**SOLUTION**

**Spring 2021 CSC332,Sec M Quiz 2 100 Points**

**75 Min.**

**Submit your answers as an attachment and upload it** rather than directly typing your answers in BB system. Use  **Notepad or Word files**.

Q1. (50 Points)

Q1(a) Consider the interrupt priority scheme with priority number bits in PSW. When we are executing the service routine for a hardware line, the lines with lower priority are automatically disabled— without any specific instructions in the service routine.

Explain how it is accomplished.

Answer:

Before the service routine starts, PSW is loaded from the interrupt vector. In this PSW value, the priority number would correspond to the current hardware line to be serviced. During the execution of the service routine, all hardware lines with lower priority than the priority in the PSW, are automatically disabled for interrupts by hardware.

Q1(b) If you need to attach a modem and a keyboard to a computer, which one should have higher interrupt priority? Explain.

The modem should have higher priority. Modems send and receive data between the computer and the network. Often we need to get the data in real time, ex. when watching a movie being streamed thru the modem. If we don’t service the modem interrupt quickly, the display of the movie on screen may not go smoothly in real time.

Q2. (50 Points)

Consider process management with RR as discussed in Ch 4.

Suppose we did the same shell command that created the 4 processes for ./cpu

Make these assumptions:

--There is only one cpu.

--Initially all the 4 processes are in ready list in the order A, B, C,D.

--There are only 5 processes in the system—A, B, C, D, and the shell.

**--All processes are entirely in physical memory.**

--The only interrupts in the system are the Hardware Timer and interrupts caused by this program.

--The cpu scheduler strictly follows the RR algorithm, with **time slice = 0.3 seconds**

**--The spin(1) will take exactly 1 second of computation time. Any other computation by the cpu will take zero time—ex. the initial if statement, checking the loop condition, service routine execution, etc. will take exactly zero time.**

**--When a process executes the printf statement in cpu.c, it does NOT get blocked; its output is stored in memory and the process continues its execution.** The OS sends various outputs to the printer, in FIFO order, from time to time when the printer becomes idle. The print operation for one printf output takes 1 second. The output device prints things in strictly First-come-first-served order.

What is the sequence of the first three letters printed?

Write down **all such possible sequences** of the first 3 letters.

Explain your answer in less than 100 words.

**Answer:**

The sequence is ABC

At time 0 process A starts execution since ready list is managed in FIFO order and A is the first one in it as the question says.

At time 0.3 A goes to back of ready list and B starts execution. At time 0.6 B goes to back of ready list and C starts.

Continuing like this, processes get 0.3 seconds each, in the sequence ABCDABCDABCD… with shell in-between.

So A will send its printout first, in its 4th appearance in this sequence, then B, then C.