Name	Signature	Student Id Nr	*Points*

Operating Systems, mini exam 2, 14.2.2018 (12 p)

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

a) [2 p] Explain exactly, what is real problem in the Dining Philosophers problem.

Give the basic solution (known to be erroneous) to the problem, and deadlock scenario to that solution.

Give a not deadlocking solution to the problem, and explain why deadlock cannot happen now.

b) [4 p] In some systems deadlocks are prevented by reserving multiple resources always in some given order, e.g., in alphabetical order ”A B C D”.
Why will the method prevent deadlock in all scenarios?

In which case would order ”B C D A” be better than order ”A B C D”? Explain. Give an example.

TURN

c) [2 p] Explain what “internal fragmentation” in memory management means. Give a concrete example on a situation where a 1KB memory block is internally fragmented. What type of memory management does your example relate to?

d) [2 p] Explain what “external fragmentation” in memory management means. Give a concrete example on a situation where a 1KB memory block is externally fragmented. What type of memory management does your example relate to?

e) [2 p] Assume that you have paged memory management, 16-bit virtual addresses, 16-bit physical main memory addresses and 1KB pages. Which main memory address is referred by program address 0x1234? How do you find it out with page tables?