CS 342 - Operating Systems, Spring 2003
Quiz Solutions

Quiz 1 – Section 2

Question:

Five processes arrive to a system at the same in the following order: A, B, C, D, E. The running times of the processes is as follows (respectively): 10, 6, 2, 4, 8ms. Computer the average turnaround time:

1. Scheduling discipline is *Shortest Job First.*
2. Scheduling discipline *is Round-Robin* (compute your answer as quantum goes to zero, and assume the context switch time is zero).

Answer:

1. The processes will be scheduled in the following order (2, 4, 6, 8, 10) = (C, D, B, E, A).
   Turnaround time of C is: 2ms
   Turnaround time of D is: 6
   Turnaround time of B is: 12
   Turnaround time of E is: 20
   Turnaround time of A is: 30

   Average turnaround time is = 2+6+12+20+30/5 = <u>14ms</u>

2. Now the scheduling discipline is RR.

   The order of completion of processes will be: C, D, B, E, A.
   Remaining times to finish for these processes: (2,4,6,8,10ms)

   First C will be complete. C's running time is 2ms. Together with C (including), there are 5 processes sharing CPU in RR fashion. Therefore It will take 2x5ms until C completes. Therefore C's turnaround time is 10ms.

   After C is completed, there are 4 processes running in the CPU; D, B, E, A. The remaining times to finish for these processes are: (2,4,6,8ms)
   D will finish next. B's remaining time is 2 ms. Therefore it will take 2x4 = 8ms until D finishes. Hence, D's turnaround time is: 10 + 8 = 18ms.

   After D is completed, there are 3 processes running in the CPU; B, E, A. The remaining times to finish for these processes are: (2,4,6ms). B
   will finish next. B's remaining time is 2 ms. Therefore it will take 2x3 = 6ms until B finishes. Hence, B's turnaround time is: 10 + 8 + 6= 24ms.

   After B is completed, there are 2 processes running in the CPU; E, A. The remaining times to finish for these processes are: (2,4ms). E
   will finish next. E's remaining time is 2 ms. Therefore it will take 2x2 = 4ms until E finishes. Hence, E's turnaround time is: 10 + 8 + 6 + 4= 28ms.

After E is completed, there are 1 processes running in the CPU; A. The remaining time to finish for this processes is: (2ms). Therefore it will take 2ms until A finishes. Hence, A's turnaround time is: 10 + 8 + 6 + 4 + 2= 30ms.

Average turnaround time is: (30 + 28 + 24 + 18 + 10) / 5= 22ms.

Quiz 2 – Section 1

Question:

Answer: Assume we are using *Shortest Process Next* scheduling discipline for an interactive system. The following measurements have been made as running times of 4 commands. T_0= 4, T_1= 2, T_2= 6, T_3= 4ms. T_3 is the latest, T_0 is the earliest measurement. What is the estimate running time of the next command using this measurement data, and using the aging method that we have seen in the class to estimate running time (a = ½=0.5).

After 1st measurement, estimate is: T_0 = 4ms
After 2st measurement, estimate is: 4*0.5+ 2*0.5= 2 + 1 = 3ms.
After 3rd measurement, estimate is: 3*0.5+ 6*0.5= 1.5 + 3 = 4.5ms.
After 4th measurement, estimate is: 4.5*0.5+ 4*0.5= 2.25 + 2 = 4.25ms.

The answer is 4.25ms.