PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ
FACULTAD DE CIENCIAS E INGENIERÍA

SISTEMAS OPERATIVOS
4ta práctica (tipo a)
(Segundo semestre de 2012)

Horario 0781: prof. V. Khlebnikov

Duración: 1 h. 50 min.
Nota: No se puede usar ningún material de consulta.
La presentación, la ortografía y la gramática influirán en la calificación.
Puntaje total: 20 puntos

Pregunta 1 (1 punto – 5 min.) (*MOS3E, Chapter 3, Problem 13*) Suppose that a 32-bit virtual address is broken up into four fields, *a*, *b*, *c*, and *d*. The first three are used for a three-level page table system. The fourth field, *d*, is the offset. Does the number of pages depend on the sizes of all four fields? If not, which ones matter and which ones do not?

Pregunta 2 (3 puntos – 15 min.) (*MOS3E, Chapter 3, Problem 14*) A computer has 32-bit virtual addresses and 2-KB pages. The program and data together fit in the lowest 4 pages (0-0x7ff, 0x800-0xfff, 0x1000-0x17ff, 0x1800-0x1fff). The stack fits in the highest page. How many entries are needed in the page table if traditional (one-level) paging is used? How many page table entries are needed for the three-level paging, with a 5-bit top-level page table field, a 8-bit second-level page table field, y a 8-bit third-level page table field?

Pregunta 3 (3 puntos – 15 min.) (*MOS3E, Chapter 3, Problem 15*) A computer whose processes have 1024 pages in their address spaces keeps its page tables in memory. The overhead required for reading a word from the page table is 5 nsec. To reduce this overhead, the computer has a TLB, which holds 32 (virtual page, physical page frame) pairs, and can do a look up in 1 nsec. What hit rate is needed to reduce the mean overhead to 2 nsec?

Pregunta 4 (2 puntos – 10 min.) (*MOS3E, Chapter 3, Problem 23*) Consider the page sequence in the following format (page, load time, *R* bit): (*B*, 3, 1), (*C*, 7, 1), (*D*, 8, 1), (*E*, 12, 0), (*F*, 14, 1), (*G*, 15, 0), (*H*, 18, 1), (*A*, 20, 1). Which page will second chance remove?

Pregunta 5 (3 puntos – 15 min.) (*MOS3E, Chapter 3, Problem 24*) A small computer has four page frames. At the first clock tick, the *R* bits are 0111 (page 0 is 0, the rest are 1). At subsequent clock ticks, the values are 1011, 1010, 1101, 0010, 1010, 1100, and 0001. If the aging algorithm is used with an 8-bit counter, give the values of the four counters after the last tick.

Pregunta 6 (4 puntos – 20 min.) (*MOS3E, Chapter 3, Problem 28*) A computer has four page frame. The time of loading, time of last access, and the *R* and *M* bits for each page are as shown below (the times are in clock ticks):

Page	Loaded	Last ref.	R	M
0	126	260	1	0
1	230	265	0	1
2	104	270	1	1
3	110	285	0	0

(a) Which page will NRU replace?

(b) Which page will FIFO replace?

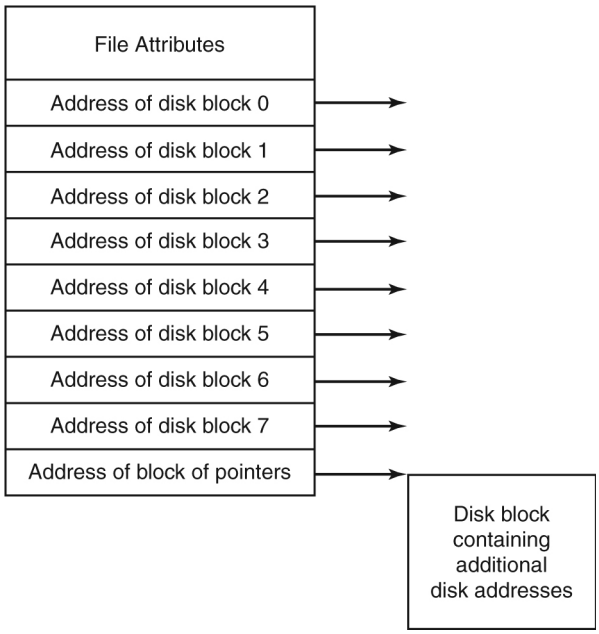
(c) Which page will LRU replace?

(d) Which page will second chance replace?

Pregunta 7 (1 punto – 5 min.) (*MOS3E, Chapter 4, Problem 8*) In UNIX and Windows, random access is done by having a special system call that moves the "current position" pointer associated with a file to a given byte in the file. Propose an alternative way to do random access without having this system call.

Pregunta 8 (1 punto – 5 min.) (*MOS3E, Chapter 4, Problem 13*) Some digital consumer devices (not media, like CD or DVD) need to store data, for example as files. Name a modern device (used almost by every person) that requires file storage and for which contiguous allocation would be a fine idea.

Pregunta 9 (2 puntos – 10 min.) (*MOS3E, Chapter 4, Problem 15*) Consider the i-node shown below. If it contains 10 direct addresses of 4 bytes each and all disk blocks are 1 KiB, what is the largest possible file?



La práctica ha sido preparada por VK
con LibreOffice Writer

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Pando, 14 de noviembre de 2012