IIT Guwahati - Department of Computer Science & Engineering
CS 343- Operating Systems: Practice Problem Set #1

1. Consider 4 processes A, B, C, D scheduled on a CPU in round robin fashion with a time quantum of 5-time units. The processes are assumed to have arrived in the order A, B, C and D, all at time T=0. There are exactly two context switching from A to B, one context switching from B to C, and no context switching from B to D and B to A. Which one of the following is possible as CPU bursts (in time units) of these processes?
   (a) A= 9, B= 10, C=12, D=5
   (b) A= 8, B= 9, C=3, D=4
   (c) A= 12, B= 8, C=4, D=4
   (d) A= 8, B= 12, C=8, D=10

2. Consider 4 processes P, Q, R, S scheduled in round robin fashion with a time quantum of 4-time units on a CPU. The processes are assumed to have arrived in the order P, Q, R and S all at time T=0. There are exactly one context switching each from S to Q, and from R to Q. There is exactly two context switching from Q to R and no context switching from S to P. Which one of the following is not possible as CPU bursts (in time units) of these processes?
   (a) P= 4, Q= 10, R=6, S=2
   (b) P= 3, Q= 9, R=5, S=4
   (c) P= 4, Q= 12, R=8, S=4
   (d) P= 2, Q= 6, R=6, S=4

3. Consider 4 processes P, Q, R, S scheduled in round robin fashion with a time quantum of 3-time units on a CPU. The processes are assumed to have arrived in the order A, B, C and D, all at time T=0. There are exactly one context switching each from Q to P, R to P and S to P. There is exactly three context switching from P to Q. After three processes complete their execution, the last process will not take more than one time quantum to complete. Which one of the following is most suitable statement for these processes?
   (a) Average turnaround time >5.5 time units
   (b) Average turnaround time <5 time units
   (c) R has the shortest CPU burst
   (d) Sum of CPU burst of R and S will always be larger than CPU burst of P.
   (e) Do not wish to attempt

4. Suppose a new process in a system arrives at an average of six processes per minute and each such process requires an average of 8 seconds of CPU time. Estimate the fraction of time the CPU is busy in a system with a single processor.
   (a) 1/5   (b) 3/5   (c) 4/5   (d) 2/5

5. Consider a ready queue which gets a new process of CPU burst 5 cycles in clock cycle X (X is a multiple of 10) and a new process of CPU burst 6 cycles in clock cycle Y (Y is a multiple of 11), FCFS scheduling is used. Neglect overhead of context switching. First process enters ready Q at clock cycle 10 and moves to running state at the same cycle itself. What is the average waiting time for first 20 process that enters the ready queue?
   (a) 2.0   (b) 6.50   (c) 4.25   (d) 5.80