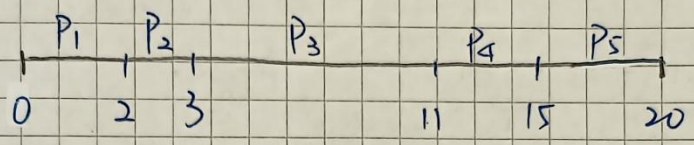
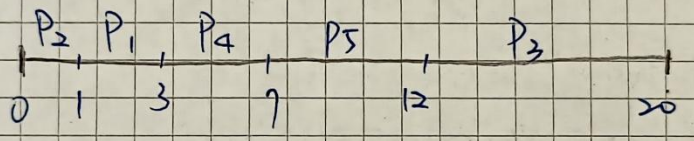
5.4

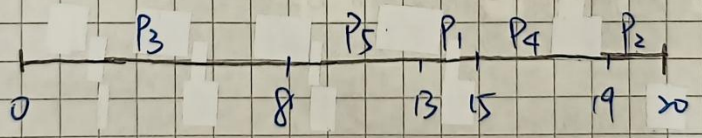
a. ① FCFS : $P_1 \to P_2 \to P_3 \to P_4 \to P_5$



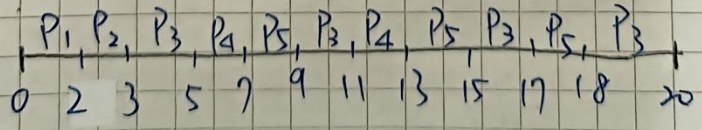
② SJF : $P_2 \to P_1 \to P_4 \to P_5 \to P_3$



③ Priority : $P_3 \to P_5 \to P_1 \to P_4 \to P_2$ (依題目數字大高優先)



④ Round Robin



b. TAT = 完成時間 - 到達時間 = CT - AT

因為 AT = 0，所以 TAT = CT

(1) FCFS

→ (2+3+11+15+20) ÷ 5 = 10.2 ms

$P_1 = 2$ $P_4 = 15$
$P_2 = 3$ $P_5 = 20$
$P_3 = 11$

(2) SJF

→ (1+3+7+12+20) ÷ 5 = 8.6 ms

$P_2 = 1$ $P_5 = 12$
$P_1 = 3$ $P_3 = 20$
$P_4 = 7$

(3) Priority

→ (8+13+15+19+20) ÷ 5 = 15 ms

$P_3 = 8$ $P_4 = 19$
$P_5 = 13$ $P_2 = 20$
$P_1 = 15$

(4) RR

→ (2+3+20+13+18) ÷ 5 = 11.2 ms

$P_1 = 2$ $P_4 = 13$
$P_2 = 3$ $P_5 = 18$
$P_3 = 20$

∴ SJF 效率較高.

c. WT = TAT - burst time.

Process	FCFS WT	SJF WT	Priority WT	RR WT
P_1	2-2=0	3-2=1	15-2=13	2-2=0
P_2	3-1=2	1-1=0	20-1=19	3-1=2
P_3	11-8=3	20-8=12	8-8=0	20-8=12
P_4	15-4=11	7-4=3	19-4=15	13-4=9
P_5	20-5=15	12-5=7	13-5=8	18-5=13
平均時間	6.2ms	4.6ms	11.0ms	7.2ms

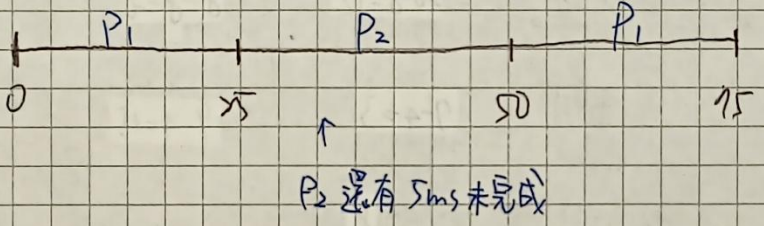
d. SJF 最佳.

5.35

a. $U = \frac{t}{P}$

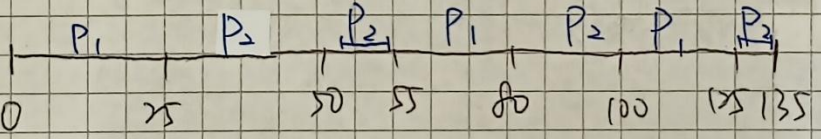
$\frac{25}{50} + \frac{30}{75} = 0.5 + 0.4 = 0.9$

∵ $U \leq 0.828$ → 不滿足，RM不可行.



P2還有5ms未完成

b. ∵ $U = 0.9 \leq 1$，可行.



Deadline

P1: 50 | 100 | 150

P2: 75 | 150