CG2271 Real Time Operating Systems

Tutorial 1

1. List and explain the differences between an RTOS and a standard operating system like Windows or MacOS. Why do these differences exist?

2. In the RTOS Application Overview, we looked at an example application that was broken into 3 tasks to run on an RTOS. We could've just created a single application and run it WITHOUT an RTOS. What are the relative advantages and disadvantages of the two approaches?

3. What are the key differences between I/O ports on desktops and servers, against those found on microcontrollers? Explain why these differences exist.

4. Given a printer that takes 10 ms to print a character, and given a CPU with a 100 MHz clock, how many clock cycles would be wasted in "programmed I/O" if we printed a 1,000 character document?

   Now suppose we have the same printer and CPU, and it takes 25 ns to process an interrupt. How many clock cycles are used in total for interrupt processing if we printed the same document?

5. Comment on the efficiency of interrupt I/O vs. programmed I/O and why interrupt I/O is preferred. What are the disadvantages of interrupt I/O?