Score:_____ Name:_____

ECE 3055 Quiz - November 9, 2011

1. The _____*short term scheduler*_____ is the code in an Operating System that selects which process to run next from the ready queue whenever a process stops running.

2. An independent process spends most of its time in the ready state (i.e. not the wait state). What could you conclude about this process? (Explain why it is this "type" of process)

   It is a compute bound process waiting for processor time slices in the ready queue.

3. Why is a timer that generates an interrupt a very important hardware feature for a processor to have so that it can support a multiprocessing OS?

   To schedule processes that share the processor, an OS needs a time slice interrupt generated by a hardware counter or timer.

4. What are privileged instructions, what controls their execution, and why are they important for a modern secure OS? (*Explain and provide at least three examples.*)

   Privileged instructions can only be executed when the mode bit is in kernel mode. This prevents applications from doing things to circumvent OS scheduling and security.

   Examples include:
   5. *Instructions that change the mode bit*
   6. *Instructions that control the time slice counter and interrupt*
   7. *Instructions that change the VM page tables*
   8. *Instructions that control the interrupts system*
   9. *Instructions that control I/O devices*

10. Describe and explain the two major approaches that are used for communication between cooperating processes. Explain why one does not require direct OS action during the actual communication

    Shared memory – global data is in a shared memory area. Once the memory area is setup, no OS action is needed for communication. Lower overhead, but also less secure.

    Message Passing – OS APIs are used to exchange messages using a buffer in the OS kernel.