

CSC 2204F -- OPERATING SYSTEMS

UNIVERSITY OF TORONTO
FALL 2004

The Quiz

Test aids allowed: An 8½ X 14 inch fact sheet, possibly double-sided.

Please **PRINT** in answering the following requests for information:

Family Name:	Given Names:
Student Number:	

Notes to students:

1. This test is 55 minutes long and consists of 55 marks. Budget your time accordingly.
2. This test has 4 pages and 6 questions.
3. Write your answers on this question and answer paper, in the spaces provided. Be concise. In general, the amount of space provided is an upper bound on the "size" of answer that is expected. If necessary, use space where available and provide explicit pointers.
4. In general, state your assumptions and show your intermediate work.
5. Do **not** go beyond here until instructed to do so. Write your student number at the top of each succeeding page once you get going.

#	MARKING
1	/9
2	/9
3	/9
4	/10
5	/9
6	/9
T	/55

1. [9 marks]

Give an example of distinguishing between policy and mechanism in the area of deadlock handling.

2. [9 marks]

Give an example of a space-time tradeoff in the area of processor scheduling.

3. [9 marks]

Describe the precise sense in which the "optimal page replacement strategy (also called OPT or MIN)" is optimal.

4. [10 marks; 5/5]

Consider a computer system with N page frames. The hardware is augmented with a matrix of $N \times N$ bits, initially all zero at boot time. Whenever page frame K is referenced, the hardware first sets all bits of row K to 1 and then sets all bits of column K to 0.

A) LRU is alive and well, and intimately associated with this procedure.

Explain briefly how LRU relates to this procedure.

b) LRU is a stack algorithm. So the idea of a stack algorithm is alive and well, and intimately associated with this procedure. **Explain** briefly how the general concept of a stack algorithm relates specifically to this procedure.

5. [9 marks]

Two types of indefinite postponement (starvation) could arise in the Linux 2.4 disk scheduling algorithm, the Linus Elevator. Briefly **describe** how these two types might arise.

6. [9 marks]

Consider a RAID level 0+1 system, in which a set of striped disks are mirrored to a second set of disks. **State** the minimum number of physical disk drives that you must have to make this scheme work, and briefly **justify** your answer.

End of quiz. Marks = (55).