

*10 marks***Question 3.** CPU Scheduling

We have been benchmarking the programs being run on a server and have learned that we can easily classify all of the programs into three categories. Furthermore, we will know which category each program belongs to when it begins to execute:

- Interactive (I/O-bound) jobs with a short average CPU burst time of SBurst.
- Interactive (I/O-bound) jobs with a long average CPU burst time of LBurst where LBurst is approximately 3 times SBurst.
- CPU-bound jobs where the time to complete the job varies widely.

One of the general goals of the scheduling algorithm is to minimize overhead by minimizing the number of context switches. A second goal is to prevent starvation.

*2 marks***Part (a)**

Given the categories above and your understanding of the example CPU scheduling examples we investigated, list one additional scheduling goal our algorithm should satisfy. Explain how this goal will affect both I/O and CPU bound jobs.

*3 marks***Part (b)**

Describe how a scheduling algorithm might use priorities to satisfy the above goals.

*3 marks***Part (c)**

Describe the factors to consider when choosing an appropriate time quantum for a pre-emptive scheduler. Is it appropriate to have different sized quanta for different priorities?

*2 marks***Part (d)**

Since we have so much information about a job when it arrives, can we assign it a priority and never change it, or do we still need dynamically changing priorities? Explain.