Name: Neptun code: _ _ _ _ _ _

Operating systems mid-term test **FOR PRACTICE** **Duration: 60 minutes**

True/false questions (max. 20 points)

∑

Circle the T (true) or F (false) answer, if you don't know the answer circle the ? symbol. Correct answer: 1 point, wrong answer: -0.5 points, ?: 0 points. You can get max. 5 points and min. 0 points for a question group.

If you want to correct an answer cross out all the three fields and write the answer at the end of the row.

1st question group: operating system basics, structure and operation

1.	The operating system's task to configure and manage the hardware devices.	T	F	?
2.	The kernel of an operating system supervises the tasks which are running in user mode.	T	F	?
3.	A typical property of a multiprogrammed system, is supporting multiple programming languages.	T	F	?
4.	There are versions of Windows which are able to operate on mobile phones.	T	F	?
5.	The system libraries of an operating system are working in protected mode.	T	F	?

2nd question group: user interface and user task management

1.	The character command line interfaces usually can be programmed.	T	F	?
2.	The X11 is a widely-used display server protocol.	T	F	?
3.	Calculating the value of π for many decimal places is an I/O intensive operation.	T	F	?
4.	A process memory range cannot be larger than the physical memory in the system.	T	F	?
5.	The process is an implementation of a task, which has its own memory range.	T	F	?

3rd question group: scheduling

1.	The scheduler chooses the next task to run from tasks which are in waiting state.	T	F	?
2.	The cooperative scheduler cannot take the right of running from a running task.	T	F	?
3.	In client operating systems 1-2 context changes per second is typical.	T	F	?
4.	The complexity of an ideal scheduler is linear (O(N)).	T	F	?
5.	Starvation cannot be avoided in systems which are using static priorities.	T	F	?

4th question group: communication

1.	The PRAM (pipelined RAM) model always performs the write operation before the read operation when a read-write conflict happens, to ensure that the read operation will return the new value.	T	F	?
2.	The completion of a send operation is happening always before the start of the receive operation when we are using synchronous communication.	T	F	?
3.	The shared memory (SHM) is a tool which operates using the PRAM model.	T	F	?
4.	With the addressing in network communications only the machines can be addressed, the running processes cannot.	T	F	?
5.	The remote procedure call (RPC) can be only used between machines.	T	F	?

Sentence completion (max. 15 points)

Complete the sentences to get true statements!

Only complete answers worth a point except enumerations, where you can get 1 point for two correct items.

1. The ..... is the first program started when a PC is turned on, which starts the Level 1 RAM loader. (1 p)

2. Enumerate three client operating systems (different versions are not enough): (2 p)

3. A standard related to operating systems is the..... (1 p)

4. There are two typical architecture for the operating systems' kernel, the ……. and the …… (2 p)

5. When we are using virtual memory management the address translation is usually performed by the ..... (2 p)
If it cannot succeed, then the..... mechanism of the ……. starts.

6. In scheduling algorithms the starvation can be avoided with..... . (1 p)

7. In the page table the 1 value of valid bit shows the data can be found in the.....…..... (1 p)

8. The..... is a data structure, which has two atomic (non-interruptible) operations, and it can be used in synchronization to protect the critical section. (1 p)

9. Indirect addressing in communications mean that there is …….. in the system, from the recipient can receive the messages . (2 p)

10. Enumerate at least three of UNIX inter-process communication methods: (2 p)

Calculation problem: comparison of simple schedulers (max. 15 points)

We are experimenting with two simple scheduling algorithms: First-Come-First-Served and Round-Robin.

We want to determine some of the measurable parameters of these algorithms with a specific task set.

At the beginning there are 3 task is in the ready-to-run queue (their CPU burst is in the parenthesis): `A(6), B(3), C(3).`

Which scheduler is cooperative? …..... Which is preemptive? …..... (2 p)

With the help of the Gantt chart, show the operation of the FCFS scheduler!

(3 p)

Tasks and arrival order	**The Gantt chart of the scheduling**														
Task A (CPU burst: 6)															
Task B (CPU burst: 3)															
Task C (CPU burst: 3)															
Time steps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Also show the operation of the RR scheduler with 2 unit long time slice!

(4 p)

Tasks and arrival order	**The Gantt chart of the scheduling**														
Task A (CPU burst: 6)															
Task B (CPU burst: 3)															
Task C (CPU burst: 3)															
Time steps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Calculate the average waiting time for both schedulers! FCFS: …..... Round-robin: …..... (4 p)

Which scheduler has a better response time typically? …..... (2 p)

Draft (not evaluated):

Tasks and arrival order	**The Gantt chart of the scheduling**														
Task A (CPU burst: 6)															
Task B (CPU burst: 3)															
Task C (CPU burst: 3)															
Time steps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Tasks and arrival order	**The Gantt chart of the scheduling**														
Task A (CPU burst: 6)															
Task B (CPU burst: 3)															
Task C (CPU burst: 3)															
Time steps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15