CS & IT ENGINEERING

Operating System

CPU Scheduling

DPP 02 Discussion Notes

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01 Question

02 Discussion

Q.1 Consider arrival time and execution time for the following processes. [MCQ]

Process	Arrival Time	Burst Time
P0	2	5
P1	7	9
P2	8	3
P3	10	4

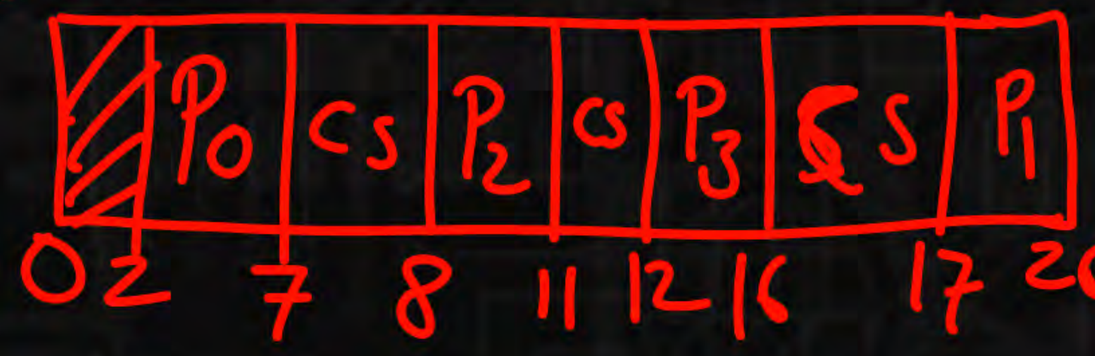
Assume, each context switch requires 1ms of time(excluding first and last context switch), then calculate the sum of schedule length, turnaround time of P3, and waiting time for P1 using SRTF algorithm?

A. 39

B. 34

C. ~~37~~ 40

D. 25



Schedule length = Max(CT) − Min(AT)

= 26 − 2 = 24

TAT of P_3 = CT(P_3) − AT(P_3)

= 16 − 10 = 6

WT of P_1 = CT − (AT + BT) / TAT(P_1) − BT(P_1)

= 19 − 9 = 10

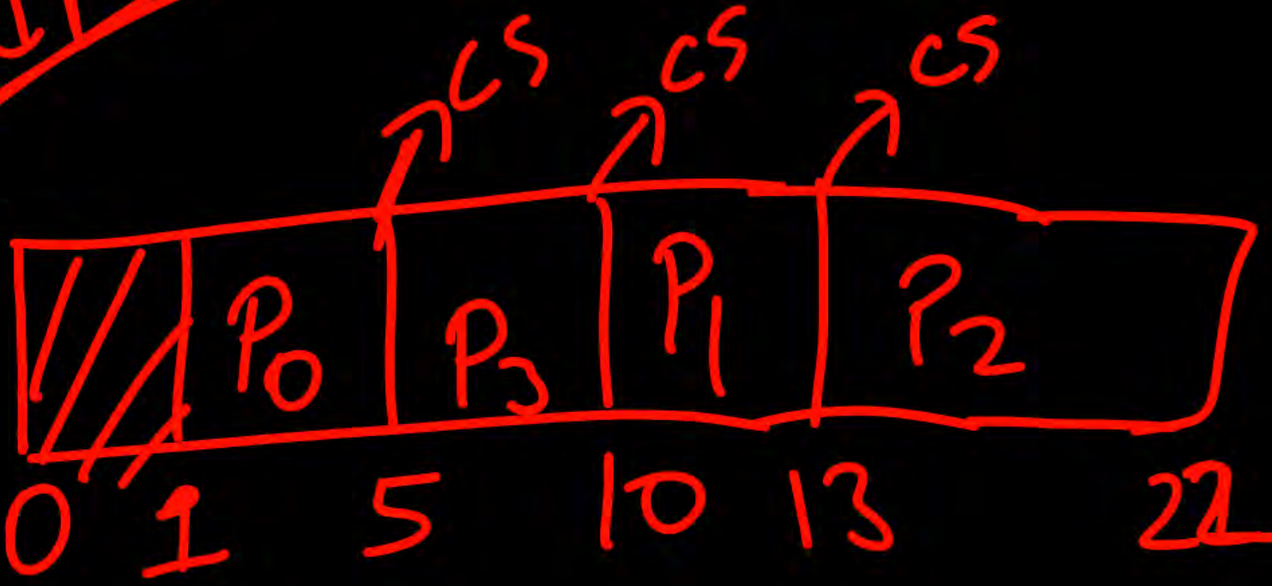
Q.2 Consider arrival time and execution time for the following processes that need to be scheduled on a single CPU. **[NAT]**

Process	Arrival Time	Burst Time
P0	1	4
P1	6	3
P2	7	9
P3	5	5

Assume X is the total number of contexts switching and Y is the throughput of the system using SJF scheduling algorithm then find the value of (X + Y)? (Exclude start and end context switching and round-off up to 2 decimal).

SJF

SJF



X = 3

Y =

$$\frac{\#\text{Process}}{\text{schedule length}} = \frac{4}{21}$$

$= 0.19$

X + Y = 3.19

Q.3 [NAT]

Consider the following set of processes with the arrival times and the CPU burst times given in milliseconds:

Process	Arrival Time	Burst Time
P0	0	4
P1	2	3
P2	3	4
P3	5	5
P4	1	2

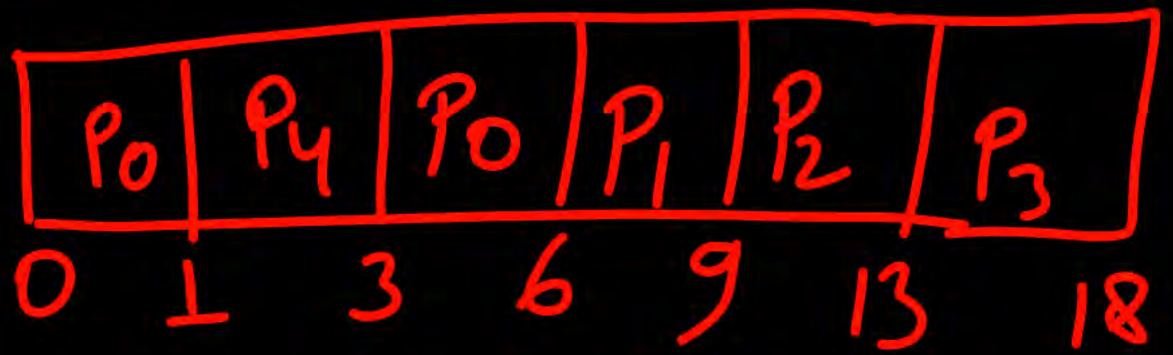
SRTF.

CT	TAT
6	6
9	7
13	10
18	13
31	2

What does the average turnaround time for these processes with the shortest remaining process time first (SRTF) algorithm? (If burst time is matching them follow lowest arrival time and round-off up to 1 decimal).

7.6

SRTF:



$$\text{Total TAT} = \frac{6+7+10+13+2}{5}$$

$$= \frac{38}{5} = 7.6$$

Q.4

Five jobs are waiting to be run. Their expected running time are 12, 5, 7, 3 and "X". Which of the following order will minimize the average completion time using the shortest job first (SJF)?

[MCQ]

A. 3, X, 5, 7, 12

B. 3, 5, X, 7, 12

C. 3, 5, 7, X, 12

D. 3, 5, 7, 12, X

	P_1	P_2	P_3	P_4	P_5
AT	0	0	0	0	0
	3	X			

Q.5

Consider a pre-emptive SJF scheduling technique followed by three processes P_1, P_2, P_3. All these 3 processes arrive at time t = 0 and their total execution time is 30, 40, and 50 units respectively. Each process spends the first 10% of execution doing I/O, 80% of CPU and the rest 10% doing I/O operation. What will be the CPU idle % time to execute all processes? (Assume a uniprocessor and all I/O operations can be overlapped, round off upto 2 decimal).

[NAT]

$\frac{1}{13} = 0.076 * 100$

$= 7.69$

3 24

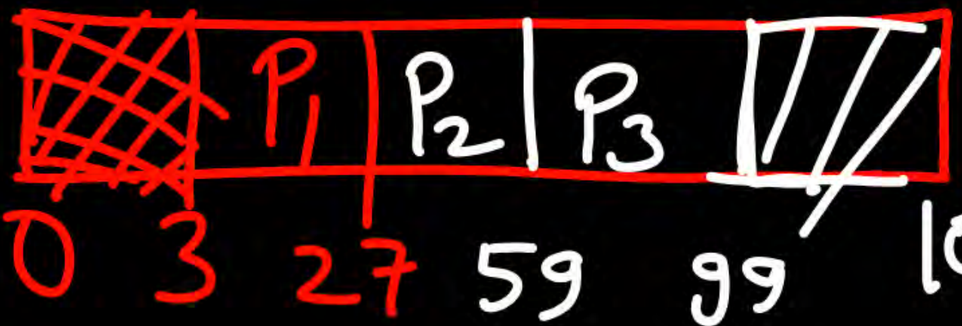
4 32

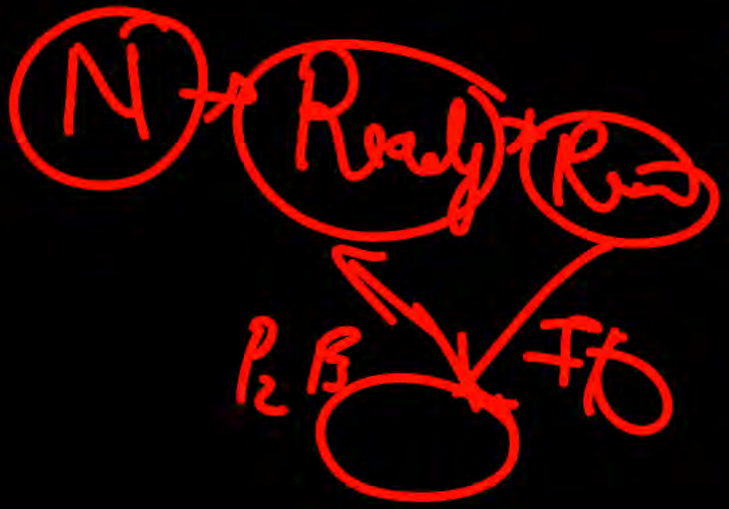
5 40

	AT	I/O	CPU	I/O	
P_1	0	30	24	3	30
P_2	10	40	32	4	63
P_3	10	50	40	5	104

$$\Rightarrow \frac{3+5}{104}$$

$$\frac{8}{104} = \frac{4}{52} = \frac{2}{26} = \frac{1}{13}$$





Q.6

Consider the following processes:

[MCQ]

Process	Arrival Time	Burst Time
P0	3	2
P1	6	3
P2	12	3
P3	5	2
P4	25	4

What is the throughput using the first come first serve(FCFS) algorithm, where scheduling overhead requires 2 unit (excluding first and last context switch)?

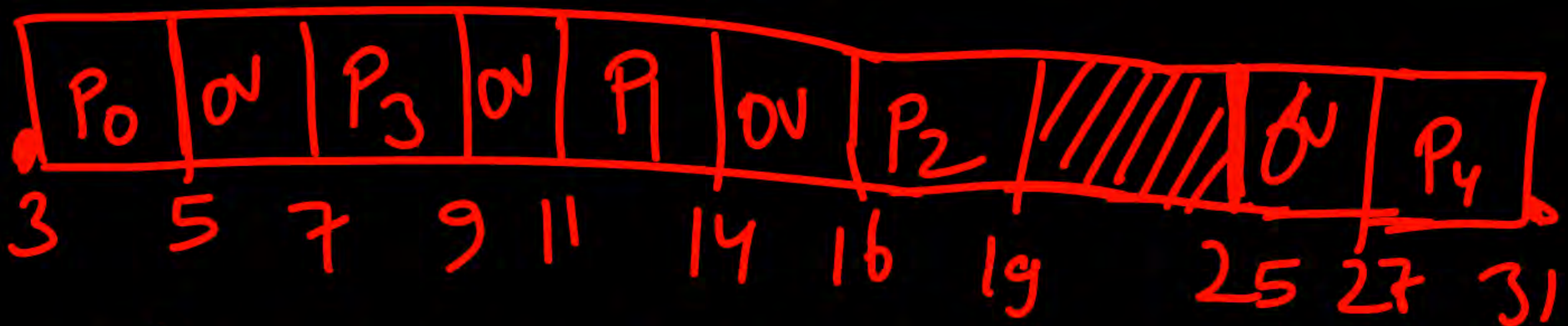
A. 0.16

B. 0.17

C. 0.18

D. 0.28

FCFS



Schedule length = 31 − 3 = 28

Throughput = $\frac{5}{28}$ = 0.17

Q.7

Match List I with List II, and select the correct answer using the code below:

[MSQ]

List I	List II
(i) SJF	1. Premptive
(ii) SRTF	2. Non-Preemptive
(iii) FCFS	3. Starvation

A. (i) - 1, (ii)- 2, (iii)-3

B. (i)- 3, (ii)- 1, (iii)- 2

C. (i)- 2, (ii)-1, (iii) 2

D. (i)-3, (ii)-3, (iii) 2

SJF = Starvation

SJF = Non-Preemptive.

SRTF = Premptive, Starvation

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THANK YOU GW
SOLDIERS !