

CSCI 331: Operating Systems I
Midterm # 2 -- closed book section

he entire exam is to be turned in at 4:20PM. Work the closed book section first and turn it in before you consult your books and notes to work on the open book section. For the closed book section, write your answers on the exam itself.

There are twenty-five questions. Each is worth two points. Choose the most appropriate phrase for terminating each sentence. Circle your choice.

In most operating system implementations, a system call is initiated by:

- A: a recursive subroutine invocation.
- B: a special hardware **trap** instruction.
- C: ``executing" an illegal instruction.
- D: creating a new process.

The page table of a process is constructed by

- A: the operating system.
- B: the disk controller.
- C: the compiler.
- D: the loader.

A five million byte program can run on a machine with four million bytes of memory if the machine and its operating system support

- A: recursion.
- B: dynamic RAM (random access memory).
- C: virtual memory.
- D: time sharing.

Most likely a page fault occurs when a process

- A: references a page it hasn't referenced in a long time.
- B: references a page it recently referenced.
- C: accesses two successive pages.
- D: is swapped to disk.

Operating systems do not implement Optimal page replacement because

- A: operating systems cannot predict future page references.
- B: most programs are not that efficient.
- C: it requires advanced hardware support.
- D: it results in too many page faults.

A disk cylinder consists of several

- A: platters.
- B: heads.
- C: tracks.
- D: sectors.

The time required to move a disk head from track 0 to track 100 is

- A: seek time.
- B: latency time.
- C: transfer time.
- D: party time.

The elevator algorithm is often used in operating systems because it

- A: fulfills disk requests in the order they arrive. B: tends to minimize overall disk seek time.
- C: gives better interactive response.
- D: avoids interleaving.

If an operating system required that a process only make one request for *all* its resources, deadlock would be prevented because there would be no possibility of

- A: mutual exclusion.
- B: hold and wait.
- C: preemption.
- D: circular wait.

If files are allocated in 512 byte blocks, 495 bytes are wasted for a 17 byte file due to

- A: sector overhead.
- B: external fragmentation.
- C: internal fragmentation.
- D: worse-fit allocation.

Most likely, the size of a page is

- A: a power of two.
- B: a prime number.
- C: 13.
- D: 1000.

In a paging system, one thing we'd expect the hardware to support in page table entries is

- A: reference bits.
- B: naughty bits.
- C: one-bit semaphores.
- D: data block references.

A non-NULL pointer in an executing C program is most likely to contain

- A: a swap space address.
- B: a virtual address.
- C: a real address.
- D: a page table reference.

When the terminal is in *raw* mode and a user erases a character using the backspace key, the code that edits the input is contained in

- A: the terminal device driver.
- B: the user process.
- C: the input buffer task.
- D: the standard I/O library.

When a user process wishes to write a character to the display, it sends a message to

- A: the file system server.
- B: the kernel task.
- C: the terminal device controller.
- D: the output buffer task.

An IOCTL on a terminal device could be used to

- A: read an input character.
- B: move the cursor.
- C: set the output baud rate.
- D: signal the process group.

In a dynamic memory system, we expect real memory to be divided into equally-sized

- A: segments.
- B: pages.
- C: sectors.
- D: frames.

The special chip that translates virtual addresses into real addresses is called the

- A: UART (Universal Asynchronous Receiver Transmitter).
- B: MMU (Memory Management Unit).
- C: PTE (Page Table Emulator).
- D: PLA (Physical-Logical Associator).

The best example of a Minix block device is

- A: the disk.
- B: the tape.
- C: the printer.
- D: the terminal.

Suppose there are three holes in memory of size 100, 300, and 500 kbytes and a job of size 200 kbytes terminates. The largest possible hole that can occur when this job's memory is reclaimed is

- A: 200 kbytes.
- B: 500 kbytes.
- C: 700 kbytes.
- D: 1000 kbytes.

If an operating system is going to perform compaction for memory management, it better be running on a machine with hardware support for

- A: time sharing.
- B: shared paging.
- C: relocation.
- D: data compression.

If 11 bits of the logical address is used as the offset into the page, each page contains

- A: 121 bytes.
- B: 1023 bytes.
- C: 1024 bytes
- D: 2048 bytes.

If the page fault rate is very high, the machine is probably

- A: compute bound.
- B: using a small time slice.
- C: thrashing.
- D: using a FIFO page replacement strategy.

In Minix, when the CPU is interrupted by the clock, the interrupt handler will

- A: increment the clock register.
- B: start a higher priority process.
- C: deliver an alarm signal (**SIGALRM**).
- D: try to send a message to the clock task.

Dynamic paging works because most programs

- A: use logical addresses.
- B: avoid recursion.
- C: exhibit locality of reference.
- D: perform few I/O operations.