Quiz 1 - MET CS575 Graduate Operating Systems

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1. Which of the following statements are true or false about kernel? (1.5 points)
2. [True] Linux kernel code is always executed in kernel mode. That includes dynamic modules such as device drivers.

   [False] All instructions used in the kernel code are privileged instructions (e.g. only can execute in kernel mode).

   [**True**] Any local variable declared in ISR (Interrupt Service Routine) is stored in the kernel stack.

3. What are the two fundamental models of interprocess communication (IPC)? (1 point)
   a) **Shared Memory**
   b) **Message Passing**

4. Describe three general methods for passing parameters to the operating system. (3 points)

   1) **Passing parameters in registers**
   2) **on the stack**
   3) **In memory (with pointers to the memory locations passed in registers)**

5. The benefits of multithreaded programming can be broken down into what four major categories? (2 points)

   a) **Resource Sharing**
   b) **Responsiveness**
   c) **Scalability**
   d) **Economy**

6. The diagram in Figure 1 shows the state transition between all five process states. Please specify name and very short description for each state. (2.5 points)

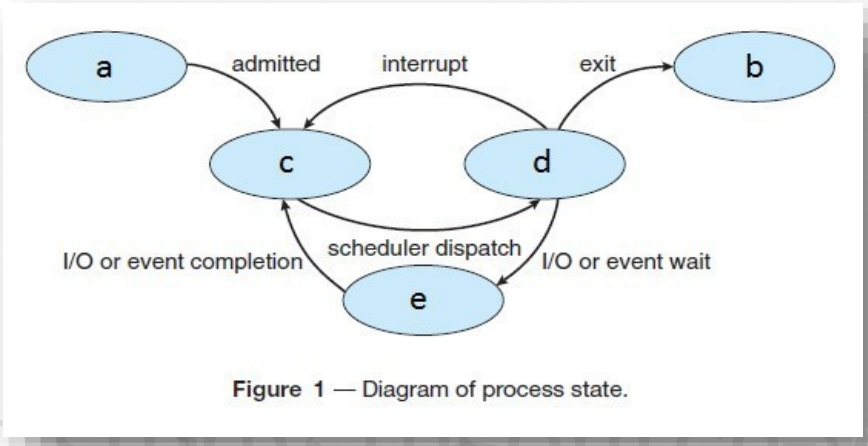

Figure 1 — Diagram of process state.

a. _New_____: The process is being created.

b. _Terminated_: The process has finished execution.

c. _Ready____: The process is waiting to be assigned to a processor.

d. _Running__: Instructions are being executed.

e. _Waiting__: Process is waiting for some event to occur.

7. Which of the following components of program state are shared across threads in a multithreaded process? Please specify which are shared and which are not shared. (2 points)

   Register values

   Heap memory

   Global variables Stack

   memory

The threads of a multithreaded process share heap memory and global variables. Each thread has its separate set of register values and a separate stack.

8. What are the six types of system calls normally provided by an operating system? (3 points)

Process Control

These system calls deal with processes such as process creation, process termination etc.

File Management

These system calls are responsible for file manipulation such as creating a file, reading a file, writing into a file etc.

Device Management

These system calls are responsible for device manipulation such as reading from device buffers, writing into device buffers etc.

Information Maintenance

These system calls handle information and its transfer between the operating system and the user program.

Communication

These system calls are useful for interprocess communication. They also deal with creating and deleting a communication connection.