

King Fahd University of Petroleum & Minerals
Department of Information and Computer Science

ICS 431 – Operating Systems

Major Examination I – 90 minutes

Name:

ID#:

DO NOT OPEN UNTIL INSTRUCTED TO DO SO!!!!

Write clearly, precisely, and briefly!!
Write in the allowed space only!!

Keep your eyes on your paper!

Problem #1. Answer (T) rue or (F) alse. Each question is worth 2 points. Circle very clearly your answer in the following table:

1. A thread is a lightweight process and shares the stack segment with the other threads created by the same process.
2. Windows 95 is an example of a network operating system.
3. ULTs require the kernel to maintain context information for the process and the threads.
4. ULT thread state is dependent on its process state.

Problem #2 Be brief.

1. Give a possible state transition, if any, for the following process states:
 - a. Running $\rightarrow$ Ready
 - b. Running $\rightarrow$ Blocked
 - c. Ready $\rightarrow$ Blocked

Problem #3. Be brief!

1. Suppose that a hardware failure happened and resulted in the timer interrupt not being generated anymore. What effect this may have on both OS multiprogramming and timesharing?
2. What is a system program? Give an example.
3. Draw an illustration showing the difference between layered and virtual machine models of the operating system?

Problem #4.

A typical process context switch will be as follows:

1. copy contents of CPU registers into a save area in the PCB of running process
 2. change status of running process from "running" to "waiting" or "ready"
 3. change a system variable running-process to point to the PCB of new process to run
 4. copy info from register save area in PCB of new process into CPU registers
- a) In line 1, where the CPU registers get copied from? Explain why.

- b) Does the CPU registers get copied in all instances? Can you give an instance where step 1 is not performed?

- c) In line 2, how does the OS determine the new status of the process?