CSE 460

Mid Term Exam

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Show your steps clearly. If the question asks for 'yes' or 'no', you must answer explicitly 'yes' or 'no' or 'depending on situation' before giving your explanations.

1. (50 points)
   Five batch jobs **A** through **E** arrive at a computer center in the order **A** to **E** at almost the same time. They have estimated running times of 6, 4, 1, 3, and 7 minutes. Their (externally determined) priorities are 3, 5, 2, 1, and 4, respectively, with 5 being the highest priority. For each of the following scheduling algorithms, determine the mean process **waiting** time. Ignore process switching overhead.

   a) Round Robin (assume quantum = 1)
   b) Priority scheduling
   c) First-come first-served
   d) Shortest job first

   For a), assume that the system is multitasking, and that each job gets its fair share of the CPU. For b) through d) assume that only one job at a time runs, until it finishes. All jobs are completely CPU bound.

Solutions:

The burst times and priorities of the processes are:

Process	Burst Times	Priorities
A	6	3
B	4	5
C	1	2
D	**3**	**1**
E	**7**	**4**

a) RR with quantum = 1

Gnatt chart is:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A	B	C	D	E	A	B	D	E	A	B	D	E	A	B	E	A	E	A	E	E	

So the average waiting time is given by:

T_{wait} = ((0+4+3+3+2+1) + (1+4+3+3) + (2) + (3+3+3) + (4+3+3+2+1+1+0) / 5

= (13 + 11 + 2 + 9 + 14) /5

= 49 / 5

= **9.8** (minutes)

b) Priority:
The processes are scheduled in the order: B E A C D
Similarly, the waiting time for A B C D E are: 11, 0, 17, 18, 4 respectively.
So the average waiting time is;

T_{wait} = (11 + 0 + 17 + 18 + 4) /5

= 50 / 5

= **10** (minutes)