FEW, Divisie W&I
Vrije Universiteit

Bedrijfssystemen
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(Voor Nederlands, z.o.z.)

Each question is worth at most one point. The final grade is the sum of the grades for the questions. The midterm exam does not count.

1. UNIX has a system call UNLINK. Explain what it does, distinguishing all the various cases that may occur.

2. Explain how a virtual machine (such as VM/370) works.

3. A MINIX file with UID = 32 and GID = 40 has mode RWXR-XR--. Another user tries to execute the file (as a program). What happens if the other user
   (a) has UID = 80 and GID = 40?
   (b) has UID = 40 and GID = 80?

4. Threads are one way to achieve parallel processing. Thread scheduling can occur in the kernel or in user space. Give an advantage of each choice.

5. I/O devices can either operate using programmed I/O or DMA mode. Briefly explain each one and tell how they differ from each other.

6. Output for the screen can be sent to the monitor in one of three ways, depending on the interface to the monitor. These are bit mapped, character mapped, or RS-232. Briefly describe how each of these works.

7. If a machine instruction takes 1 nsec and a page fault takes an additional n nsec, give a formula for the effective instruction time if a page fault occurs every k instructions.

8. Some computers use inverted page tables instead of regular ones. Under what circumstances are inverted page tables used and how do they work?

9. The UNIX fsck program can be run after a crash to repair the file system. It scans all the i-nodes and then all the directories. Show the main data structure it creates and explain how fsck works.

10. A file system has to keep track of which blocks go with which files. Briefly describe three different schemes for doing this.