
Every correctly answered question is worth 1 point. The final grade is the sum of the questions. The midterm exam does not count for this exam.

1. UNIX has a system call fstat. What does it do? How does it differ from stat?

2. What is a race condition. Give a short example of one.

3. The MINIX clock driver does various things. Name three of them.

4. Explain how a two-level scheduler works. What is the use of it?

5. A computer has 11 copies of a certain resource. There are four users who need these resources. At a certain moment, the situation is like this

User	Has	Max
A	2	5
B	2	6
C	3	5
D	2	5

(a) A wants 1 more. Is the resulting situation safe?
(b) B wants 1 more. Is the resulting situation safe?
(c) C wants 1 more. Is the resulting situation safe?
(d) D wants 1 more. Is the resulting situation safe?

6. Why do operating systems have 'escape' characters for keyboard input? (read this question very carefully).

7. A computer has 32 pages of 8 KB. The page table starts as follows

Virtual	Physical
0	4
1	7
2	-
3	5
4	1
5	0
6	-
7	2

For the following virtual addresses, give the corresponding physical ones: 4095, 4096, 16385, 24576, 45000.

8. What is an inverted page table? Under what circumstances is it used?

9. The UNIX fsck program is run after a crash to repair the file system. It constructs a list of blocks in use by inspecting all the i-nodes. It also inspects the free list to see which blocks are free. After the first crash, fsck discovers situation (a). After the second crash he sees (b). Which is worse and why?

(a)		(b)
Bloknr		Bloknr
0 1 2 3 4 5 6 7 8		0 1 2 3 4 5 6 7 8
_ _ _ _ _ _ _ _ _		_ _ _ _ _ _ _ _ _
1 0 1 1 1 0 0 1 1	Blokken in gebruik	1 0 1 1 2 0 0 1 1
0 1 0 0 0 2 1 1 0	Vrije blokken	0 1 0 0 0 1 1 1 0

10. Explain how mounted file systems work in UNIX.