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CIS 161 Winter 2025  
Feb 9, 2025 **Operating Systems Written Assignment**

1. **Summarize the booting procedure (include steps including CPU, ROM, RAM, secondary storage**) **Identify 3 things that get loaded into RAM in order.**The CPU runs the BIOS/UEFI which is stored in ROM. The BIOS/UEFI then runs the POST. If all is well, the BIOS then loads the MBR into RAM and runs it. The MBR loads the bootloader into RAM, then the bootloader loads the operating system into RAM and runs it.
2. **Summarize the difference between a program and a process and a thread.**A program is the static set of instructions usually stored in mass storage. A process is a program that has been loaded into RAM and is being executed along with any information associated with it. A thread is like a mini-process created by a process that’s better-suited for smaller tasks, but with downsides, like not having independent memory.
3. **If each time slice in a multiprogramming system is 50 milliseconds and each context switch requires at most a microsecond, how many processes can the machine service in a single second?**19. 1000 ms / 50.001 ms ≈ 19.9996 processes
4. **Suppose a two-lane road converges to one lane to pass through a tunnel. To coordinate the use of the tunnel, the following signal system has been installed:**

**A car entering either end of the tunnel causes red lights above the tunnel entrances to be turned on. As the car exits the tunnel, the lights are turned off. If an approaching car finds a red light on, it waits until the light is turned off before entering the tunnel.**

**What is the flaw in this system?**A deadlock could occur if both cars enter the tunnel at the same time. When they meet, they will both have to stop and will be unable to move again unless at least one of the cars backs out of the tunnel.