

# Operating Systems PhD Qual

Fall, 2004

Do all problems.

1. Many architectures provide (and many operating systems use) two bits that are associated with each virtual page: the "referenced" and "modified" bits. Explain how these bits are used by hardware. Also select one page replacement algorithm and explain how it uses the bits.
2. Draw a diagram that shows how a process transitions among the states of "running," "ready," and "blocked." Explain the cause of each state transition.
3. Traditional UNIX operating systems divided the virtual address space of a process into four major regions: text, data, bss, and stack. Explain how each region is used and where in the address space each region lies.
4. There are a variety of different RAID organizations for disks. Each has its advantages and disadvantages relative to other RAID organizations. However, all RAID organizations purport to be superior to the traditional "SLED" disk organization. Explain why RAID organizations in general might be expected to be superior to SLED in both performance and reliability.