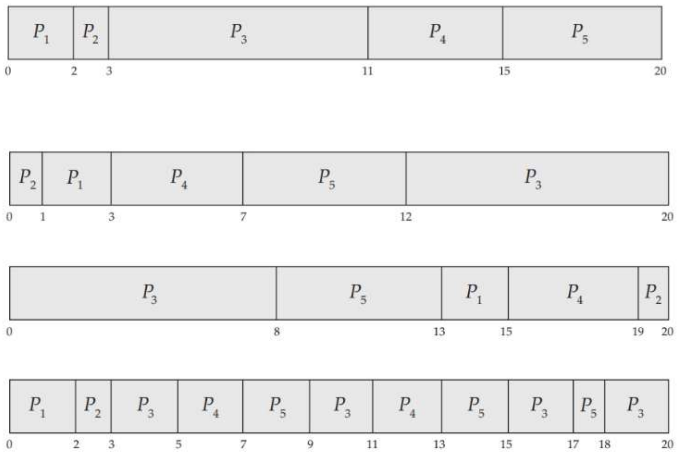
CSC-139 Problem Set A Solutions

5.4)

Answer:

a. The four Gantt charts:



b. Turnaround time:

	FCFS	SJF	Priority	RR
P_1	2	3	15	2
P_2	3	1	20	3
P_3	11	20	8	20
P_4	15	7	19	13
P_5	20	12	13	18

c. Waiting time (turnaround time minus burst time):

	FCFS	SJF	Priority	RR
P_1	0	1	13	0
P_2	2	0	19	2
P_3	3	12	0	12
P_4	11	3	15	9
P_5	15	7	8	13

d. SJF has the shortest wait time.

5.7)

Answer:

a. The shortest job has the highest priority.

b. The lowest level of MLFQ is FCFS.

c. FCFS gives the highest priority to the job that has been in existence the longest.

d. None.

9.13)

Answer:

a. **First fit**:

b. 200 MB is put in 205-MB partition, leaving 100 MB, 170 MB, 40 MB, 5 MB, 300 MB, 185 MB

c. 15 MB is put in 100-MB partition, leaving 85 MB, 170 MB, 40 MB, 5 MB, 300 MB, 185 MB

d. 185 MB is put in 300-MB partition, leaving 85 MB, 170 MB, 40 MB, 5 MB, 115 MB, 185 MB

e. 75 MB is put in 85-MB partition, leaving 10 MB, 170 MB, 40 MB, 5 MB, 115 MB, 185 MB

f. 175 MB is put in 185-MB partition, leaving 10 MB, 170 MB, 40 MB, 5 MB, 115 MB, 10 MB

g. 80 MB is put in 170-MB partition, leaving 10 MB, 90 MB, 40 MB, 5 MB, 115 MB, 10 MB

h. **Best fit**:

i. 200 MB is put in 205-MB partition, leaving 100 MB, 170 MB, 40 MB, 5 MB, 300 MB, 185 MB

j. 15 MB is put in 40-MB partition, leaving 100 MB, 170 MB, 25 MB, 5 MB, 300 MB, 185 MB

k. 185 MB is put in 185-MB partition, leaving 100 MB, 170 MB, 25 MB, 5 MB, 300 MB, 0 MB

l. 75 MB is put in 100-MB partition, leaving 25 MB, 170 MB, 25 MB, 5 MB, 300 MB, 0 MB

m. 175 MB is put in 300-MB partition, leaving 25 MB, 170 MB, 25 MB, 5 MB, 125 MB, 0 MB

n. 80 MB is put in 125-MB partition, leaving 25 MB, 170 MB, 25 MB, 5 MB, 45 MB, 0 MB

Worst fit:

o. 200 MB is put in 300-MB partition, leaving 100 MB, 170 MB, 40 MB, 205 MB, 100 MB, 185 MB

p. 15 MB is put in 205-MB partition, leaving 100 MB, 170 MB, 40 MB, 190 MB, 100 MB, 185 MB

q. 185 MB is put in 190-MB partition, leaving 100 MB, 170 MB, 40 MB, 5 MB, 100 MB, 185 MB

r. 75 MB is put in 185-MB partition, leaving 100 MB, 170 MB, 40 MB, 5 MB, 100 MB, 110 MB

s. 175 MB is denied, as there is no partition large enough to hold the request.

t. 80 MB is put in 170-MB partition, leaving 100 MB, 90 MB, 40 MB, 5 MB, 100 MB, 110 MB

In this example, only worst fit does not allow a request to be satisfied. An argument could be made that best fit is most efficient, as it leaves the largest holes after allocation.

9.25)

Answer:

a. 100 nanoseconds: 50 nanoseconds to access the page table and 50 nanoseconds to access the word in memory.

b. Effective access time = 0.75 × (50 nanoseconds) + 2 + 0.25 × (100 nanoseconds) = 64.5 nanoseconds.

10.18)

Answer:

- `0x2A1` → `0xAA1`
- `0x4E6` → `0x9E6`
- `0x94A` → `0x14A`
- `0x316` → `0xF16`

10.24)

Answer:

- FIFO = 18, LRU = 17, OPT = 13
- FIFO = 16, LRU = 19, OPT = 13
- FIFO = 15, LRU = 16, OPT = 11
- FIFO = 20, LRU = 20, OPT = 16
- FIFO = 12, LRU = 11, OPT = 11

11.13)

Answer:

a. The FCFS schedule is 2,150; 2,069; 1,212; 2,296; 2,800; 544; 1,618; 356; 1,523; 4,965; 3,681 The total seek distance is 13,011.

b. The SCAN schedule is 2,150; 2,296; 2,800; 3,681; 4,965; 2,069; 1,618; 1,523; 1,212; 544, 356. The total seek distance is 7,492.

c. The C-SCAN schedule is 2,150; 2,296; 2,800; 3,681; 4,965; 356; 544; 1,212; 1,523; 1,618; 2,069. The total seek distance is 9,917.