Subject Summary

What You Would have learned if you didn’t skip classes
(True of only a small minority)
2002–2003

Nick Urbanik <nicku(at)nicku.org>
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A computing department

Main Topics

- Shell Programming and POSIX commands
- Free Software, Open Standards
- Operating System Structure, Open Standards
- Processes and Threads
- Race Conditions, Locking and Deadlock
- Secure Shell
- Memory Management
- Input and Output
- Systems Integration

What did we Cover from Workshop Notes?

A burning question from some people in group W, and some specific people from other groups

Answer is on the web site, reproduced here:
- Module 1, Overview
- Module 2, Basic Shell
- Module 3, Basic Tools
- Module 4, More Tools
- Module 5, Basic Filesystem
- Module 6, Finding Documentation
- Module 7, Administering User Accounts and Permissions
- Module 13, SSH — The Secure Shell

Shell Programming, POSIX commands

- The first seven chapters of Workshop Notes introduced POSIX commands
- The lectures on shell programming used these commands with the shell programming language
- You studied file permissions, including SUID, SGID executables and SGID directories
- Study the lab exercises on shell programming
  - There are solutions on the web site—examine them closely
- One exam question relates to these topics
- No need to memorise commands: appendices to exam contain lots of information you can refer to, including an excerpt from lecture notes on the sed command.
Operating System Structure, Open Standards

- We studied operating system structures:
  - Monolithic kernel (Linux)
  - Microkernel (Mach, Hurd, Windows NT, 2000, XP)
  - Virtual Machine (Mainframes, Java VM, VMware)
  - Layered Architecture (Windows)
- There was one lecture on Free Software and Open Standards
- We studied systems integration in two lectures
- Make sure you understand the lecture on the operating system kernel.
- Most of an exam question relates to these topics

Processes and Threads

- In this long lecture, we covered many topics, including:
  - Comparing processes and threads
    - Make sure you understand the practical effect of the differences between threads and processes
  - Process states
  - POSIX process creation — fork(), exec*, wait(), and exit()
    - ... and using these to create a simple interactive shell
  - One exam question relates to these topics

Locking, Race Conditions, Deadlock

- The material came from the end of the lecture slides on Processes and Threads, and a separate lecture on Deadlock
  - They really belong together
  - We covered locking mainly in relation to POSIX threads
  - We did a lab exercise on Deadlock
  - Understand the purpose of locking (understand, don’t just memorise the notes)
  - One exam question relates to these topics

Input and Output

- This lecture focused on a number of things, including designing and partitioning hard disk systems with redundancy and flexibility.
  - There is a case study involving RAID and a volume manager
  - Half an exam question relates to these topics
  - For those who where out to lunch,
    - I skipped the section of the notes on installing device drivers
Secure Shell

- We studied the lecture from Module 13 of the Workshop Notes
- We did a workshop on the topic in the laboratory
  - The main issues relate to the proper handling of keys
  - Avoiding security risks
- Half an exam question relates to this topic

Memory Management

- We studied this topic in the lecture theatre
- We did a tutorial exercise on memory management
- One exam question relates to these topics


- Has six questions
- Select five of them
- All of equal value, 20%

Advice for the Exam

- Budget your time wisely in the exam:
  - Spend a few minutes to decide which question you will not attempt
  - Divide remaining time by five
  - Do not spend more than this time until you have answered five questions fully

- Show your working
  - A wrong answer with no working gets zero marks
  - A wrong answer with some working that is on the right track gets some marks

- If you are attempting the supplementary, study the solutions to the main exam on web site :-(
  - but this is not enough to pass :-(

Except for Group W, who were “out to lunch.”
Compared with past papers

- This year’s exam is different from past papers
- Teaching focuses on use of C and system calls much more than previously
- An appendix to the exam includes function prototypes for some system calls and library functions
- Revising using previous exam papers:
  - I will attempt to provide solutions to previous exams
  - Definitely not sufficient for revision of whole course, however.

Watch the Subject Web Site

- Watch the web site for announcements:
  - I will write and post solutions to problems as soon as I can.
  - I made a new icon to highlight changes to solutions on the site, including solutions to problems I have written.