Operating System - Quiz Ch5

1. (16%) Please mark the algorithms listed below that could result in starvation. You can assume that each process will use the CPU for a finite burst before performing I/O.
   a) FCFS b) SJF c)SRTF d) RR e) Priority (non-preemptive) (f) Priority (preemptive)
   (g) proportional share scheduling (h) multilevel queues where RR is used inside each queue and priority (preemptive) scheduling is used among queues
   Sol. b, c, e, f, h

2. (60%) Here is a table of processes and their associated arrival and running times. For each process, indicate the waiting time (WT) and turnaround time (TRT) under the scheduling algorithms below, respectively. Assume that the context switch overhead is 0
   (a) SJF (b) SRTF (c) RR (time slice = 4)

Process	Arrival	CPU burst
A	0	3
B	2	6
C	4	4
D	6	5
E	8	2

(Please fill the table below)

Algorithms	**Process A**	**Process B**	**Process C**	**Process D**	**Process E**
SJF	WT=	WT=	WT=	WT=	WT=
(non-preemptive)	TRT=	TRT	TRT=	TRT=	TRT=
SRTF	WT=	WT=	WT=	WT=	WT=
(preemptive)	TRT=	TRT=	TRT=	TRT=	TRT=
RR	WT=	WT=	WT=	WT=	WT=
Time slice = 4	TRT=	TRT=	TRT=	TRT=	TRT=

Sol:

Scheduler	Process A	Process B	Process C	Process D	Process E
SJF	WT= 0	WT= 1	WT= 7	WT= 9	WT= 1
(non-preemptive)	TRT= 3	TRT=7	TRT= 11	TRT= 14	TRT= 3
SRTF	WT= 0	WT= 7	WT= 0	WT= 9	WT= 0
(preemptive)	TRT= 3	TRT= 13	TRT= 4	TRT= 14	TRT= 2
RR	WT= 0	WT= 9	WT= 3	WT= 9	WT= 9
Time slice = 4	TRT= 3	TRT= 15	TRT= 7	TRT= 14	TRT= 11

3. (24%) Given three real-time periodic processes with their periods and processing time (in terms of ms) on the right side, please answer questions below.

Process	t (CPU burst)	p (period)
A	15	30
B	15	40
C	5	50

   (a) (6%) What's the total CPU utilization of processes A, B and C?
   (b) (6%) Which process(s) will be scheduled to run during 30ms~40ms if (i) RMS (ii) EDF is used?
   (c) (6%) Which process(s) will be scheduled to run during 40ms~50ms if (i) RMS (ii) EDF is used?
   (d) (6%) Will any process miss its deadline if (i) RMS (ii) EDF is used ?

Sol:

(a) 0.5+0.375+0.1=0.975

(b) RMS: A EDF: C and A

(c) RMS: A, B EDF: A

(d) RMS: yes (process C will miss the deadline). EDF: no.