

COMP SCI 3004/7064 Operating Systems

Tutorial II-a

1. What an operating system needs to provide for concurrent processing?
2. What two advantages do threads have over multiple processes? What major disadvantages do they have? Suggest one application that would benefit from the use of threads, and one that would not.
3. What are the differences between user-level threads and kernel-supported threads?
4. The correct producer-consumer algorithm presented in Section 4.6 allows only $n - 1$ buffers to be full at any time. Modify the algorithm to allow all the buffers to be utilized fully.
5. Define the differences between preemptive and nonpreemptive scheduling. State why strict nonpreemptive scheduling is unlikely to be used in a computing system.
6. Consider the following sets of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The process are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 , all at time 0.

- (1) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF a nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum=1) scheduling.

- (2) What is the turnaround time for each process for each of the scheduling algorithms in (1)?
- (3) What is the waiting time for each process for each of the scheduling algorithms in (1)?
- (4) Which of the schedulers in (1) results in the minimal average waiting time (over all processes)?