Assignment no : 03
Write Up..

Q1. Draw Process state transition diagram & explain in brief.

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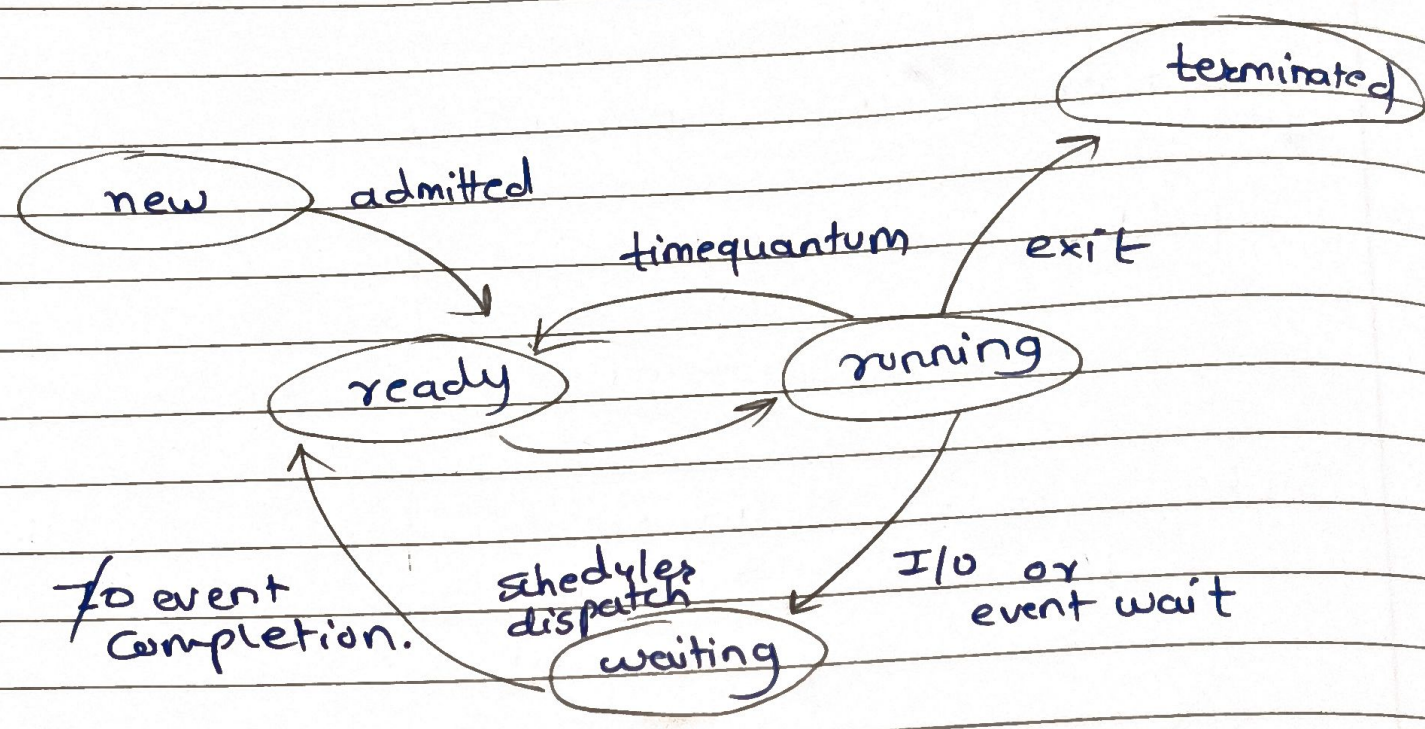

– fig. Process state transition →

i). New : The process is created, but it hasn't started execution yet

ii). Ready : The process is loaded into main memory and is waiting for CPU time.

iii). Running : The process is acticely executing instructions on the CPU.

iv). Blocked | Waiting : The process is waiting for an event.

The process remains blocked until the event occurs.

vi). Terminated :

The process has finished execution or was forcefully stopped by the OS or user.

The OS removes the process and deallocates its resources.

Q2. Compare CPU schduling algorithms :

Scheduling algo	Type	Scheduling criteria	Advantages	Disadvantages
i). FCFS	Non-preemptive	- Simple to implement. - Processes are executed in arrival order.	- Fair & easy to implement. - Suitable for batch system.	- convoy effect. - High waiting time for later process.
ii). SJF	~~Preemptive~~ and non-preemptive	- Minimizes ~~average~~ waiting time once the process ~~start execution~~ it cannot be interupted. o selects the process with shortest CPU burst time from the ready queue.	- Simple to implement - minimizes waiting time. - best for batch system.	- suffers from starvation.

	Scheduling Algo	Type	Scheduling Criteria	Advantages	Disadvantages
iii)	SRTN	Preemptive	- If a new process with shortest burst time arrives, the current process is preemptive	- More responsive - better for time-sensitive environment.	- Starvation - increases context switching.
iv).	RR	Preemptive	Time quantum determines the fairness.	- fair for all processes. - Good for time-sharing system.	- High context switching overhead. - longer turn around time if quantum is too short.

Q4. Explain the concept of Context Switching & Draw PCB.

→ Context Switching:

Context switching is when the CPU pauses one process and switches to another, saving previous process's progress so it can resume later.

It allows the CPU to handle multiple processes at the same time.

It ensures that when a process is temporarily stopped, it can later continue from the exact point where it left off.

antages | Disadvantages

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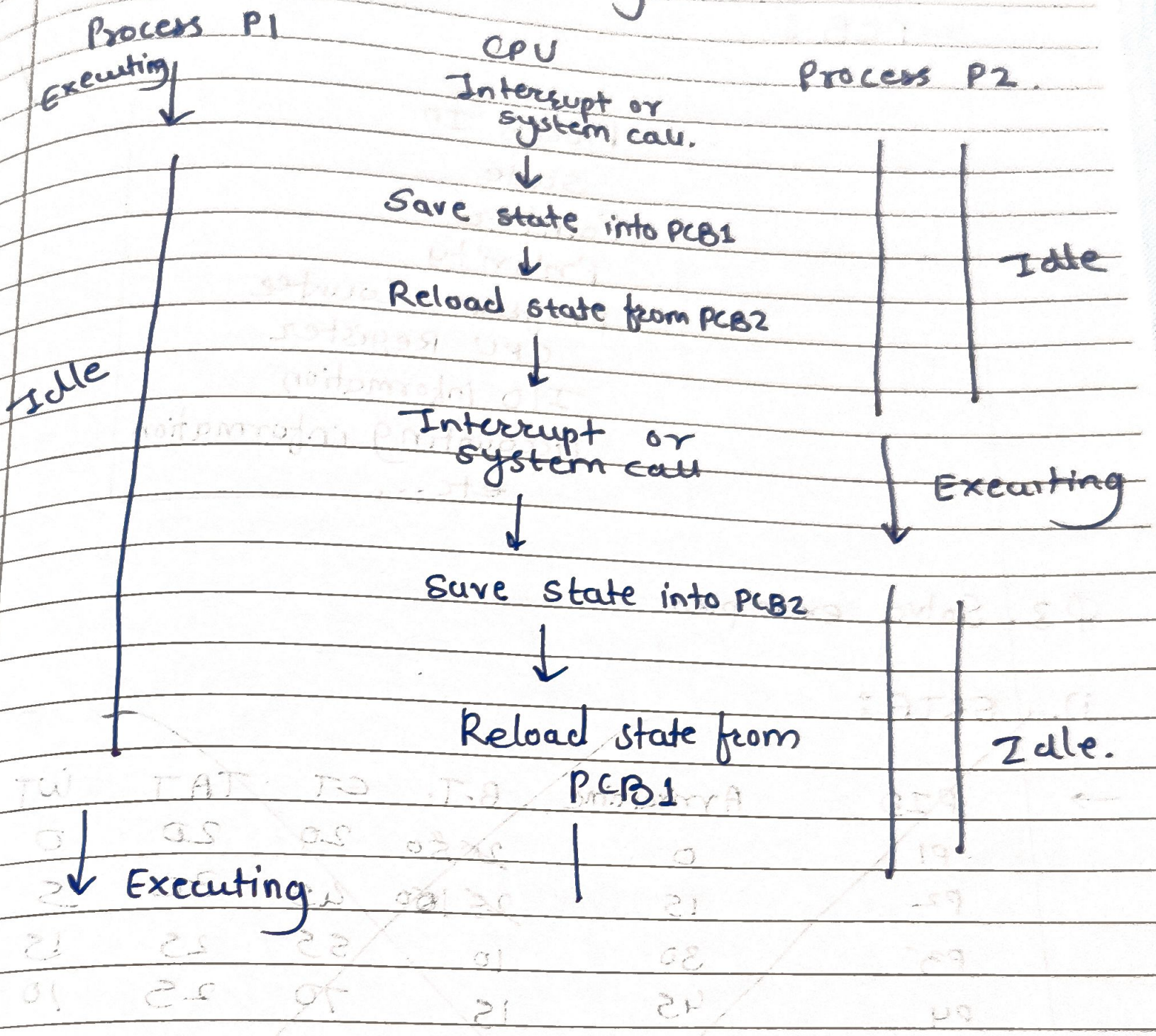
- steps of context switching:



- PCB :

Process ID
State
Pointer
Priority
Program Counter
CPU Register
I/O information
Accounting information
etc...

Q3. Solve examples.

i). SRTF :

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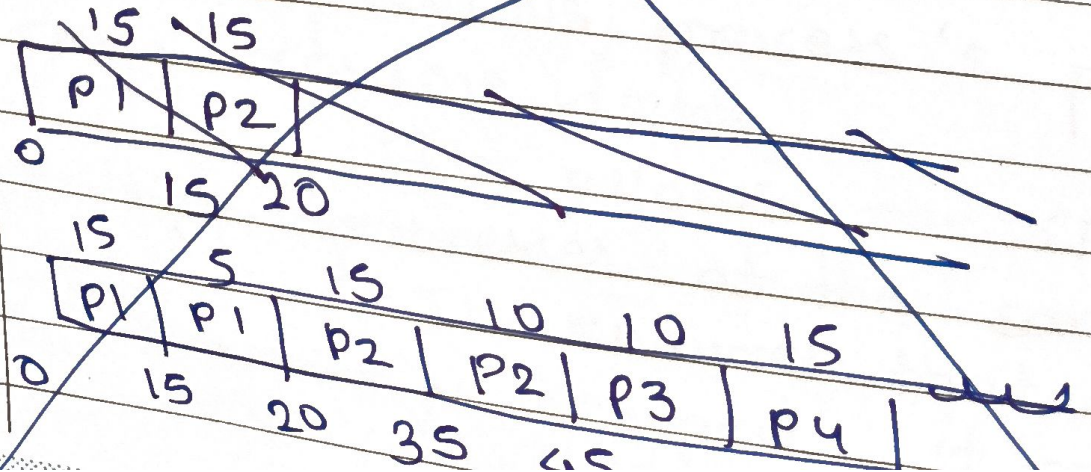
PID	Arrival time	B.T.	CT	TAT	WT
P1	0	~~20~~ 50	20	20	0
P2	15	~~25~~ ~~10~~ 0	45	30	5
P3	30	10	55	25	15
P4	45	15	70	25	10

- Gantt chart :



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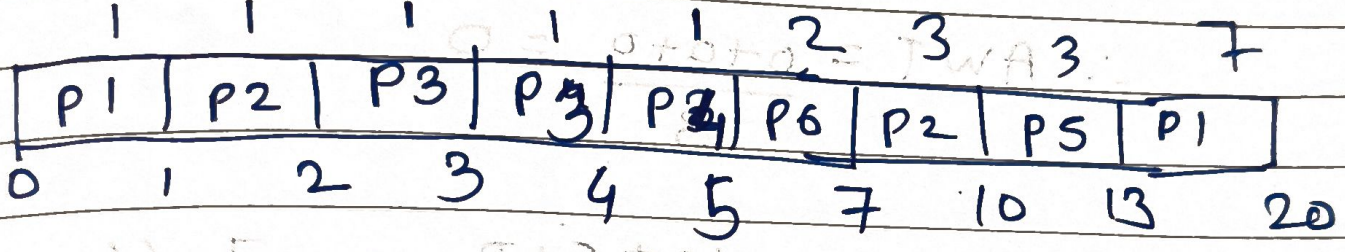
1). SRTF :

PID	AT	BT	CT	TAT	WT
P1	0	~~8~~ 7	20	20	12
P2	1	~~4~~ 3	10	9	5
P3	2	~~2~~ 1	4	2	0
P4	3	1	5	2	1
P5	4	3	13	9	6
P6	5	2	7	2	0
P					

- Gantt chart.



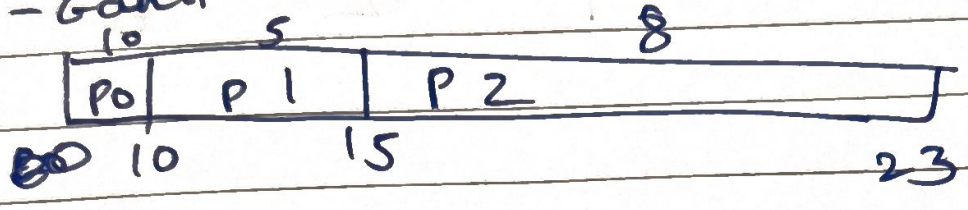
$$AWT = \frac{12+5+0+1+6+0}{6} = \frac{24}{6} = 4$$

$$TAT = \frac{20+9+2+2+9+2}{6} = 7.33$$

ii). FCFS

PID	AT	BT	CT	TAT	WT
P0	0	10	10	10	0
P1	10	5	15	5	0
P2	15	8	23	8	0

- Gantt chart :



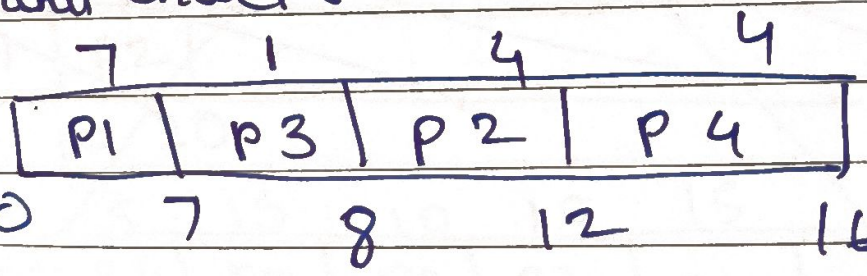
$$\therefore AWT = \frac{0+0+0}{3} = 0$$

$$\therefore ATAT = \frac{10+5+8}{3} = 7.66$$

iii). SJF :

PID	AT	BT	CT	TAT	WT
P1	0	7	7	7	0
P2	2	4	12	10	6
P3	4	1	8	4	3
P4	5	4	16	11	7

- Gantt chart :



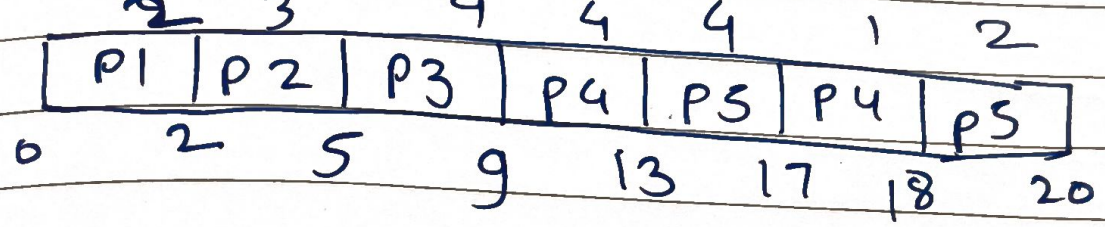
$$AWT = \frac{0+6+3+7}{4} = 4 \qquad ATAT = 8$$

(iv). Round robin :

P1P	AT	BT	CT	TAT	WT
P1	0	2	2	2	0
P2	2	3	5	3	2
P3	4	4	9	5	5
P4	6	5	18	12	13
P5	8	6	20	12	14

TQ = 4

- Gantt chart.



$$AWT = \frac{0+2+5+13+14}{5} = 6.8$$

$$ATAT = \frac{2+3+5+12+12}{5} = 2.8$$