Exercise Sheet 8

Johannes Koch

May 29, 2018

1 Definitions

1.1 Turnaround time

Average time a process needs from arriving to finishing.

1.2 Response time

Average time a process has to wait for its first CPU time.

1.3 Waiting time

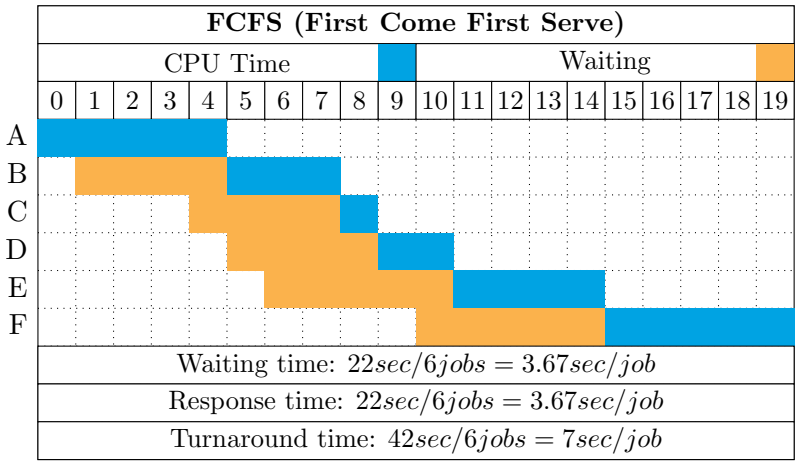
Average time a process spends waiting for CPU time from arriving to finishing.

2 Task 1

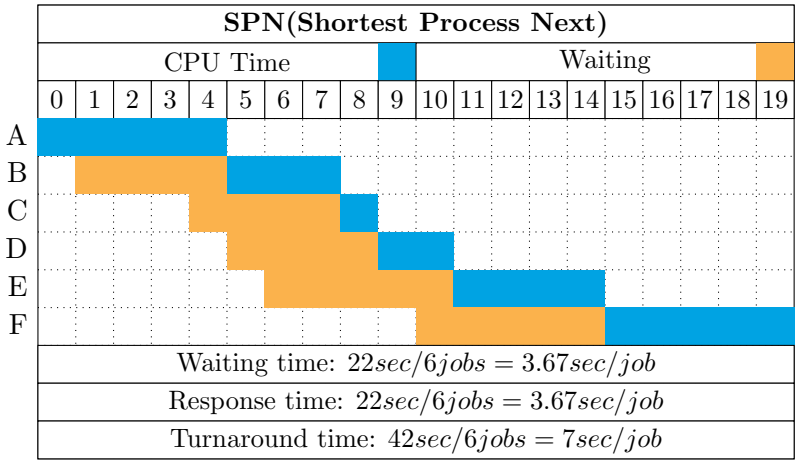
2.1 Processes

Process	**Arrival Time**	**Service Time**	**Priority**	**Tickets**
A	0	5	3	7
B	1	3	3	14
C	4	1	1	22
D	5	2	0	28
E	6	4	2	14
F	10	5	1	20

2.2 FCFS(First Come First Served)

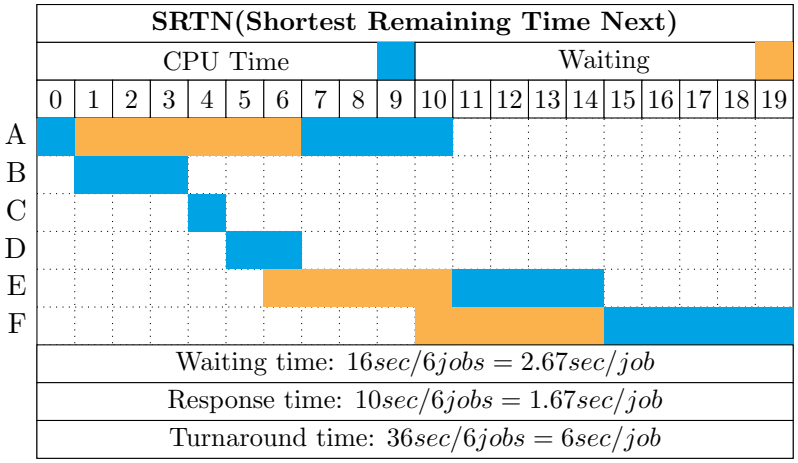


2.3 SPN(Shortest Process Next)

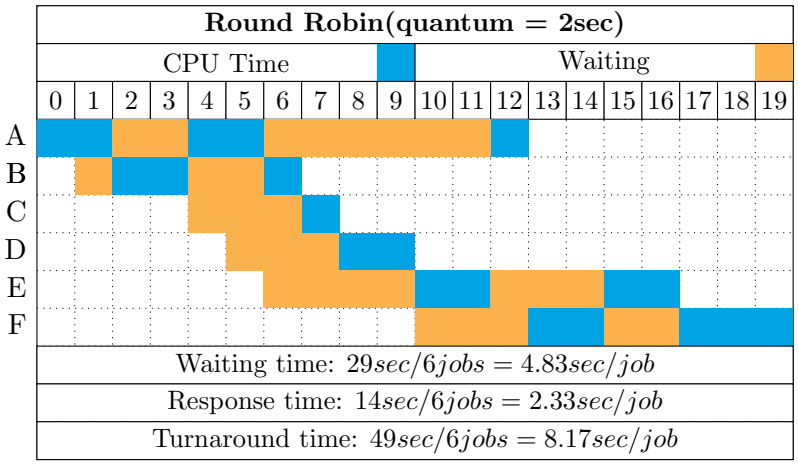


2.4 SRTN(Shortest Remaining Time Next)

Note: FCFS is used as collision handling strategy.

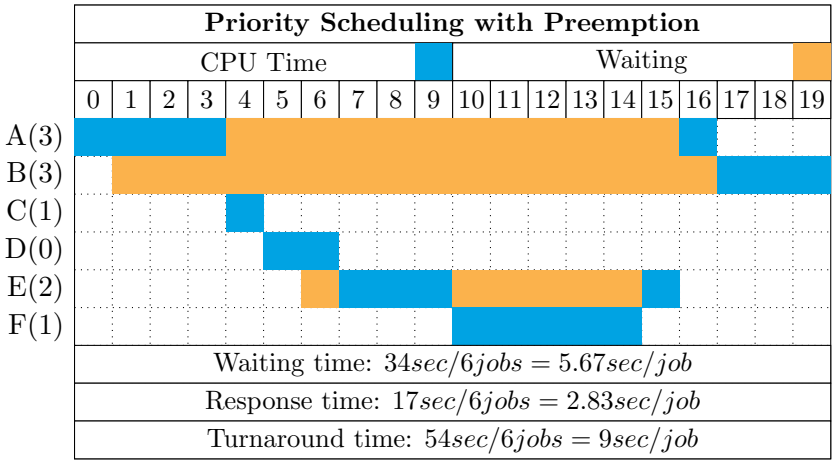


2.5 Round Robin(quantum = 2sec)



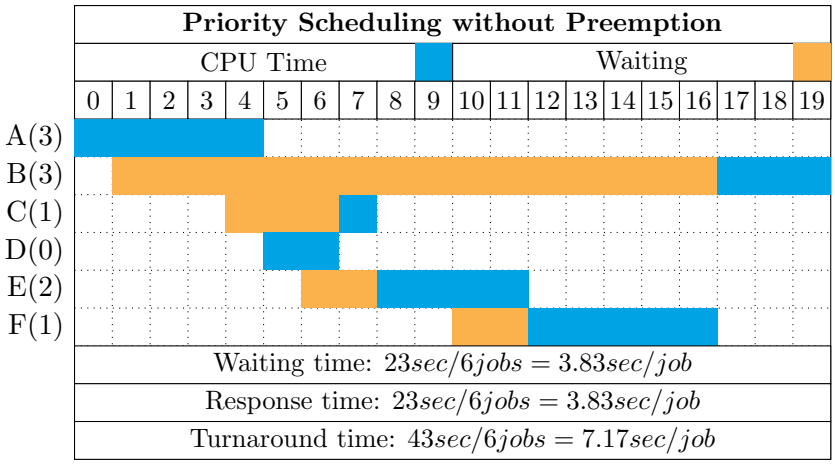
2.6 Priority Scheduling with Preemption

Note: Lower number equals higher priority.



2.7 Priority Scheduling without Preemption

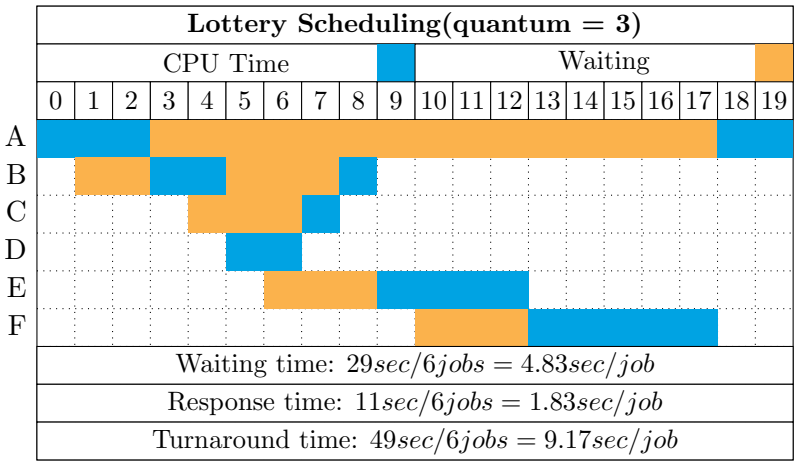
Note: Lower number equals higher priority.



2.8 Lottery Scheduling(quantum = 3)

Assumption: The processes only require the CPU and are not going to be interrupted by I/O or any other reasons. The scheduler only decides online(only based on the information of currently present processes). The quantum is $3sec$. Processes **B**, **E** and **F** only use **2** time units of their quantum, while all other processes use the full quantum.
It is assumed that the process with the highest probability always wins the drawing.

Time	**%A**	**%B**	**%C**	**%D**	**%E**	**%F**	**Choice**	**Notes**
0	7/7						A	
1	7/21	14/21					(B)	A still working
2	7/21	14/21					(B)	A still working
3	7/21	14/21					B	
4	7/42	14/42	22/42				(C)	B yields, gets +7 tickets
5	7/78	21/78	22/78	28/78			D	
6	7/92	21/92	22/92	28/92	14/92		(D)	D finishes now
7	7/64	21/64	22/64		14/64		C	C finishes now
8	7/42	21/42			14/42		B	B finishes now
9	7/21				14/21		E	
10	7/41				14/41	20/41	(F)	E yields, gets +7 tickets
11	7/48				21/48	20/48	E	
12	7/41				14/41	20/41	(F)	E finishes now
13	7/27					20/27	F	
14	7/27					20/27	(F)	F yields, gets +10 tickets
15	7/37					30/37	F	
16	7/27					20/27	(F)	F yields, gets +10 tickets
17	7/37					30/37	F	F finishes now
18	7/7						A	
19	7/7						A	A finishes now


Lottery Scheduling(quantum = 3)
CPU Time
Waiting
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
A
B
C
D
E
F
Waiting time: 29sec/6jobs = 4.83sec/job
Response time: 11sec/6jobs = 1.83sec/job
Turnaround time: 49sec/6jobs = 9.17sec/job

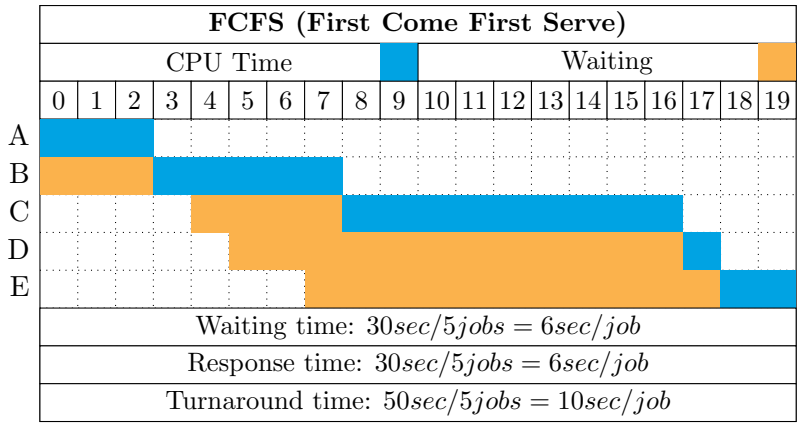
3 Task 2

3.1 Processes

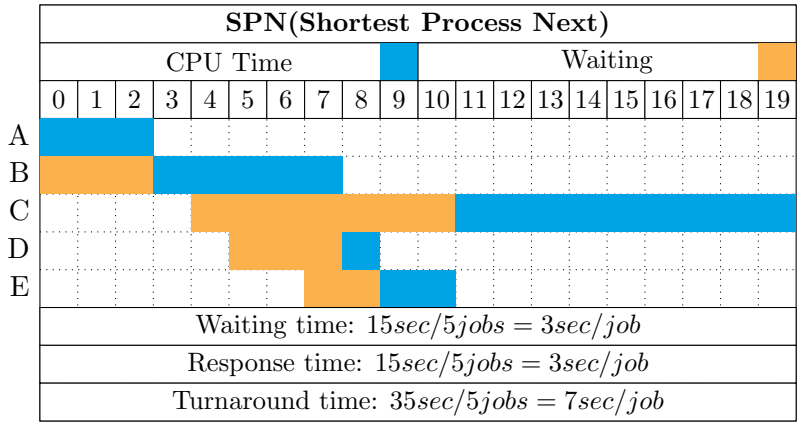
Process	Arrival Time	Service Time	Priority	Tickets
A	0	3	3	11
B	0	5	4	16
C	4	9	3	8
D	5	1	0	20
E	7	2	1	15

3.2 FCFS(First Come First Served)

Note: Process with higher priority(lower number equals higher priority) is executed first.

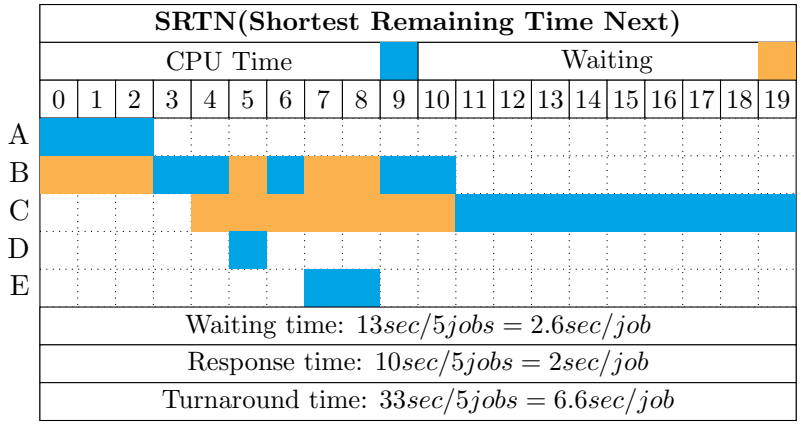


3.3 SPN(Shortest Process Next)

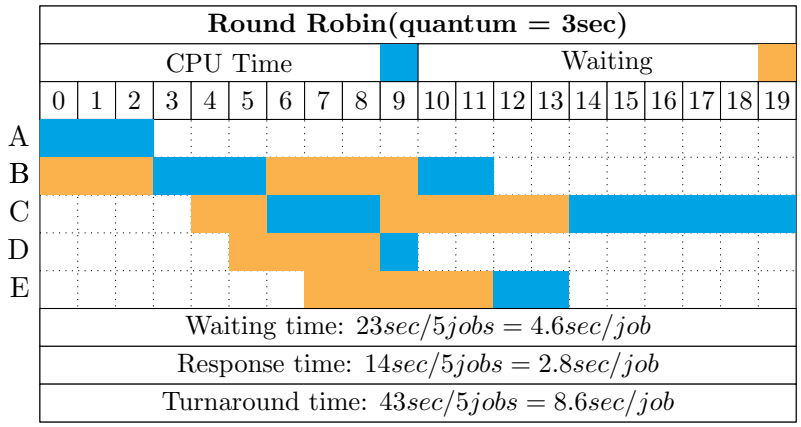


3.4 SRTN(Shortest Remaining Time Next)

Note: Priority is used as collision handling strategy.

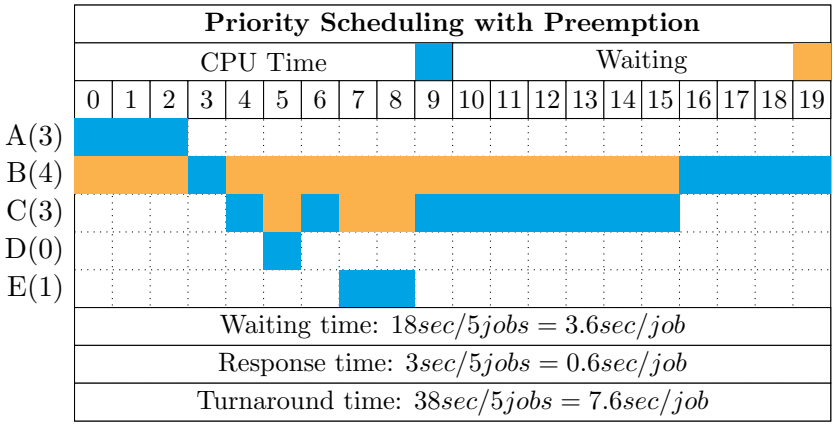


3.5 Round Robin(quantum = 3sec)



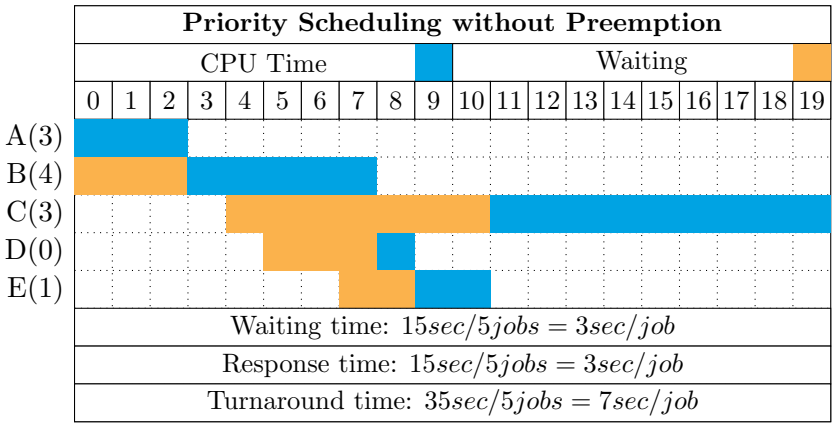
3.6 Priority Scheduling with Preemption

Note: Lower number equals higher priority.

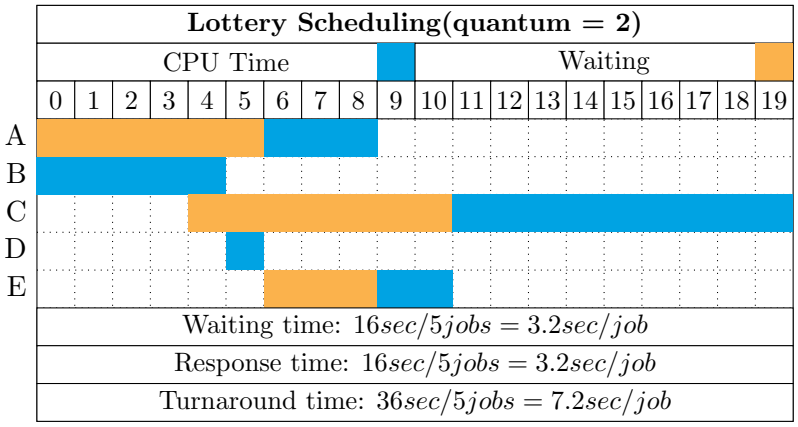


3.7 Priority Scheduling without Preemption

Note: Lower number equals higher priority.



3.8 Lottery Scheduling(quantum = 2)

Assumption: The processes only require the CPU and are not going to be interrupted by I/O or any other reasons. The scheduler only decides online(only based on the information of currently present processes). The quantum is $2sec$. Processes **A** and **E** only use **1** time units of their quantum, while all other processes use the full quantum.
It is assumed that the process with the highest probability always wins the drawing.

Time	%A	%B	%C	%D	%E	Choice	Notes
0	11/27	16/27				B	
1	11/27	16/27				(B)	
2	11/27	16/27				B	
3	11/27	16/27				(B)	
4	11/35	16/35	8/35			B	B finishes now
5	11/39		8/39	20/39		D	D finishes now
6	11/19		8/19			A	A yields, gets +11 tickets
7	22/45		8/45		15/45	A	A yields, gets +11 tickets
8	22/45		8/45		15/45	A	A finishes now
9			8/23		15/23	E	E yields, gets +15 tickets
10			8/38		30/38	E	E finishes now
11 - 18			8/8			C	
19			8/8			C	C finishes now