Name_____

Problem

Suppose that you wished to design an OS with the following specifications:

a. The context switch time (time to process a quantum timer interrupt, including scheduling and dispatching) is 100 microseconds. (You coded it as efficiently as possible and measured the time :-)).

b. You want at least 95% processor utilization (i.e., less than 5% time-slicing overhead.)

c. You want to guarantee less than 1/10 second response time.

1. What minimum quantum size (q) is compatible with (a.) and (b.) (Justify your answer)

5% of CPU Time = Context Switch = 100 microseconds
95% = 1900 microseconds
Thus Quantum >= 1900 microseconds
Note: Context Switch is not part of Quantum

2. Incorporating constraint (c.), what is the maximum number of jobs that can be permitted in the *READY* queue. Justify your answer (note, there is a trick here on the exact number).

*1 microsecond = 1 * 10**-6 seconds*
Each process will expend Quantum and Context Switch = 2000 microseconds
*or 2 * 10**-3 seconds*

1/10 second = 1 * 10**-1 seconds
Response Time/Process Time = 1*10**-1/2*10**-3 = 1/2 * 10**2 = 50 Processes
Therefore Maximum < 50 Processes
< because one process is running, therefore the Maximum in the Queue is 49