

Exam in Operating Systems 2013-05-29

Inga hjälpmedel!

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30 out of 60p are needed to pass the exam.

1. (5p) Explain the basic workings of a UNIX command line interpreter. Which system calls can be useful and for what? Explain in particular I/O redirection for files and pipes. Explaining the exact details of the system calls you mention is not necessary — focus on why they are useful.

Answer: See Lecture 1.
2. (5p) What is a UNIX signal and why when can they be useful? A signal can temporarily be blocked — what does that mean and when would you like to use that?

Answer: See Lecture 2. Blocking is useful to avoid receiving a signal while some particular code is being executed.
3. (5p) When a signal handler returns, it looks to the application code as if the signal handler function simply returns as if it had been called from the application. This is not the case actually. What happens and why is that necessary?

Answer: It returns via the kernel so the signal can be unblocked. See Lecture 2.
4. (10p) Describe the Linux completely fair scheduler.

Answer: See book.
5. (10p) Describe what happens in a virtual memory system at a pagefault. Start with the TLB fault.

Answer: See Lab 3 and Lecture 8.
6. (5p) Why did AT&T, the owner of Bell Labs, not sell UNIX when they realized how great it was?

Answer: They would then risk being split into smaller companies since in the U.S.A. it is illegal to exploit a monopoly in one industry section (which they legally had in telecom) to enter a different industry sector. They were later split anyway however.
7. (5p) What is a virus and how would you proceed if you would like to spread one? What can you as a UNIX system administrator do to avoid viruses from infecting your system?

Answer: See Lecture 10.
8. (5p) Which is the most frequent file operation and which is the most frequent disk access operation and why are they not the same?

Answer: Reads are the most frequent file operation and writes are the most frequent disk operation and the reason is the high read hit rate of the buffer cache.
9. (5p) What is a SETUID program and how can this feature be useful?

Answer: See Lecture 1.
10. (5p) What is the purpose of the operation called *relocation* which is used during link-editing? How is it done?

Answer: The purpose is to modify instructions and data with static storage duration that contains an address (including PC-relative) so that they have the correct values. See Lecture 5.