SOFT400227: Operating System 2022-Fall

Homework-**3** Solutions

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Honor Code: I promise that I finished the homework solutions on my own without copying other people's work.

Scheduler

1.

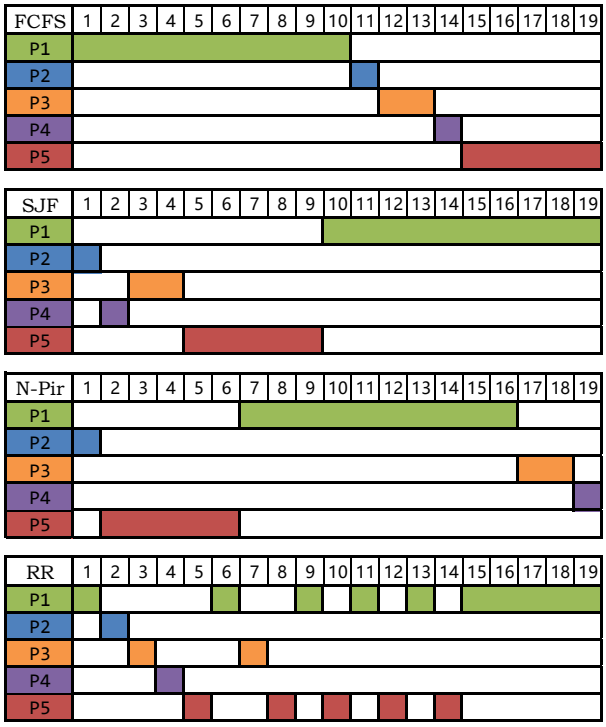
A CPU-bound program spends most of its time executing instructions on the processor while a I/O-bound program spends most of its time waiting for input and output operations to complete.

Distinguishing them is helpful for scheduling processes to utilize CPU better.

2.

use N-Pir as a short case for non-preemptive priority

a. Gantt charts



b.

	FCFS	**SJF**	**N-Pir**	**RR**
turnaround time	13.4	7	12	9.2

FCFS. $t_1 = (10 + 11 + 13 + 14 + 19)/5 = 13.4$

SJF. $t_2 = (19 + 1 + 4 + 2 + 9)/5 = 7$

N-Pir. $t_3 = (16 + 1 + 18 + 19 + 6)/5 = 12$

RR. $t_4 = (19 + 2 + 7 + 4 + 14)/5 = 9.2$

c.&d.

Waiting time	**FCFS**	**SJF**	**N-Pir**	**RR**
P1	0	9	6	9
P2	10	0	0	1
P3	11	2	16	5
P4	13	1	18	3
P5	14	4	1	9
Average	9.6	3.2	8.2	5.4

minimum average waiting time: SJF

3.

Answer: **b**, **d**

b. When a long job waiting for a lot of short jobs.

d. When a low priority job waiting for a lot of high priority jobs.

4.

	P1	**P2**	**P3**
Priority	80	69	65

Will lower the relative priority of a CPU-bound process.

CPU-bound don't need to wait for I/O and finish their tasks on CPU, so they use CPU less frequently than I/O.

Other things

LaTeX code refer to these things and was complied on texlive2020.

- UCB-CS70's given homework template.
- A free website useful to edit LaTeX formula code.
- A free website helpful to generate LaTeX table.

Some description refer to *Operating System Concepts 10th*, Wikipedia and Professor.Tian's PPT.

The purpose of writing in English is to adapt to bilingual teaching and to improve my poor English writing skills in preparation for a possible future exchange program.

Thanks for your correcting and grading :).