Name	Signature	Student Id Nr	*Points*

Operating Systems, miniexam 1, 30.1.2017 (6p)

Write your answer on this exam paper in the space given. Please notice, that the exam paper is 2-sided.

a) [1 p] Assume that cache memory access time is 3 ns, and main memory access time is 50 ns. If the cache hit ratio is 99%, how long is the average access time for memory references?

b) [2 p] Assume that cache size is 16KB. How does the cache line (block) length influence cache hit ratio? Consider both types of locality. Compare situations, where cache line length is 4 words (16B) and 16 words (64B).

c) [1 p] Explain the concept *operating systems microkernel architecture*. What advantages do you gain with it?

d) [1 p] Which hardware features support operating system implementation?
Give 3 different features, and explain how they are used to operating system implementation.

e) [1 p] What is a virtual machine and what is it good for?