

CS 385: HW1–Due Oct 10, 2003

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1. Real, virtual, transparent. For the following, describe which of the adjectives of real, virtual or transparent applies:
 - (a) You just bought a memory module and put it in your computer.
 - (b) Your system uses disk storage to pretend it has more main memory than you actually do. What is the “main memory” produced in this way?
 - (c) You just bought a hardware add-on which does not require any software support but speeds up the processing of the computer.
2. Finite progress. Do the following implementations provide finite progress or not. Explain.
 - (a) Process i gets $\frac{1}{2^i}$ th the CPU cycles, for $i = 1, \dots$
 - (b) While a process executes at least one system call per millisecond, it is not context switched.
 - (c) Rather than a timer interrupt, an interrupt occurs after the process has executed n instructions.
3. What are the ways of entering the kernel from the process? Is there any way to enter the kernel without entering privilege mode? Explain.
4. How does your computer know how to load different OS (eg. Linux or Windows) into the computer’s main memory? How do you load the OS without their being an OS present in main memory?
5. Are all processes created with fork? Explain.
6. Can a process read kernel memory? Can the kernel read process memory? Explain.
7. Take the syscall implementation on page 22, and add in code necessary to work with base and limits register. Does the RTI need to modify base and limits register as well? Show how it would be modified.

8. Given the CPU OS State (pg 64 of processes.pdf), what are the special purpose registers which must be changed when there is:

- (a) a system call
- (b) a context switch
- (c) an rti