Highest Response Ratio Next (HRRN)

Mode: (Non-preemptive)

Criteria: R-R $\longrightarrow$ $\dfrac{w+s}{s}$

(Response Ratio)

w: waiting time for a process so far.

s: service time for each process
$\quad\hookrightarrow BT$

@13:

$RR_1: \dfrac{(13-6)s}{s} = \dfrac{13}{5}$

$RR_4: \dfrac{(13-0)+2}{2} = \dfrac{7}{2}$ ✓

@9:

$RR_2 = \dfrac{(9-4)+4}{4} = \dfrac{9}{4} = 2.25$ ✓

$RR_3 = \dfrac{(9-0)+s}{s} = \dfrac{8}{5} = 1.6$

$RR_4 = \dfrac{(9-8)+2}{2} = \dfrac{3}{2} = 1.5$

PNo.	AT	BT(s)	CT	TAT	WT
✓ 0	0	3	3	3	0
✓ 1	2	6	9	7	J
✓ 2	4	4	13	9	5
3	6	5	20	14	9
4	8	2	15	7	5
✓					

P_0	P_1	P_2	P_4	P_3

0   3   9   13   15   20
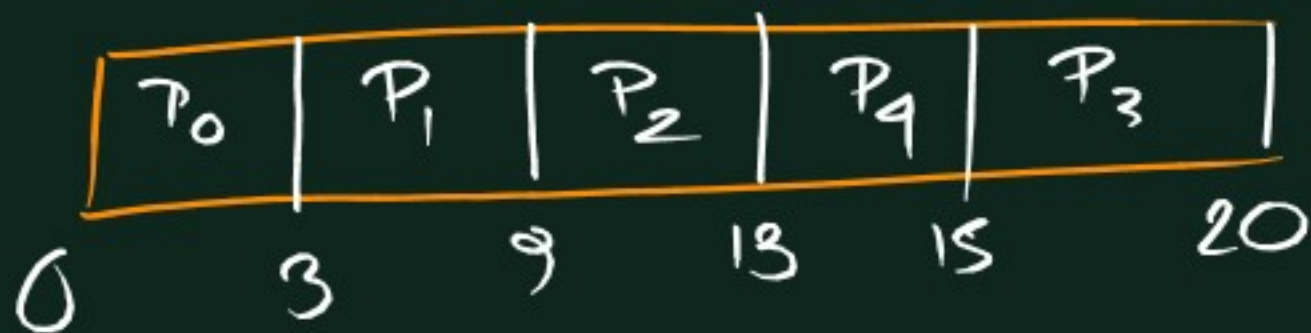
(1)

PNo.	AT	BT
1	0	3
2	1	2
3	2	4

(2)

PNo.	AT	BT
1	0	7
2	1	5
3	2	3
4	3	1
5	4	2
6	5	1

(3)

PNo.	AT	BT
1	3	1
2	1	4
3	4	2
4	0	6
5	2	3

(4)

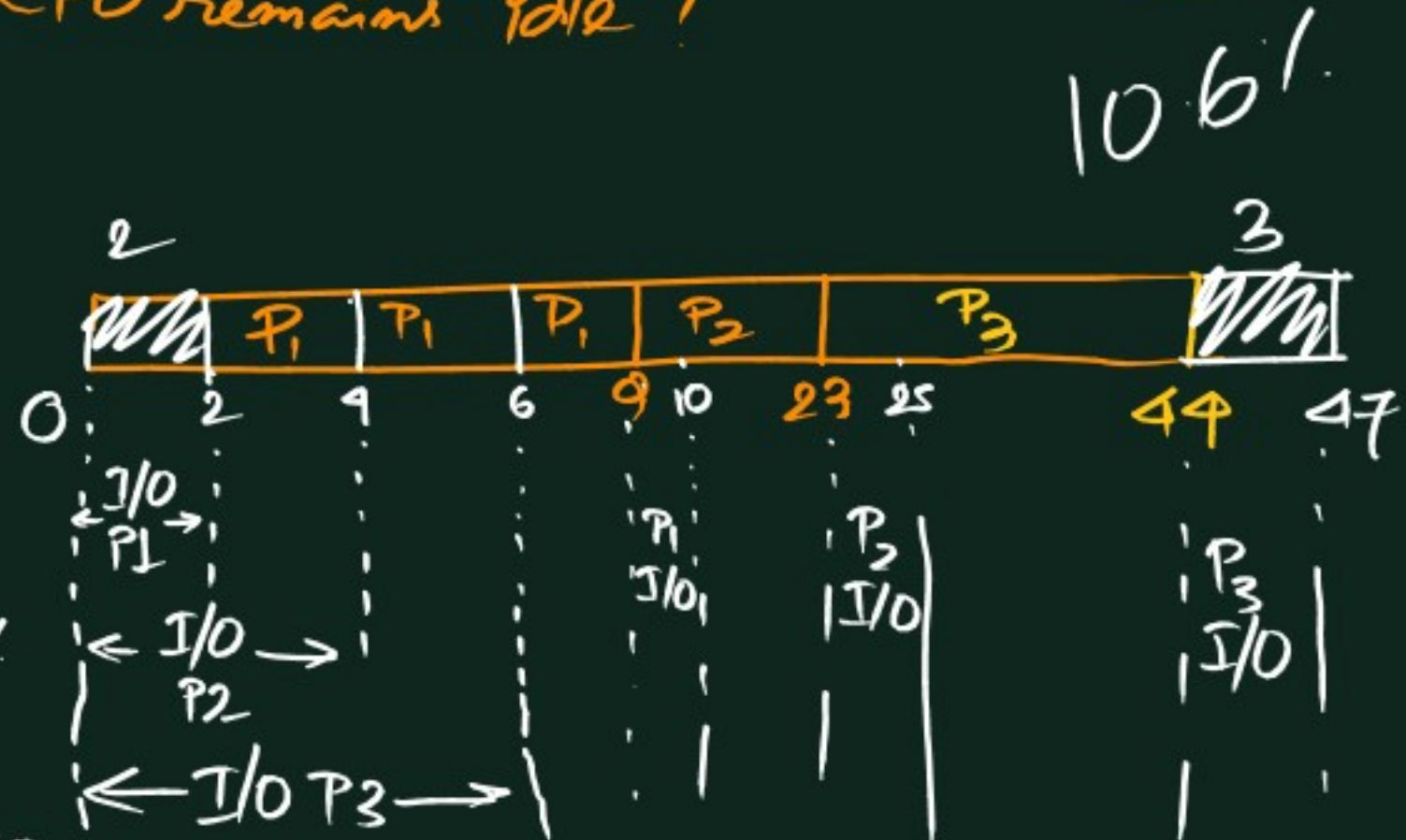| PNo.	AT	BT
1	1	6
2	2	7
3	0	8
4	3	2

Q: Consider 3 processes, all arriving @ time 0, with total execution time of 10, 20 & 30, respectively. Each process spends the 1st 20% of execution time doing I/O, next 70% time doing computation & the last 10% of time doing I/O again.

The OS uses an SRTF algorithm & schedules a new process with either when the running process gets blocked on I/O or when the running process finishes its complete BT. Assume all <u>I/O operations can be overlapped as much as possible</u>. Then, for what percentage of time, the CPU remains idle?

10.6%

		Execution time		
P No.	AT	I/O (20%)	BT (70%)	I/O (10%)
1	0	2	~~7~~ 8~~%01~~	
2	0	4	14	2
3	0	6	21	3

CPU remains Idle: $\dfrac{2+3}{47} \times 100\%$

$= \dfrac{5}{47} \times 100\% = 10.6\%$

PNo.	AT	BT	I/O	BT
1	0	3	2	2
2	0	2	4	1
3	2	1	3	2
4	5	2	2	1

(SRTF)