

**CSCI 331: *Operating Systems***  
*Final exam -- closed book section*

The entire exam is to be turned in at 8:30PM. 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 questions on *two* pages. Each is worth two and one half (2.5) points. Choose the *most* appropriate phrase for terminating each sentence. Circle your choice.

Name: \_\_\_\_\_

The global variables of a C program are stored

- A: in the data segment.
- B: in the stack segment.
- C: in the text segment.
- D: in the object segment.

A process is

- A: a compiled program.
- B: a program in execution.
- C: a job in the Unix operating system.
- D: a series of system calls.

If frames are 1024 bytes long, virtual address 10000 is stored at physical address 7952 and virtual address 11000 at physical address 5880, then virtual address 10500 is stored at

- A: 5380.
- B: 6380.
- C: 7452.
- D: 8452.

The Unix operating system was designed by

- A: Ken Thompson and Dennis Richie.
- B: Samuel Leffler and Marshall McKusick.
- C: Ken Olson and Jack Dennis.
- D: Brian Kernighan and Richard Pike.

A Unix directory file contains

- A: component names.
- B: component names and inode numbers.
- C: component names, inode numbers, and device numbers.
- D: component names, inode numbers, device numbers, and generation numbers.

One disadvantage of the Unix buffer cache is

- A: disk traffic is increased.
- B: two process may use different buffers when accessing the same file.
- C: in-core data blocks may be lost when the system crashes.
- D: user I/O must be aligned with buffer boundaries.

When a process `exec ( )`'s a set-uid program, it changes its

- A: user id.
- B: real user id.
- C: effective user id.
- D: process id.

The three terminal modes of Unix are

- A: input, output, and error.
- B: raw, cbreak, and cooked.
- C: raw, block, and cooked.
- D: input, output, and bonged.

The part of the Unix kernel that sends the SIGKILL signal when you type the ``kill" character is

- A: the system call layer.
- B: the terminal device driver.
- C: the line discipline.
- D: the terminal control process.

An inode will not contain

- A: file access permissions.
- B: a file pathname.
- C: a file link count.
- D: a directory of data blocks.

In Unix, standard input

- A: is read on file descriptor 0.
- B: follows the specification of the ANSI C committee.
- C: is read from the user terminal.
- D: passes through the buffer pool.

A successful `execve` system call

- A: returns the process id of the new child process.
- B: returns 0.
- C: generates a death-of-child signal.
- D: does not return.

A switch table is

- A: a list of compiler options.
- B: an array of boolean values.
- C: an array of procedure addresses.
- D: a data structure used to change the context of a process.

The page size of a modern computer is likely to be

- A: a power of two.
- B: a prime number.
- C: one-tenth the size of available memory.
- D: the size of a sector on the paging disk.

A few entry to the inode table is *always* allocated when

- A: a file descriptor is duplicated.
- B: a file is opened.
- C: a file system is mounted.
- D: a device is opened.

Most likely, the line printer daemon is started when

- A: the system is booted.
- B: the superuser logs in.
- C: Duke and Wake Forest play basketball.
- D: a file is printed.

When the parent of a process terminates, the child process

- A: is terminated.
- B: is adopted by a grandparent process.
- C: is adopted by the `init` (#1) process.
- D: becomes a zombie.

When an X Window System client draws a line, it sends an output request to

- A: the kernel.
- B: the X window manager.
- C: the X window server.
- D: the frame buffer.

A dirty page has been modified, but

- A: not unassigned to the free queue.
- B: not saved to disk.
- C: not referenced.
- D: not deallocated.

A device driver is

- A: a device-related system call.
- B: a procedures.
- C: a collection of procedures.
- D: a bus.