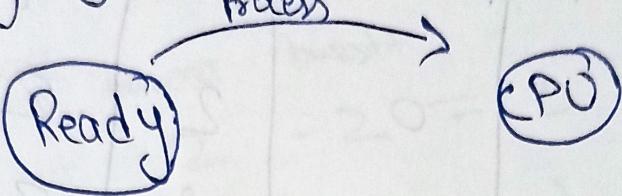


Operating System

10:30

## ① Scheduling Algorithm:



② Primitive - breaking while executing (stopping)  
 (Process after के साथ रुकता है)

③ Non-primitive - execute fully to terminate  
 (Process पूरा execute होता है + तभी terminate होता है)

Primitive part

## Time for Numerical :-

- Arrival time (time in Ready Q)
- burst time (Execution in CPU time)
- Completion (Complete termination of a process time)
- Turn around time (Completion time - Arrival time)
- waiting time (turnaround - burst time)

② Mod

20:01

1

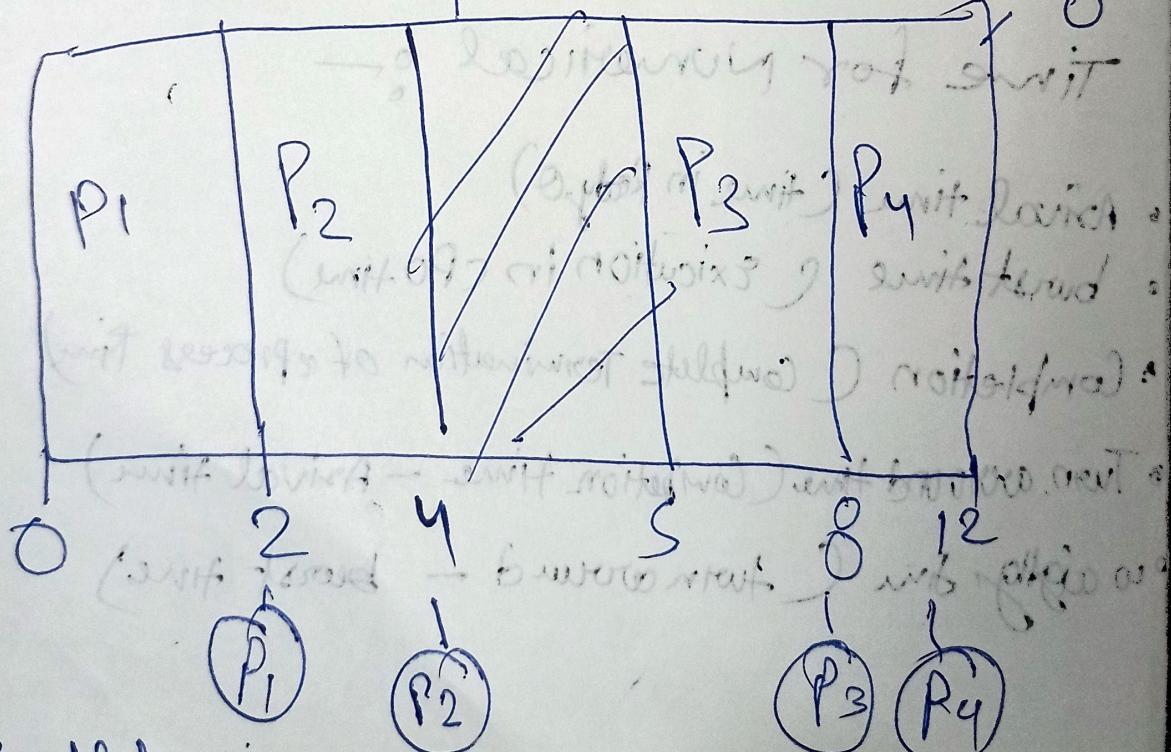
~~AVAC~~ Gantt chart of Non-prefixed

turnaround waiting time

Process No	Arrival time	Burst time	Completion time	Waiting time
P <sub>1</sub>	0	2	2	0
P <sub>2</sub>	1	2	3	1
P <sub>3</sub>	5	3	6	0
P <sub>4</sub>	6	4	10	4

Gantt chart

starts with 0



Completion time

turn around time

99887-67993

$$P_1 = 2 - 0 = 2$$

$$P_2 = 4 - 1 = 3$$

$$P_3 = 8 - 5 = 3$$

$$P_4 = 12 - 6 = 6$$

waitin

burst time

turnar.

burstt.

$$P_1 = 2 - 2 = 0$$

$$P_2 = 3 - 2 = 1$$

$$P_3 = 3 - 3 = 0$$

$$P_4 = 6 - 4 = 2$$

Average turn around time

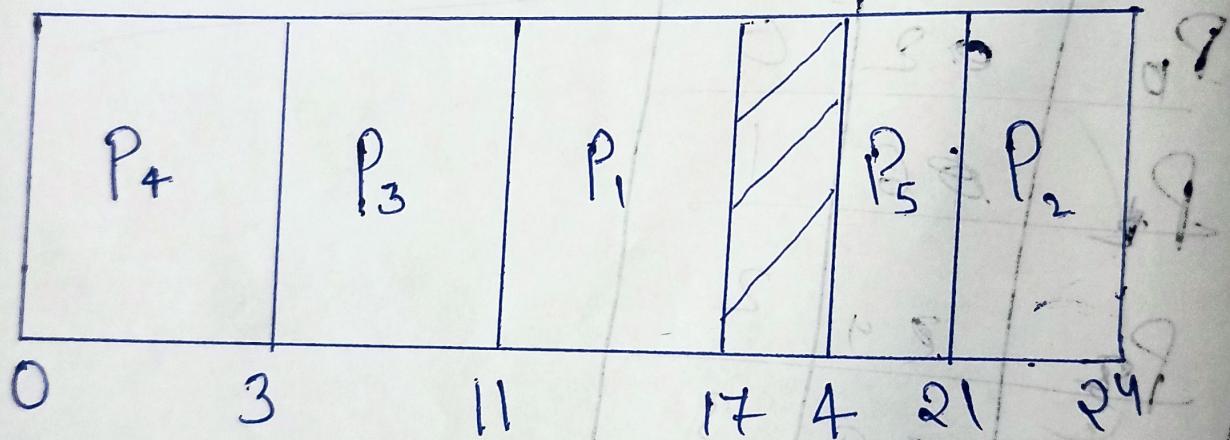
$$2 + 3 + 3 + 6 \times 4 = 3.5$$

Ave waiting time

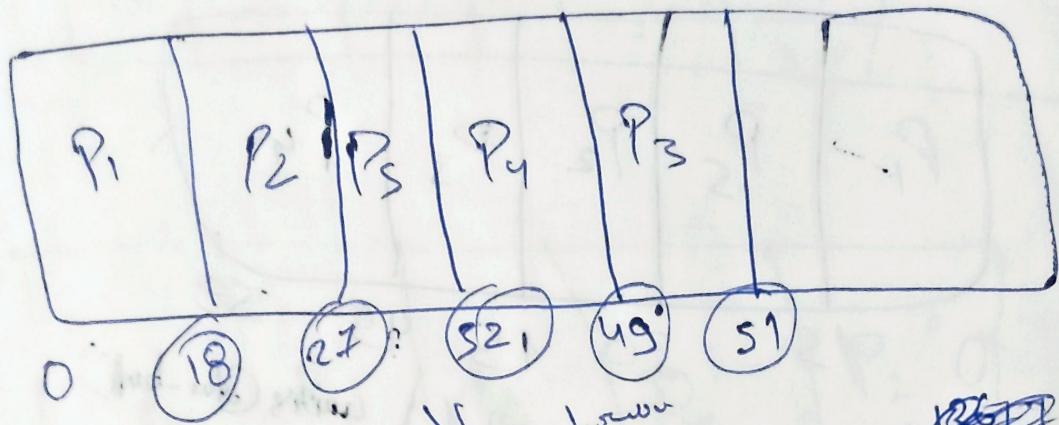
$$0 + 1 + 0 + 2 = 0.4$$

Question - 1

P. Id	Arrival time	Burst time	turn. acc.t.	W. time	Avg. Av.
P <sub>1</sub>	2	6			
P <sub>2</sub>	5	3			
P <sub>3</sub>	1	8			
P <sub>4</sub>	0	3			
P <sub>5</sub>	4	4			



	arrival	burst time	Completion time	Turnaround time	Waiting time	Avg
P <sub>1</sub>	0	18	18	18 - 0 = 0	0	0
P <sub>2</sub>	4	9	27	27 - 4 = 23	23	5.75
P <sub>3</sub>	11	2	29	29 - 11 = 18	18	5.67
P <sub>4</sub>	10	17	46	46 - 10 = 36	36	9.00
P <sub>5</sub>	8	5	51	51 - 8 = 43	43	8.60
						8.40
						8.40



turn around (Gantt - Actual)

$$P_1 = 18 - 0 = 18$$

$$P_2 = 27 - 4 = 23$$

$$P_3 = 51 - 11 = 40$$

$$P_4 = 49 - 10 = 39$$

$$P_5 = 32 - 8 = 24$$

Waiting (Gantt - burst time)

$$P_1 = 18 - 18 = 0$$

$$P_2 = 27 - 9 = 18$$

$$P_3 = 50 - 2 = 48$$

$$P_4 = 49 - 17 = 32$$

$$P_5 = 32 - 5 = 27$$

$$P_5 = 24 - 5 = 19$$

turn around (Actual)

$$18 + 23 + 40 + 39 + 24 = 124$$

avg. wait

$$0 + 14 + 38 + 22 + 19 = 85$$

~~27.8~~

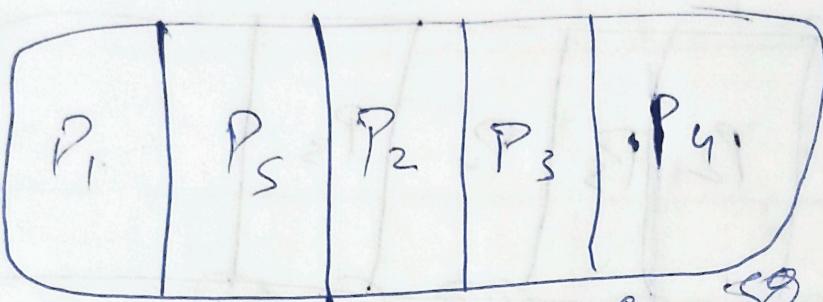
18.6

fully add first  
then divide 5

20 Aw. wait burst Cpk Jitter max Jitter Aver.

	Pw	1S	1S	1S	0	1S	
P1	0	1S	1S	1S	24	39	
P2	6	1S	4S	39	39	43	
P3	6	4	49	43	39	43	
P4	11	9	58	47	37	47	
Ps	4	1S	30	26	11	26	

$$\frac{39}{24}$$



0 1S : 30 4S 49 : 58 waiting (Aw - burst)  
from avg. (Average - Actual) waiting (Aw - burst)

$$P_1 = 1S - 0 = 1S$$

$$P_{1f} = 1S - 1S = 0$$

$$P_2 = 4S - 6 = 39$$

$$P_{2f} = 39 - 1S = 29$$

$$P_3 = 49 - 6 = 43$$

$$P_{3f} = 43 - 4 = 39$$

$$P_4 = 58 - 11 = 47$$

$$P_{4f} = 47 - 9 = 37$$

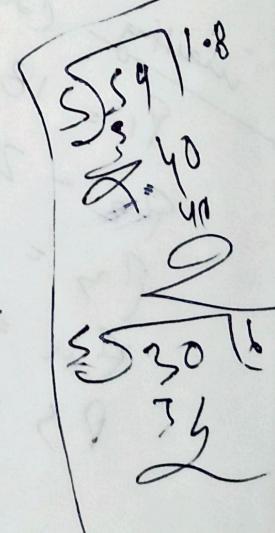
$$P_s = 30 - 4 = 26$$

$$P_{sf} = 26 - 18 = 11$$

~~37~~ Aw. Jitter  
~~1S + 39 + 43 + 47 + 26 = 134~~

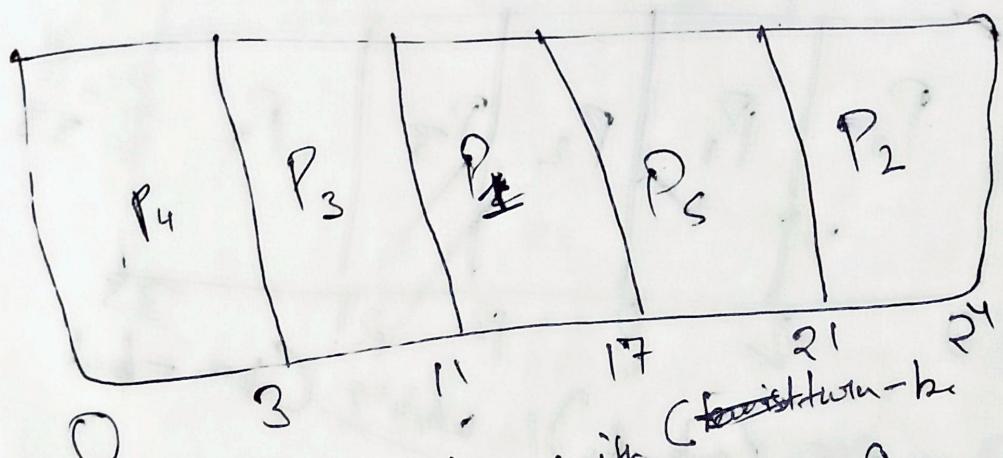
Avg. waiting

$$6 + 24 + 39 + 37 + 11 = 127.2$$



Question

IP	Avg. burst	Cunks from A - wait			
P <sub>1</sub>	2	6	17	15	9
P <sub>2</sub>	5	3	24	19	16
P <sub>3</sub>	1	8	11	10	2
P <sub>4</sub>	0	3	3	3	0
P <sub>5</sub>	4	4	21	27	23



turn Avar. (Cmp.-Abi) | wait (for instruction-bus)

$$P_1 = 17 - 2 = 15 \quad P_1 = 15 - 6 = 9$$

$$P_2 = 24 - 5 = 19 \quad P_2 = 19 - 3 = 16$$

$$P_3 = 11 - 1 = 10 \quad P_3 = 10 - 8 = 2$$

$$P_4 = 3 - 0 = 3 \quad P_4 = 3 - 3 = 0$$

$$P_5 = 21 - 9 = 12 \quad P_5 = 27 - 4 = 23$$

$$P_5 = \cancel{21} - 9 = 12$$

Avg. turn = 1.8  
Avg. waiting = 6

Clastie - 2

ID	Ar	B+	Carb	Sulf.	Iron	Others
P <sub>0</sub>	0	2	2	2	0	
P <sub>1</sub>	1	6	8	7	1	
P <sub>2</sub>	2	4	12	10	8	
P <sub>3</sub>	3	9	21	18	15	
P <sub>4</sub>	4	12	33	19	23	
			66	57	57	

$$\begin{array}{r}
 \underline{\underline{66}} \\
 \underline{\underline{57}} \\
 \hline
 \underline{\underline{10}}
 \end{array}$$
  

$$\begin{array}{r}
 \underline{\underline{357}} \\
 \underline{\underline{35}}
 \end{array}$$
  

$$\begin{array}{r}
 \underline{\underline{25}}
 \end{array}$$
  

$$\begin{array}{r}
 \underline{\underline{9.16}}
 \end{array}$$
  

$$\begin{array}{r}
 \underline{\underline{457}}
 \end{array}$$
  

$$\begin{array}{r}
 \underline{\underline{45}}
 \end{array}$$
  

$$\begin{array}{r}
 \underline{\underline{30}}
 \end{array}$$

P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
0	2	8	12	21	33

$$\begin{array}{r}
 \underline{\underline{21}} \\
 + \underline{\underline{12}} \\
 \hline
 \underline{\underline{33}}
 \end{array}$$

Average Clastie - best

Junc Ar. (carb - Ar)

P <sub>0</sub>	2 - 0 = 2
P <sub>1</sub>	8 - 1 = 7
P <sub>2</sub>	12 - 2 = 10
P <sub>3</sub>	21 - 3 = 18
P <sub>4</sub>	33 - 4 = 29

$$\begin{array}{l}
 P_0 \quad 2 - 2 = 0 \\
 P_1 \quad 7 - 6 = 1 \\
 P_2 \quad 10 - 2 = 8 \\
 P_3 \quad 18 - 3 = 15 \\
 P_4 \quad 29 - 4 = 25
 \end{array}$$

$$\text{Average Ar. } 66 = 13.2$$

$$\begin{array}{r}
 \underline{\underline{12}} \\
 + \underline{\underline{21}} \\
 \hline
 \underline{\underline{33}}
 \end{array}$$

Avg. neutrig.  $\div 7 = 1.5$

turn Ar. (Comp-Ar)

$$P_0 = 2 - 0 = 2$$

$$P_1 = 8 - 1 = 7$$

$$P_2 = 12 - 2 = 10$$

$$P_3 = 21 - 3 = 18$$

$$P_4 = 33 - 4 = 29$$

$$\text{Av.turn} = 66 \frac{1}{5}$$

$$\begin{array}{r} 5 \\ \sqrt[5]{66(13.2)} \\ \hline -5 \\ \hline 16 \\ -15 \\ \hline 10 \\ \hline \end{array}$$

waitin. Curr - burst

$$P_0 = 2 - 2 = 0$$

$$P_1 = 7 - 6 = 1$$

$$P_2 = 10 - 4 = 6$$

$$P_3 = 18 - 9 = 9$$

$$P_4 = 29 - 12 = 17$$

$$\text{Av.waiting} = 33 \frac{1}{5}$$

$$\begin{array}{r} 5 \sqrt[5]{33(6.6)} \\ \hline -30 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

(A - phi)  $\rightarrow$  3 moments  
and wait after

$$13 + 7 = 20$$

$$2 = 2 - 1 = 1$$

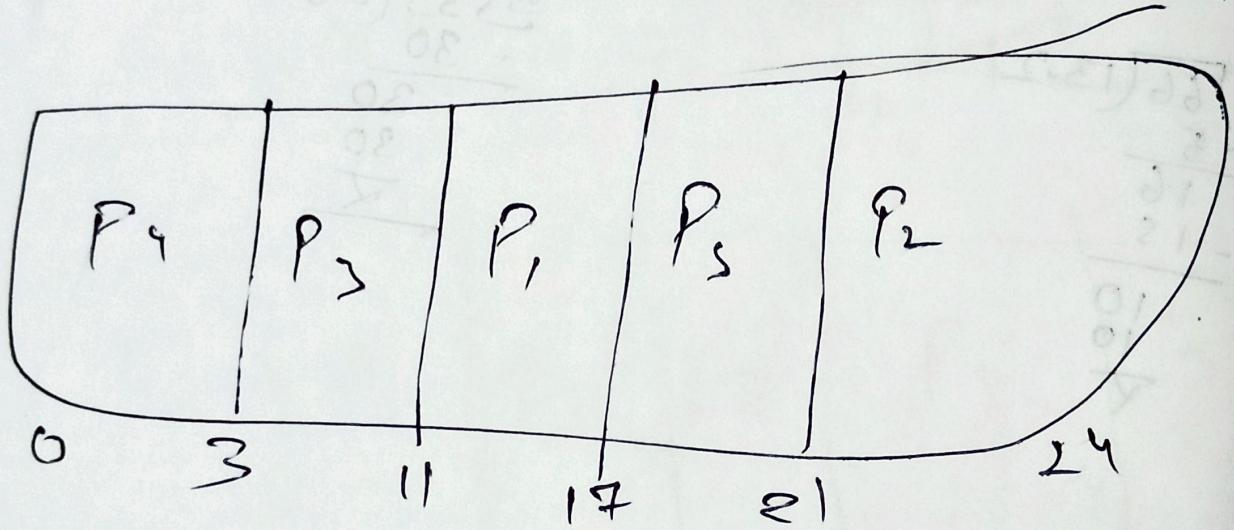
$$11 = 1 - 1 = 0$$

$$19 = 0 - 1 = -1$$

$$0 = 0 - 0 = 0$$

Question - 1

SP	A	B	Cm	Sum
P <sub>1</sub>	2	6	3	1
P <sub>2</sub>	5	3	11	6
P <sub>3</sub>	1	8	17	16
P <sub>4</sub>	0	3	21	21
P <sub>5</sub>	4	9	27	26



Sum area =  $\frac{1}{2} \times (Cm - A)$

$$P_1 = 3 - 2 = 1$$

$$P_2 = 11 - 5 = 6$$

$$P_3 = 17 - 1 = 16$$

$$P_4 = 21 - 0 = 21$$

$$P_5 = 24 - 4 = 20$$

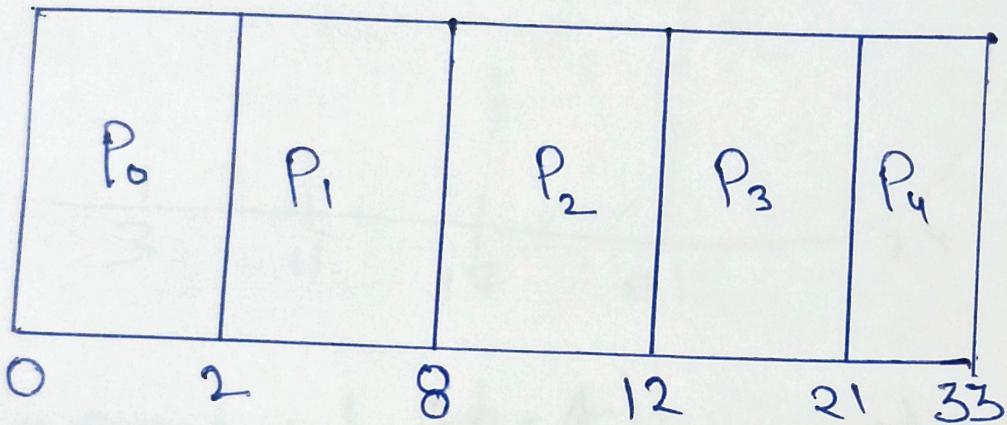
Sum area =  $\frac{1}{2} \times (Cm - A)$

$$P_1 = 1 - 6$$

Question -2

P.ID	A.T.	B.t.	C.T	T.A.T	W.T.
------	------	------	-----	-------	------

P <sub>0</sub>	0	2	2	2	0
P <sub>1</sub>	1	6	8	7	1
P <sub>2</sub>	2	4	12	10	6
P <sub>3</sub>	3	9	21	18	9
P <sub>4</sub>	4	12	33	29	17



Turn Around [Completion-Arrival Time]

$$P_0 = 2 - 0 = 2$$

$$P_1 = 8 - 1 = 7$$

$$P_2 = 12 - 2 = 10$$

$$P_3 = 21 - 3 = 18$$

$$P_4 = 33 - 4 = 29$$

## Waiting Time [Twin Around - Busted Time]

$$P_0 = 2 - 2 = 0$$

$$P_1 = 7 - 6 = 1$$

$$P_2 = 10 - 4 = 6$$

$$P_3 = 18 - 9 = 9$$

$$P_4 = 29 - 12 = 17$$

Average Twin Around Time :-

$$2 + 7 + 10 + 18 + 29 = 66$$

$$66 \div 5 = 13.2$$

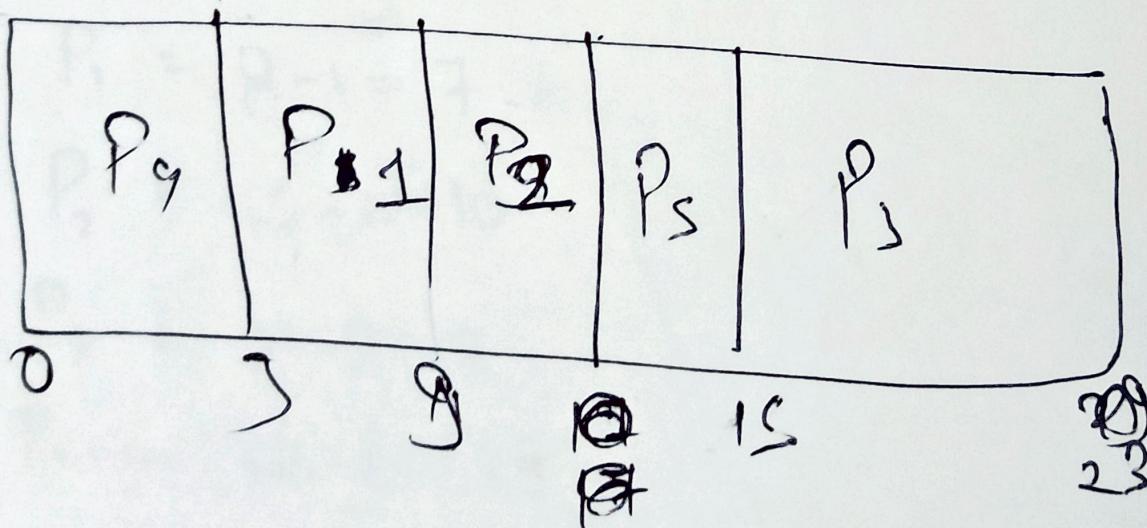
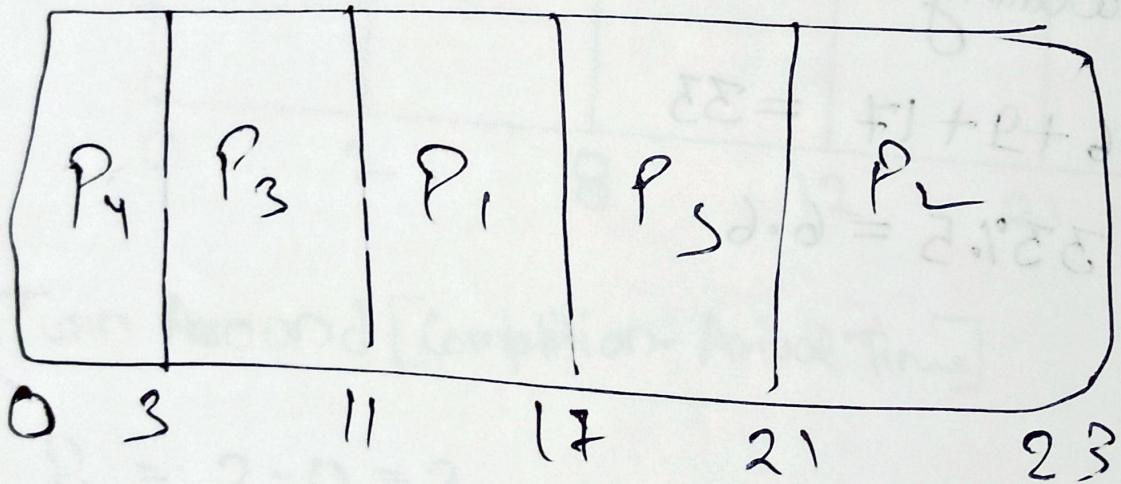
Average waiting time :-

$$0 + 1 + 6 + 9 + 17 = 33$$

$$33 \div 5 = 6.6$$

shortest Job First [SJF]      burst time short

P.J	A.T	B.T	C.T	T.A.T	wait
P <sub>1</sub>	2	6	03	7	
P <sub>2</sub>	5	2	09	4	
P <sub>3</sub>	1	8	011	10	
P <sub>4</sub>	0	3	03	3	
P <sub>5</sub>	-4	4	08	19	



Form A. (Con-A)

$$P_1 = 3 - 2 = 1$$

$$P_2 = 9 - 5 = 4$$

$$P_3 = 11 - 1 = 10$$

$$P_4 = 15 - 0 = 15$$

$$P_5 = 23 - 4 = 19$$

west (tue - br)

$$P_1 = 1 - 6 = 9$$

$$P = 12, 3, 4, 5, 8, 0, 1, 8, 1, 0$$

$$A = 1, 3, 6, 7, 9$$

$$B = 7, 3, 2, 10, 8$$

A - no

$$F = 1 - \beta$$

$$\alpha = 2, -$$

$$\gamma = \beta - \alpha$$

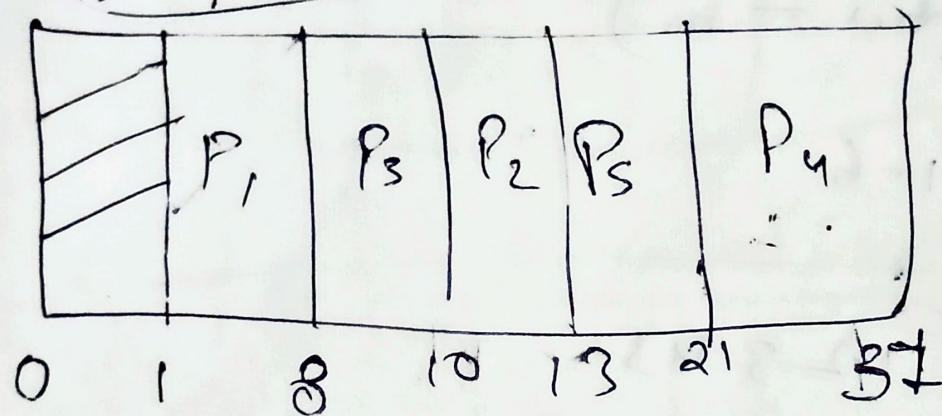
$$F_C = F - \Sigma$$

$$S = P - \Sigma$$

operating System

	A	B	C	D	E	F
P <sub>1</sub>	1	7	8	17	0	
P <sub>2</sub>	3	9	13	18	7	
P <sub>3</sub>	6	2	10	4	2	
P <sub>4</sub>	7	10	31	24	14	
P <sub>5</sub>	9	8	21	12	4	

(P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> P<sub>4</sub> P<sub>5</sub>)



Car - A

$$P_1 = 8 - 1 = 7$$

$$P_2 = 13 - 7 = 6$$

$$P_3 = 10 - 6 = 4$$

$$P_5 = 21 - 13 = 8$$

$$P_{25} = 21 - 9 = 12$$

well do - be

$$P_c = 7 - 7 = 0$$

$$P_L = 10 - 3 = 7$$

$$P_r = 4 - 2 = 2$$

$$P_M = 24 - 10 = 14$$

$$P_S = 12 = 4$$

A

$$f_m = 11.4$$

$$m_w = 5.4$$

2, 12, 6, 21, 33

	A	B	C	f_m	
P <sub>0</sub>	0	2	2		
P <sub>1</sub>	1	6	8		
P <sub>2</sub>	2	4	12		
P <sub>3</sub>	3	9	21		
P <sub>4</sub>	4	12	33		

$$\begin{array}{r} 12 \\ + 21 \\ \hline 33 \end{array}$$

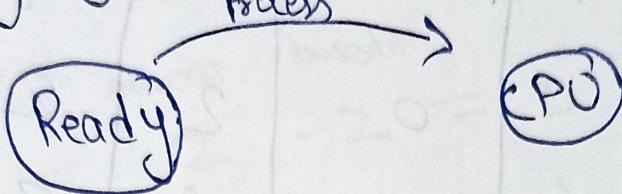
P<sub>0</sub>, P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>

P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
0	2	8	12	21	33

Operating System

10:30

## ① Scheduling Algorithm:



② Primitive - breaking while executing (stopping)  
 (Process after के साथ रुकता है)

③ Non-primitive - execute fully to terminate  
 (Process पूरा execute होता है & तभी terminate होता है)

Primitive part

## Time for Numerical :-

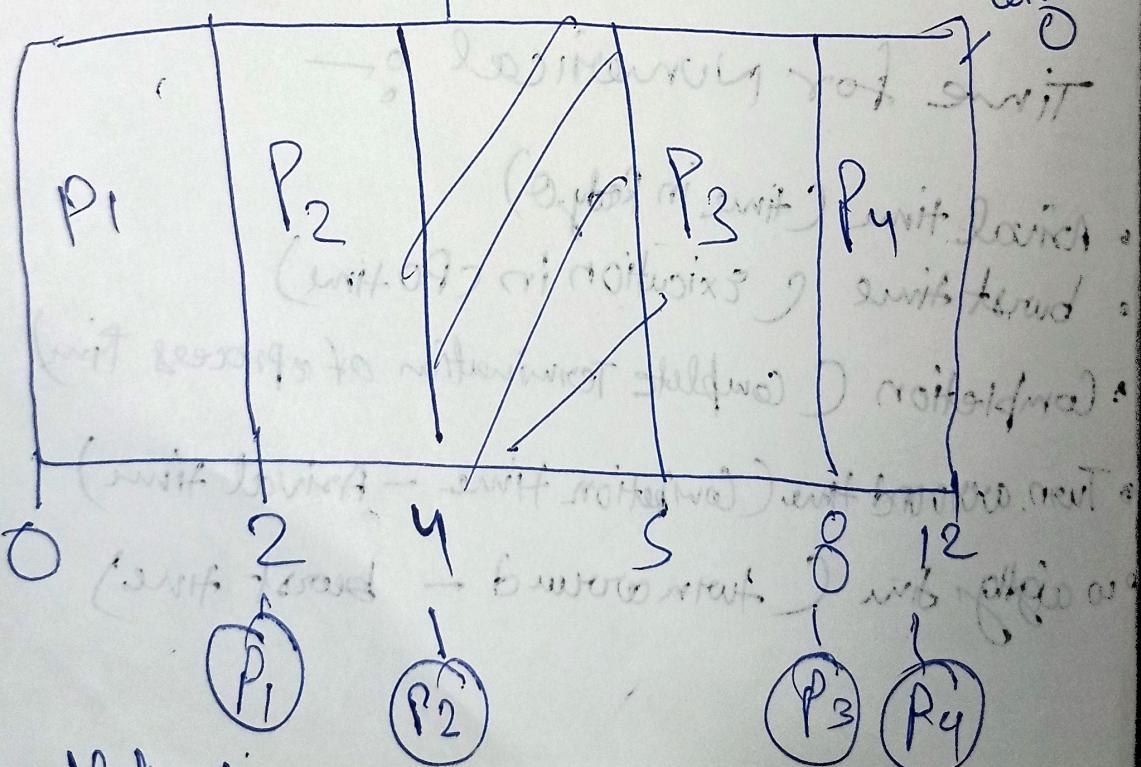
- Arrival time (time in Ready Q)
- burst time (Execution in CPU time)
- Completion (Complete termination of a process time)
- Turn around time (Completion time - Arrival time)
- waiting time (turnaround - burst time)

Q) Gantt chart of Non-priodifer

Process No	Arrival time	Burst time	Completion time	Waiting time
P <sub>1</sub>	0	2	2	0
P <sub>2</sub>	1	2	3	1
P <sub>3</sub>	5	3	6	1
P <sub>4</sub>	6	4	10	4

Gantt chart

Starts with 0



Completion time

turn around time

99887-67993

$$\begin{aligned}
 P_1 &= 2 - 0 = 2 \\
 P_2 &= 4 - 1 = 3 \\
 P_3 &= 8 - 5 = 3 \\
 P_4 &= 12 - 6 = 6
 \end{aligned}$$

waiting  
burst time

turnar.

burst.

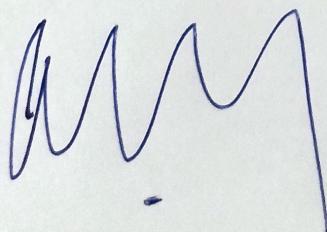
$$\begin{aligned}
 P_1 &= 2 - 2 = 0 \\
 P_2 &= 3 - 2 = 1 \\
 P_3 &= 3 - 3 = 0 \\
 P_4 &= 6 - 4 = 2
 \end{aligned}$$

Average turn around time

$$2 + 3 + 3 + 6 \times 4 = 3.5$$

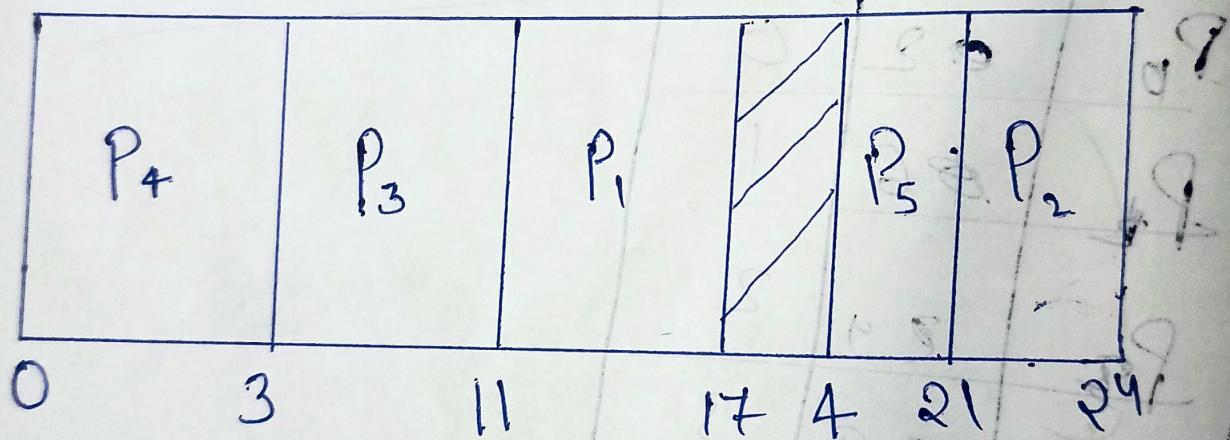
Ave waiting tm

$$0 + 1 + 0 + 2 = 0.4$$

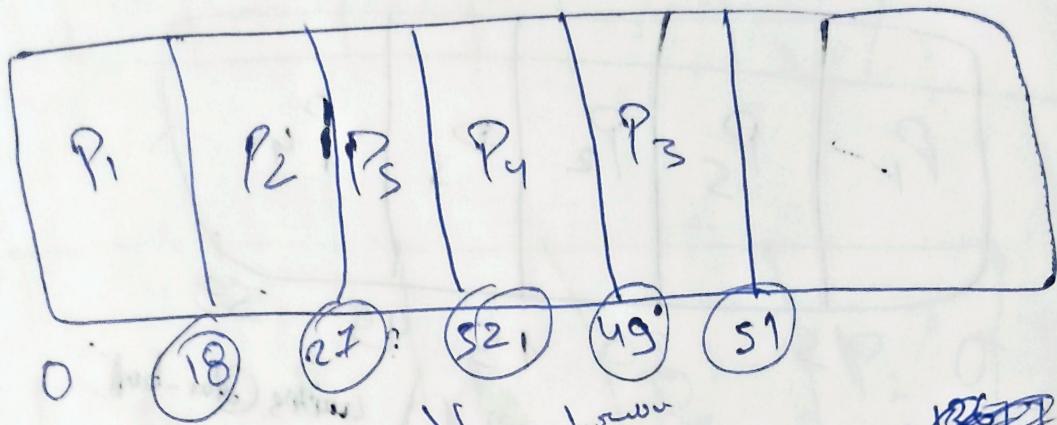


Question - 1

P. Id	Arrival time	Burst time	turn. acc.t.	W. time	Avg. Av.
P <sub>1</sub>	2	6			
P <sub>2</sub>	5	3			
P <sub>3</sub>	1	8			
P <sub>4</sub>	0	3			
P <sub>5</sub>	4	4			



	arrival	burst time	Completion time	Turnaround time	Waiting time	Avg
P <sub>1</sub>	0	18	18	18 - 0 = 0	0	0
P <sub>2</sub>	4	9	27	27 - 4 = 23	23	5.75
P <sub>3</sub>	11	2	29	29 - 11 = 18	18	5.67
P <sub>4</sub>	10	17	46	46 - 10 = 36	36	9.00
P <sub>5</sub>	8	5	51	51 - 8 = 43	43	8.60
						8.40
						8.40



turn around (Gantt - Actual)

$$P_1 = 18 - 0 = 18$$

$$P_2 = 27 - 4 = 23$$

$$P_3 = 51 - 11 = 40$$

$$P_4 = 49 - 10 = 39$$

$$P_5 = 32 - 8 = 24$$

Waiting (Gantt - burst time)

$$P_1 = 18 - 18 = 0$$

$$P_2 = 27 - 9 = 18$$

$$P_3 = 50 - 2 = 48$$

$$P_4 = 49 - 17 = 32$$

$$P_5 = 32 - 5 = 27$$

turn around

$$18 + 23 + 40 + 39 + 24 = 144$$

avg. wait

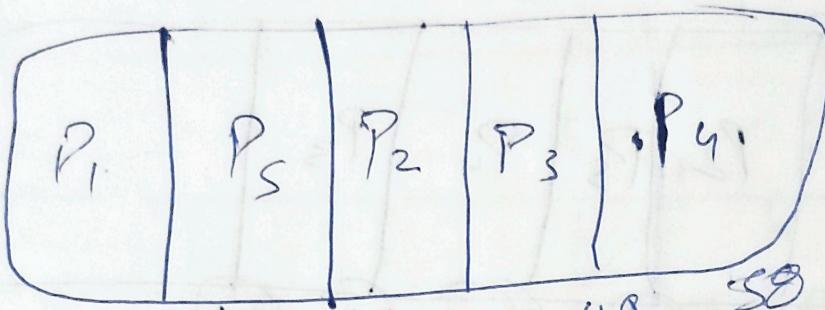
$$0 + 14 + 38 + 22 + 19 = 103$$

~~27.8~~

~~18.6~~

fully add first  
then divide 5

	20	Aw	burst cap from weight				
	P <sub>1</sub>	0	15	15	15	0	15
	P <sub>2</sub>	6	15	45	39	24	39
	P <sub>3</sub>	6	4	49	43	39	43
	P <sub>4</sub>	11	9	58	47	37	47
	P <sub>5</sub>	4	15	30	26	11	26



Form arr. (Complex - Actual)      using (true-burst)

$$P_1 = 15 - 0 = 15$$

$$P_2 = 45 - 6 = 39$$

$$P_3 = 49 - 6 = 43$$

$$P_4 = 58 - 11 = 47$$

$$P_5 = 30 - 4 = 26$$

$$P_1 = 15 - 15 = 0$$

$$P_2 = 39 - 15 = 24$$

$$P_3 = 43 - 4 = 39$$

$$P_4 = 47 - 9 = 37$$

$$P_5 = 26 - 15 = 11$$

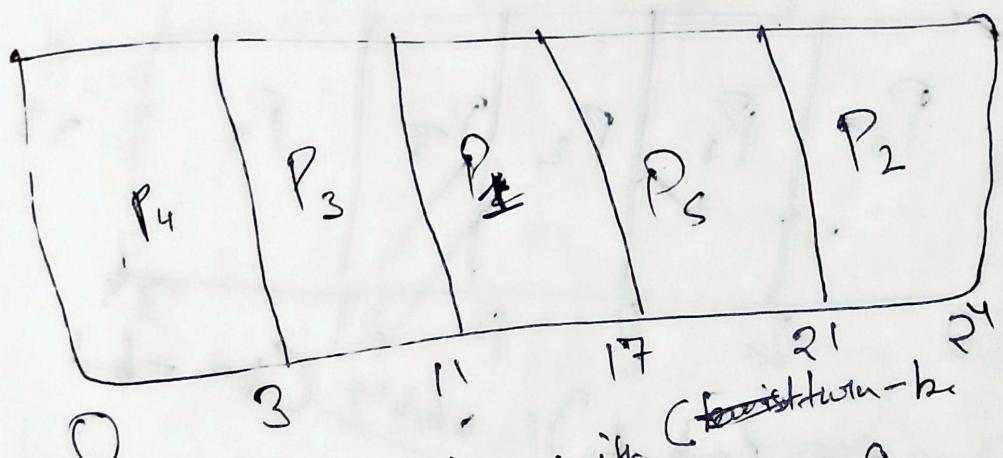
$$\frac{0+15+6+4+9}{5} = \frac{39}{5} = 7.8$$

$$\frac{0+24+39+37+11}{5} = \frac{101}{5} = 20.2$$

$$\begin{array}{r} 559 \\ 53 \\ \hline 108 \\ 40 \\ \hline 48 \\ 2 \\ \hline 530 \\ 35 \\ \hline 2 \end{array}$$

Question

IP	Avg. burst	Cunks from A - wait			
P <sub>1</sub>	2	6	17	15	9
P <sub>2</sub>	5	3	24	19	16
P <sub>3</sub>	1	8	11	10	2
P <sub>4</sub>	0	3	3	3	0
P <sub>5</sub>	4	4	21	27	23



turn Avar. (Cmp.-Abi) | wait (for instruction-bus)

$$P_1 = 17 - 2 = 15 \quad P_1 = 15 - 6 = 9$$

$$P_2 = 24 - 5 = 19 \quad P_2 = 19 - 3 = 16$$

$$P_3 = 11 - 1 = 10 \quad P_3 = 10 - 8 = 2$$

$$P_4 = 3 - 0 = 3 \quad P_4 = 3 - 3 = 0$$

$$P_5 = 21 - 9 = 12 \quad P_5 = 27 - 4 = 23$$

$$P_5 = \cancel{21} - 9 = 12$$

Avg. turn = 1.8  
Avg. waiting = 6

## Clastie - 2

IP	Atr	B+	Card.	Surf. int.	int	
P <sub>0</sub>	0	2	2	2	0	
P <sub>1</sub>	1	6	8	7	1	
P <sub>2</sub>	2	9	12	10	8	
P <sub>3</sub>	3	9	21	18	15	
P <sub>4</sub>	4	12	33	29	23	
				66	66	

P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>
0	2	8	12	23

Sum A.R. (surf - int)      avales      Caron - best

$$\begin{array}{l}
 P_0 \quad 2 - 0 = 2 \\
 P_1 \quad 8 - 1 = 7 \\
 P_2 \quad 12 - 2 = 10 \\
 P_3 \quad 21 - 3 = 18 \\
 P_4 \quad 33 - 4 = 29
 \end{array}
 \quad
 \begin{array}{l}
 P_0 \quad 2 \cdot 2 = 6 \\
 P_1 \quad 7 - 6 = 1 \\
 P_2 \quad 10 - 2 = 8 \\
 P_3 \quad 18 - 3 = 15 \\
 P_4 \quad 29 - 4 = 25
 \end{array}$$

Average A.R.  $66 = 13.2$

Avg. volegry  $\therefore 7.5$

$$\begin{array}{r}
 21 \\
 + 21 \\
 \hline
 33
 \end{array}$$

turn Ar. (Comp-Ar)

$$P_0 = 2 - 0 = 2$$

$$P_1 = 8 - 1 = 7$$

$$P_2 = 12 - 2 = 10$$

$$P_3 = 21 - 3 = 18$$

$$P_4 = 33 - 4 = 29$$

$$\text{Av.turn} = 66 \frac{1}{5}$$

$$\begin{array}{r} 5 \\ \sqrt[5]{66(13.2)} \\ \hline -5 \\ \hline 16 \\ -15 \\ \hline 10 \\ \hline \end{array}$$

waitin. Curr - burst

$$P_0 = 2 - 2 = 0$$

$$P_1 = 7 - 6 = 1$$

$$P_2 = 10 - 4 = 6$$

$$P_3 = 18 - 9 = 9$$

$$P_4 = 29 - 12 = 17$$

$$\text{Av.waiting} = 33 \frac{1}{5}$$

$$\begin{array}{r} 5 \sqrt[5]{33(6.6)} \\ \hline -30 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

(A - phi)  $\rightarrow$  3 moments  
and wait after

$$1 - 5 - 8 = 2$$

$$2 - 2 - 11 = 9$$

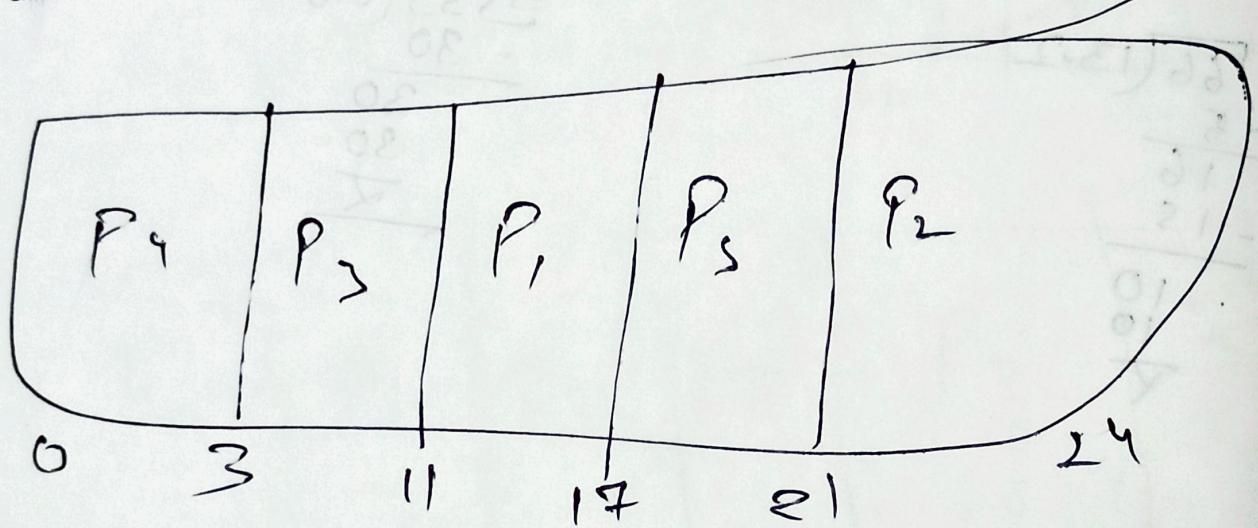
$$11 - 1 - 11 = 2$$

$$19 - 0 - 19 = 0$$

$$06 = 4 - 16 = 2$$

Auction - 1

SP	A	B	C	D	Sum
P <sub>1</sub>	6	3	1		
P <sub>2</sub>	5	11	6		
P <sub>3</sub>	1	17	16		
P <sub>4</sub>	0	21	21		
P <sub>5</sub>	4	27	26		



Sum needed :- (Cup - A) )

$$P_1 = 3 - 2 = 1$$

$$P_2 = 11 - 5 = 6$$

$$P_3 = 17 - 1 = 16$$

$$P_4 = 21 - 0 = 21$$

$$P_5 = 24 - 4 = 20$$

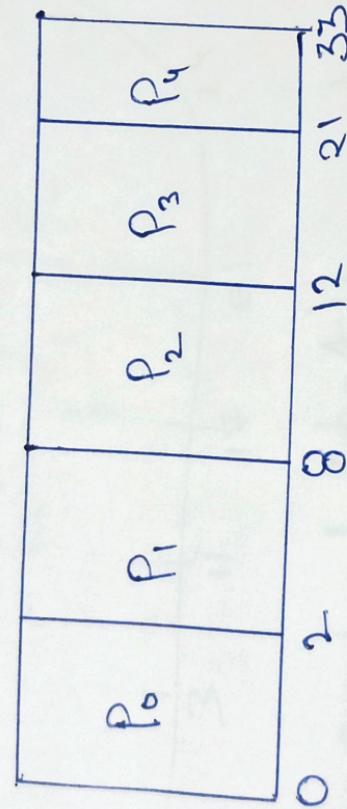
needed (sum - sum)

$$P_1 = 1 - 6$$

QUESTION -2

P.I.D A.T. B.t. C.T T.A.T W.T.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
P <sub>0</sub>	0	2	2	2	0	
P <sub>1</sub>	1	6	8	7	1	
P <sub>2</sub>	2	4	12	10	6	
P <sub>3</sub>	3	9	21	18	9	
P <sub>4</sub>	4	12	33	29	17	



Turn Around [Completion-Arrival Time]

$$P_0 = 2 - 0 = 2$$

$$P_1 = 8 - 1 = 7$$

$$P_2 = 12 - 2 = 10$$

$$P_3 = 21 - 3 = 18$$

$$P_4 = 33 - 4 = 29$$

## Waiting Time [Twin Around - Busted Time]

$$P_0 = 2 - 2 = 0$$

$$P_1 = 7 - 6 = 1$$

$$P_2 = 10 - 4 = 6$$

$$P_3 = 18 - 9 = 9$$

$$P_4 = 29 - 12 = 17$$

Average Twin Around Time :-

$$2 + 7 + 10 + 18 + 29 = 66$$

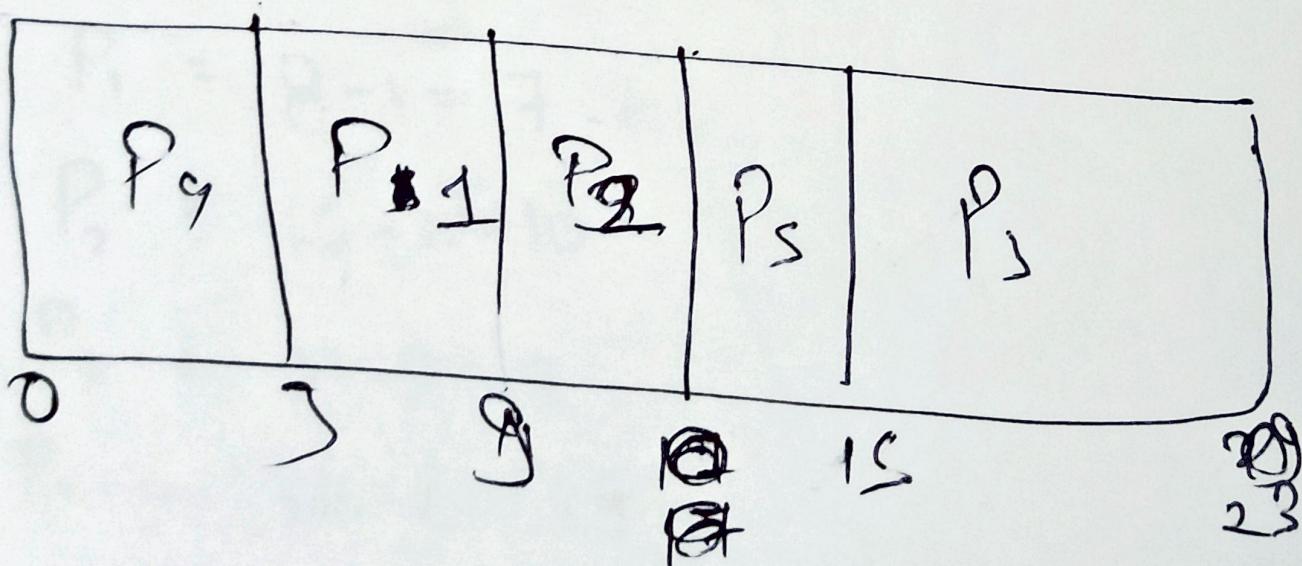
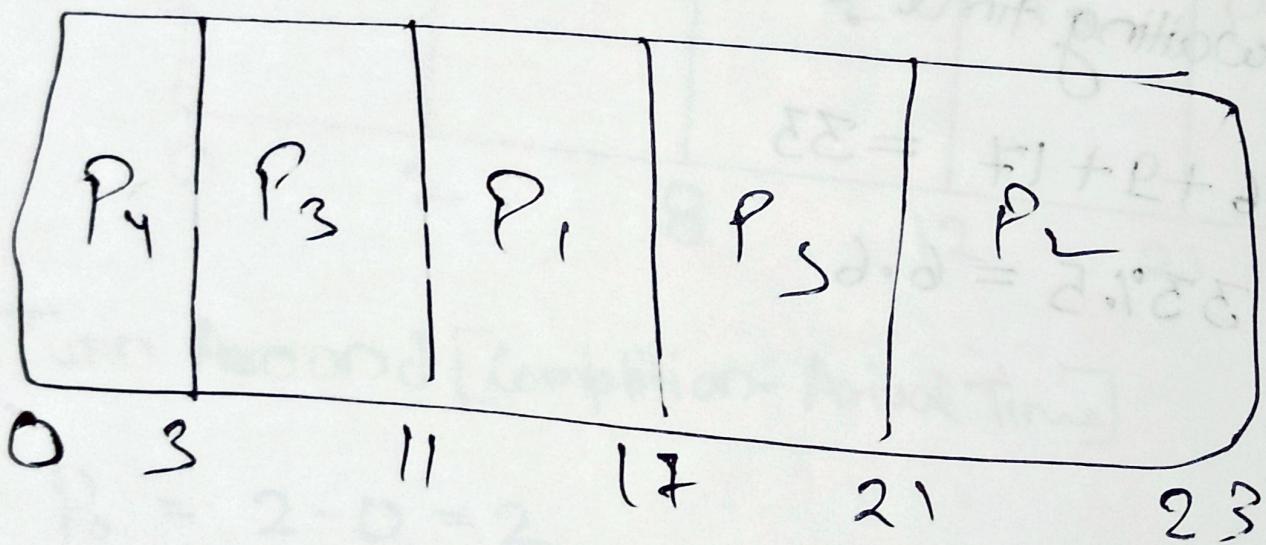
$$66 \div 5 = 13.2$$

Average waiting time :-

$$0 + 1 + 6 + 9 + 17 = 33$$

$$33 \div 5 = 6.6$$

	P.T	A.T	B.T	C.T	T.A.T	wait
P <sub>1</sub>	2	6	13	1		
P <sub>2</sub>	5	2	9	4		
P <sub>3</sub>	1	8	11	10		
P <sub>4</sub>	0	3	15	12		
P <sub>5</sub>	-4	4	18	19		



Form A. (Con-A)

$$P_1 = 3 - 2 = 1$$

$$P_2 = 9 - 5 = 4$$

$$P_3 = 11 - 1 = 10$$

$$P_4 = 15 - 0 = 15$$

$$P_5 = 23 - 4 = 19$$

water (true - br)

$$P_1 = 1 - 6 = 9$$

$$P = 1, 2, 3, 4, 5$$

$$A = 1, 3, 6, 7, 9$$

$$B = 7, 3, 2, 10, 8$$

$$F = 1 - 8 =$$

$$\theta_1 = 2,$$

$$\theta_2 = 3, \theta_3 =$$

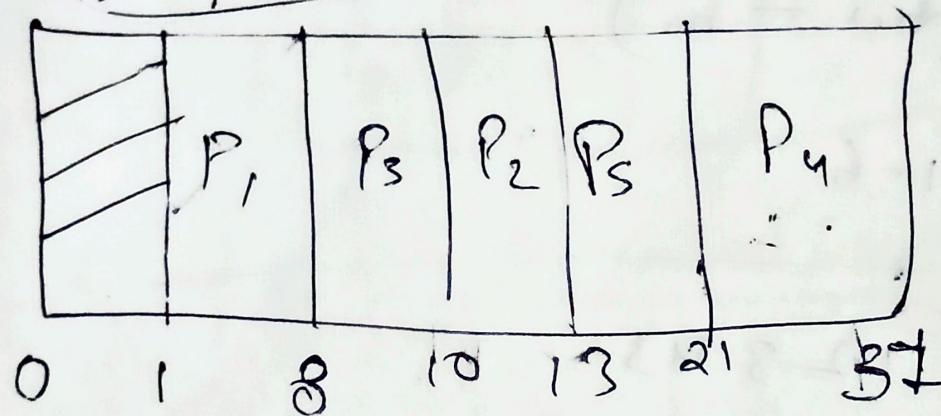
$$F_S = F - 12 =$$

$$S = P - 11 =$$

operating System

	A	B	C	D	E	F
P <sub>1</sub>	1	7	8	17	0	
P <sub>2</sub>	3	9	13	18	7	
P <sub>3</sub>	6	2	10	4	2	
P <sub>4</sub>	7	10	31	24	14	
P <sub>5</sub>	9	8	21	12	4	

(P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> P<sub>4</sub> P<sub>5</sub>)



Com - A

$$P_1 = 8 - 1 = 7$$

$$P_2 = 13 - 7 = 6$$

$$P_3 = 10 - 6 = 4$$

$$P_5 = 21 - 13 = 8$$

$$P_{25} = 21 - 9 = 12$$

well do - be

$$P_c = 7 - 7 = 0$$

$$P_L = 10 - 3 = 7$$

$$P_r = 4 - 2 = 2$$

$$P_M = 24 - 10 = 14$$

$$P_S = 12 = 4$$

A

$$f_m = 11.4$$

$$m_w = 5.4$$

2, 12, 6, 21, 33

	A	B	C	f_m	
P <sub>0</sub>	0	2	2		
P <sub>1</sub>	1	6	8		
P <sub>2</sub>	2	4	12		
P <sub>3</sub>	3	9	21		
P <sub>4</sub>	4	12	33		

$$\begin{array}{r} 12 \\ + 21 \\ \hline 33 \end{array}$$

P<sub>0</sub>, P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>

P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
0	2	8	12	21	33