

## Scheduling Questions

Turnaround time of a process is computed as the time of termination minus the time of submission.

1. There are five processes A to E to run. Their arrival times are 0, 1, 3, 9 and 12 second and their processing times are 3, 5, 2, 5, 5 seconds, respectively. What is the average turnaround time using round-robin scheduling?
2. Compute the turnaround time for the following five processes using the multiple queues (round robin on each priority level) scheduling algorithm. Processes A, B, and C have priority 1, and processes D and E priority 0 (the higher the priority, the sooner the process is scheduled). Their arrival times are 0, 1, 2, 0 and 5 seconds, and their run times are 1.5, 1, 1.5, 1.5 and 1.5 seconds, respectively.

## Answers

We determine which processes run in each interval, and note in brackets the remaining runtime.

1. 0-1: A (2).  
1-3: A (1) and B (4).  
3-6: A (0), B (3) and C (1).  
6-8: B (2) and C (0).  
8-9: B (1).  
9-11: B (0) and D (4).  
11-12: D (3).  
12-18: D (0) and E (2).  
18-20: E (0).  
Thus we have (in seconds)

$$\frac{(6-0) + (8-3) + (11-1) + (18-9) + (20-12)}{5} = \frac{38}{5} = 7.6$$

2. First priority 1, then priority 0 processes run in a round-robin fashion.  
0-1: A (0.5).  
1-2: A (0), B (0.5).  
2-3: B (0), C (1).  
3-4: C (0).  
4-5: D (0.5).  
5-6: D (0), E (1).  
6-7: E (0).

Thus we have (by subtracting the arrival time from the time of termination):

$$\frac{(2-0) + (3-1) + (4-2) + (6-0) + (7-5)}{5} = \frac{14}{5} = 2.8 \text{ (sec).}$$