CS 377 – Operating System

Discussion Session 3 Questions

Name: _____

Write your answers individually without consulting your notes, the textbook, or the Internet. Be succinct (complete sentences not necessary).

1. The lifecycle of a process consists of five execution states, which are (in no particular order): running, terminated, new, ready, and waiting. Say what each of these states means in a few words and fill in the state labels in the sequence graph shown below.

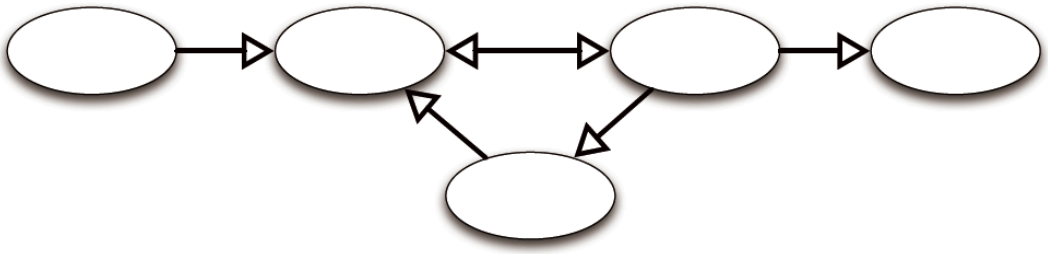

Figure 1: A state sequence graph depicting the lifecycle of a process.

2. Several types of scheduling policies were discussed in class {first-come-first-served (FCFS), round robin (RR), shortest job first (SJF), multilevel feedback queues (MLFQ), and lottery scheduling (LS)}. Suppose you want to optimize your scheduler for certain types of workloads. For each type, state and briefly justify which type of scheduler you would use: **(i)** multiuser workloads in which no individual user should be favored, **(ii)** workloads with many mixed CPU and I/O jobs, and **(iii)** workloads with frequent I/O bound jobs and some very long-running, CPU-heavy jobs.

3. Suppose there are 3 jobs: A, B, and C, of length 30, 20, and 10 seconds, and with start time at the 0^{th}, 2^{nd}, and 4^{th} second respectively. The last 4 seconds of the 10-seconds job (job C) has 1 second of I/O every other second. There are 3 queues, and initial time slice is 1 second. Assume that the context-switch time is 0. Under the strategy of Multilevel Feedback Queues,

   a. Please indicate that the 1^{st} time for job B entering "*Ready*" state is ____ second, and the 1^{st} time for job C entering "*Wait*" state is ____ second.
   b. Sketch the scheduling of the jobs below. Remember the notation $Job_{time}^{workDone}$; for example B_6^2 means that job *B* has completed 2 seconds of work at time $t = 6$. You are required to show the progress to which the job C is accomplished.

Queue	Time Slice	Jobs
1	1	
2	2	
3	4	