled C/C++ code
 - normal (debug'able) Unix process
 - I/O System:
 - simulated by Unix process I/O

The diagram illustrates the Nachos system architecture as a stack of layers. At the top, a human figure represents the user, with two boxes labeled 'application' on either side. Below these is the 'shell' layer, which is part of the 'user programs' category. Underneath the shell is the 'MIPS simulation' layer. The next layer is the 'portable OS kernel', which is divided into 'syscalls' and 'virtual memory'. Below this is another 'portable OS kernel' layer containing 'RPC TCP' and 'address spaces'. The next layer is 'file system'. Below that is 'thread management'. The 'hardware simulation' category includes the 'machine-dependent OS layer' and the 'I/O device simulation' layer. At the very bottom, the entire stack is labeled as a 'UNIX process'.

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3

Assignment 2

- Thread Synchronization in Nachos
 - Task 1: Implement the missing locks and condition variables
 - files `synch.h` and `synch.cc`
 - Task 2: Test the locks and condition variables
 - file `threadtest.cc`
(based on `threadtest.cc.W11templateA2`)
 - implement *safe* scheduling of strictly alternating threads
 - *no change in execution order due to any `-rs` value!*
- Deliverables
 - code for locks, condition variables, and safe test case
 - log file of test runs with five different random seeds
 - Email to doemer@uci.edu
- Due by email to doemer@uci.edu
 - Wednesday, February 2, 2011, at 2pm (sharp!)

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4

Memory Management

- Excerpts from chapter 9 of
“Operating System Concepts”, 8th Edition,
by A. Silberschatz, P. B. Galvin, G. Gagne,
John Wiley & Sons, 2009.
- Memory Management
 - Virtual Memory