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(Voor Nederlands, z.o.z.)

All 10 questions count equally. Final grade = max(midterm, part 1) + part 2

## PART 1

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1. What is the essential difference between a block special file and a character special file?
  2. Here is the code for a producer-consumer problem. Is it correct? If not, describe what is wrong with it in a few sentences. Assume count is initialized to 0 elsewhere.

Producent	Consument
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<pre>while(1) {     produce_item();     if (count == N) sleep();     enter_item();     count = count + 1;     if (count == 1)         wakeup(consumer); }</pre>	<pre>while(1) {     if (count == 0) sleep();     remove_item();     count = count - 1;     if (count == N-1)         wakeup(producer);     consume_item(); }</pre>

3. Briefly explain the difference between policy and mechanism in CPU scheduling. Give an example.
4. Disk requests come into the disk driver nearly simultaneously for the following cylinders: 10, 22, 20, 2, 40, 6, and 38 in that order. All seeks take 6 msec. How much seek time is needed to process all the requests for:
  - (a) First-come first-served
  - (b) Closest cylinder first
  - (c) Elevator algorithm (initially moving upward)

In all cases the disk arm is initially at cylinder 20.

5. Name 3 things the MINIX clock driver does

## PART 2

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6. Is memory compaction ever done on systems with virtual memory based on pure paging like the SPARC? If so, under what conditions? If not, why not?
  7. MINIX carries out the fork system call in a series of small steps. List the main steps the memory manager does (at least five important steps).
  8. Some operating systems have a system call to rename a file. Is there any difference between renaming a file and copying it followed by deleting the original? If so, name one difference.
  9. In CP/M, the list of blocks in a file is kept in the directory entry that points to the file, rather than in an i-node, as in UNIX. Is a file allowed to have more blocks than fit in a directory entry? If so, is this handled?
  10. Passwords are often used for authenticating users at login time. Name another authentication method that could also be used using the keyboard (thus no biometrics--finger length, blood, etc.).