



Dept. of Computer Science and Engineering
Operating Systems (521453A)
Examination 27.06.2015

1. Explain (6p)
 - a) Critical section problem
 - b) Round-Robin scheduling
 - c) Fragmentation

2. Processes P1-P5 are running in a system and the processes have allocated resources A, B, and C according to the table. The table also shows the maximum amount of resources each process requires and the amount of available resources currently in the system.
 - a) Explain what is a safe state. (1p)
 - b) Use the banker's algorithm to determine if the system is in a safe state. (4p)
 - c) What are the downsides of the banker's algorithm? (1p)

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P1	0	1	0	7	5	3	3	3	2
P2	2	0	0	3	2	2			
P3	3	0	2	9	0	2			
P4	2	1	1	2	2	2			
P5	0	0	2	4	3	3			

3. a) Explain the term demand paging. Under what circumstances do page faults occur? (2p)

b) A computer memory management is implemented by demand paging using LRU page-replacement algorithm. A process will access its memory space according to the following reference string:

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0

The process can use three frames. Show the content of the frames after each reference. How many page faults will occur? (3p)

c) Is FIFO in this situation an optimal demand paging algorithm? Justify your answer. (1p)

4. a) Below there is a diagram of process' states and transitions between them. Name the entries 1.-11. (5p)

b) What is device queue? (1p)

