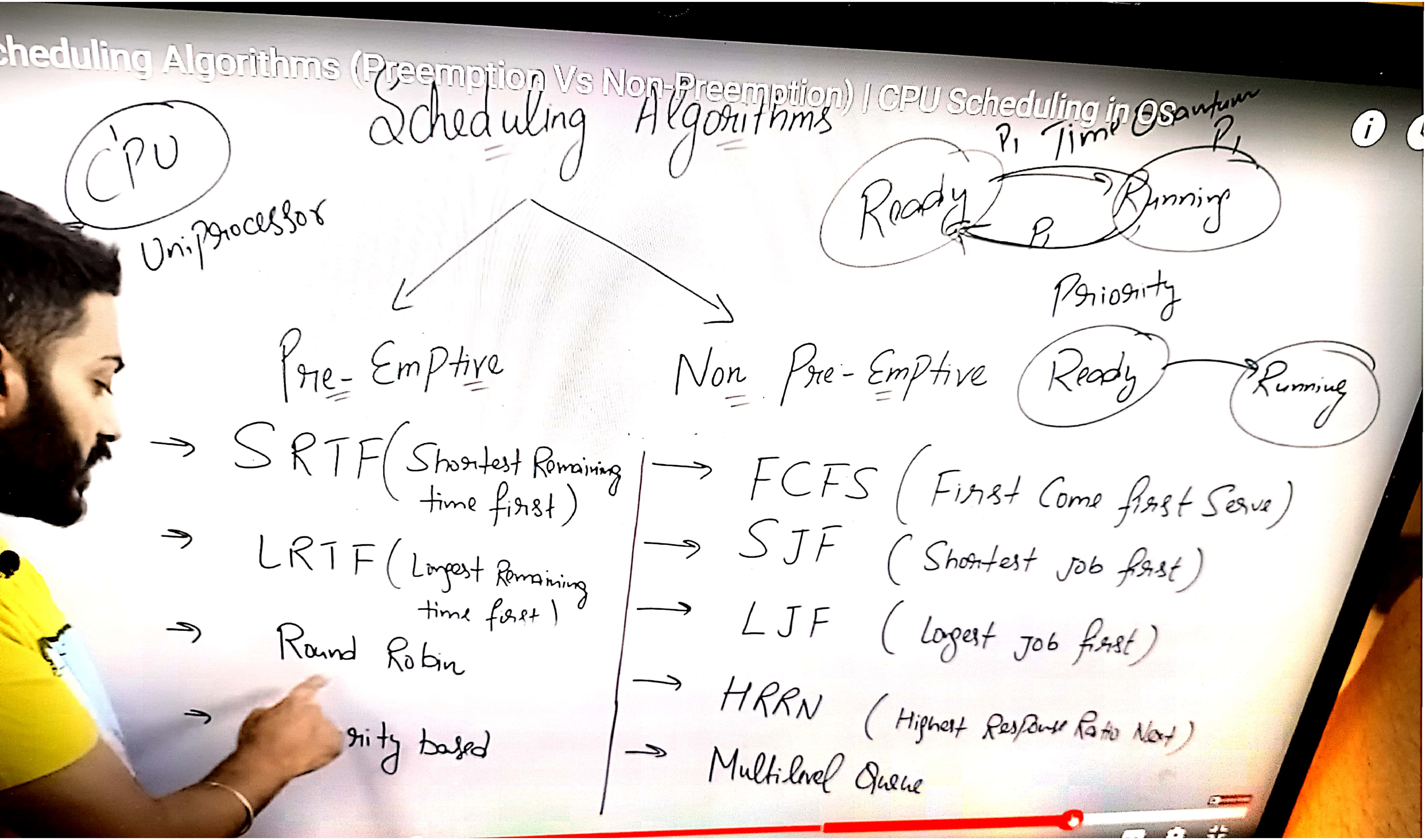
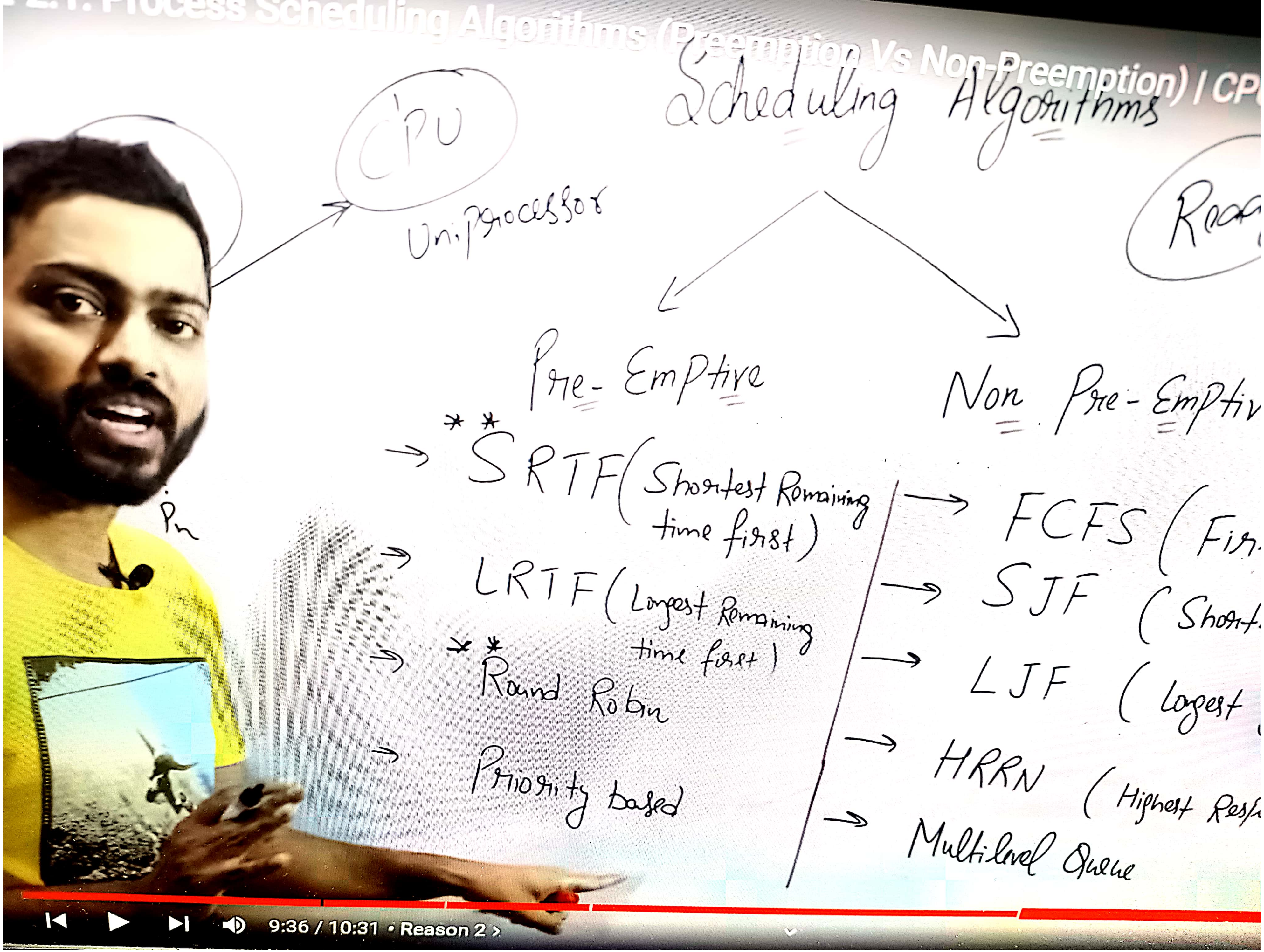

cheduling Algorithms (Preemption Vs Non-Preemption) | CPU Scheduling in OS
Scheduling Algorithms
CPU
Uniprocessor
Time Quantum
P1
P1
Ready
Running
P1
Priority
Ready
Running
Pre-Emptive
Non Pre-Emptive
→ SRTF (Shortest Remaining time first)
→ LRTF (Longest Remaining time first)
→ Round Robin
→ ...rity based
→ FCFS (First Come first Serve)
→ SJF (Shortest job first)
→ LJF (Longest job first)
→ HRRN (Highest Response Ratio Next)
→ Multilevel Queue


Process Scheduling Algorithms (Preemption Vs Non-Preemption) | CP
Scheduling Algorithms
CPU
Uniprocessor
Pre-Emptive
Non Pre-Emptiv
** SRTF (Shortest Remaining time first)
LRTF (Longest Remaining time first)
** Round Robin
Priority based
FCFS (Fir
SJF (Short
LJF (Longest
HRRN (Highest Resp
Multilevel Queue
9:36 / 10:31 • Reason 2 ›

L-2.1: Process Scheduling Algorithms (Preemption Vs Non-
Scheduling Alg
Ready Queue
CPU
Uniprocessor
P1
P2
P3
Pn
Non
Remaining
first)
Remaining
first)
FCF
SJF
LJF

(633) L-2.2: What is Arrival, Burst New Tab

youtube.com/watch?v=n7Owxwfr6Ko&list=PLxCzCOWd7aiGz9donHRrE9I3Mwn6XdP8p&index=15

YouTube IN

gate smashers os

"CPU Scheduling"

→ Arrival time: The time at which process enter the Ready Queue or State.

duration

→ Burst time: Time required by a Process to get execute on CPU

CPU I/O

→ Completion time: The time at which process Complete its execution.

12 − 11 = 1 hour = 60 minutes

CPU bound

→ Turn Around time: {Completion time − Arrival time}

I/O bound

60 minutes − 15 min = 45 minutes

→ Waiting time: {Turn Around time − Burst time}

→ Response time: [(The time at which a Process get CPU first time) − Arrival time]

SUBSCRIBE

8:30 / 8:58 • Response time

FCFS

Process No	Arrival Time	Burst Time (Execution)	Completion Time	TAT	WT	RT
P_1	0	2	2	2	0	0
P_2	1	2	4	3	1	1
P_3	5	3	8	3	0	0
P_4	6	4	12	6	2	2

Criteria: "Arrival Time"

Mode: "Non-Preemptive"

CT − AT = TAT

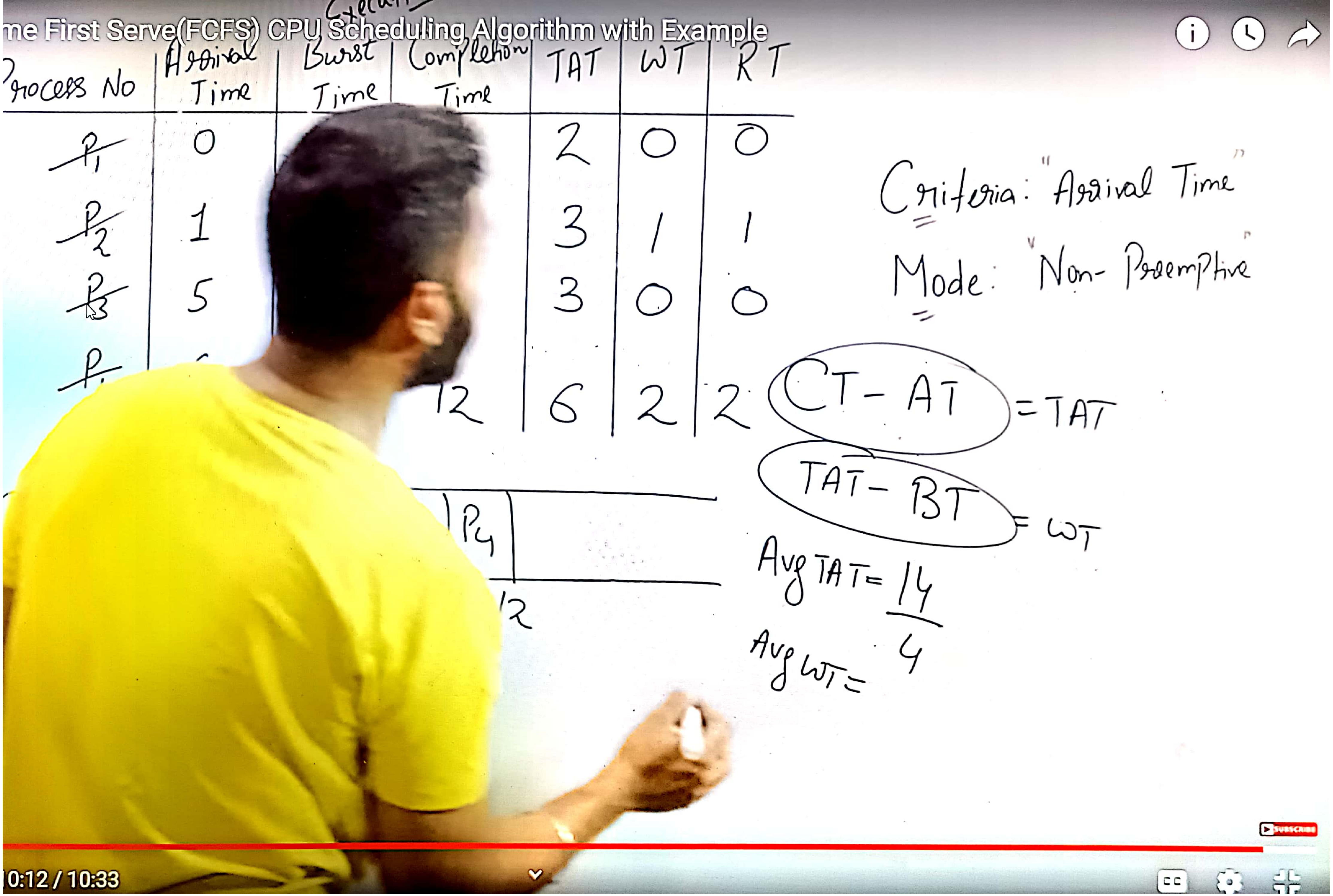
TAT − BT = WT

Gantt Chart

P_1	P_2		P_3	P_4
0–2	2–4	4–5	5–8	8–12

0 2 4 5 8 12

Time →


me First Serve(FCFS) CPU Scheduling Algorithm with Example
Process No
Arrival Time
Burst Time
Completion Time
TAT
WT
RT
P1 0 2 0 0
P2 1 3 1 1
P3 5 3 0 0
P4
12 6 2 2
Criteria: "Arrival Time"
Mode: "Non-Preemptive"
CT - AT = TAT
TAT - BT = WT
P4
12
Avg TAT = 14/4
Avg WT =
0:12 / 10:33

SVU -2020 TY B.Tech IT Syllabus July 2 | (633) L-2.4: Shortest Job First(SJF | New Tab

youtube.com/watch?v=VCIVXPoiLpU&list=PLxCzCOWd7aiGz9donHRrE9I3Mwn6XdP8p&index=17

YouTube IN

gate smashers os

SJF

Process No	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
~~P_1~~	1	3	6	5	2	2
P_2	2	4	10	8	4	4
~~P_3~~	1	2	3	2	0	0
P_4	4	4	14	10	6	6

Criteria: "Burst Time"

Mode: "Non-Preemptive"

TAT = CT − AT

WT = TAT − BT

Gantt Chart

	P_3	P_1	P_2	P_4

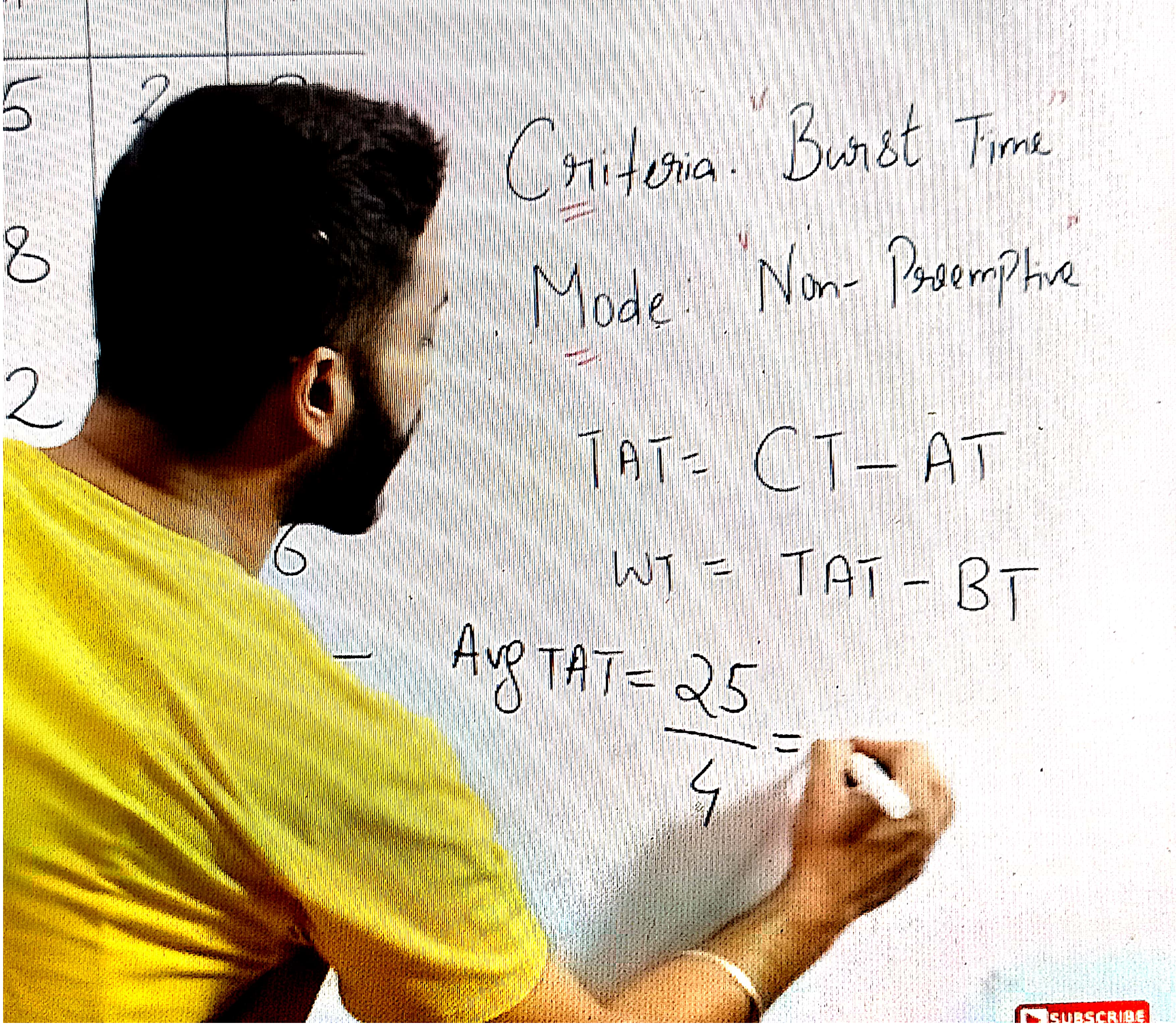
0 1 3 6 10 14

P_2 P_4

→ Time

SUBSCRIBE

8:38 / 9:13



Criteria: "Burst Time"
Mode: "Non-Preemptive"
TAT = CT − AT
WT = TAT − BT
Avg TAT = 25/4 =
SUBSCRIBE

L-2.5: Shortest Remaining Time First (SJF With Preemption) Scheduling Algorithm with Example | OS

SRTF

Process No	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P_1	0	~~5~~ ~~4~~ ~~3~~ ~~2~~ ~~1~~ 0	9	9	4	0
~~P_2~~	1	~~3~~ ~~2~~ ~~1~~ 0	4	3	0	0
P_3	2	~~4~~ 0	13	11	7	7
~~P_4~~	4	~~1~~ 0	5	1	0	

Criteria: "Burst Time"

Mode: "Preemptive"

TAT = CT − AT

WT = TAT − BT

RT = { CPU first time − AT }

P_1

Chart

P_1	P_2	P_2	P_2	P_4	P_1	P_1	P_1	P_1	P_3

0 1 2 3 4 5 6 7 8 9 13

Time →

P_1

0 1 2

P_1 P_2

P_1 P_2 P_3

P_1 P_2 P_3

P_1 P_3 P_4

P_1 P_3

12:03 / 13:36

...ng Time First (SJF With Preemption) Scheduling Algorithm with Example | OS

Arrival Time	Burst Time	Completion Time	TAT	WT	RT
0	~~5~~ ~~4~~ 4 ~~3~~ ~~2~~ ~~1~~ 0	9	9	4	0
1	~~3~~ ~~2~~ ~~1~~ 0	4	3	0	0
2	~~4~~ 0	13	11	7	7
4	~~1~~ 0	5	1	0	0

P1	P2	P2	P2	P4	P1	P1	P1	P1	P3

3 4 5 6 7 8 9 13

P1 P3 P4

P1 P3

Criteria: "Burst Time"

Mode: "Preemptive"

$TAT = CT - AT$

$WT = TAT - BT$

$RT = \{CPU \text{ first time} - AT\}$

$\text{Avg } TAT = \frac{24}{4} = 6$

$\text{Avg } WT = \frac{11}{4} = 2.75$

$\text{Avg } RT = \frac{7}{4} = 1.75$

2.6: Question on Shortest Job First(SJF) with Preemption Scheduling Algorithm

UGC NET July-18

Process	Arrival Time	Burst time
✓ P_1	0	~~7~~ 6
P_2	1	~~4~~ ~~3~~ ~~2~~ ~~1~~ 0
P_3	2	8

P_1	P_2	P_2	P_2	P_1	P_3

0 1 2 3 5 11 19

SRTF

P_1	P_2	P_1	P_3

0 1 5 11 19

The Gantt Chart for Preemptive SJF Scheduling algorithm is ______ ?

1)

P_1	P_2	P_3

0 7 13 21

✓ 2)

P_1	P_2	P_1	P_3

0 1 5 11 19

3)

P_1	P_2	P_3

0 7 11 19

4)

P_2	P_3	P_1

0 4 12 19

6:45 / 7:51

Robin(RR) CPU Scheduling Algorithm with Example

Process No	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P_1	0	~~5~~ ~~3~~ ~~1~~ 0	12	12	7	0
P_2	1	~~4~~ ~~2~~ 0	11	10	6	1
P_3	2	~~2~~ 0	6	4	2	2
P_4	4	~~1~~ 0	9	5	4	4

Criteria: "Time Quantum"

Mode: "Preemptive"

$TAT = CT - AT$

$WT = TAT - BT$

$RT = \{ \text{CPU first time} - AT \}$

Given TQ = 2

Ready Queue: ~~P_1~~ | ~~P_2~~ | ~~P_3~~ | ~~P_1~~ | ~~P_4~~ | ~~P_2~~ | ~~P_1~~

Running Queue (Gantt Chart):

P_1	P_2	P_3	P_1	P_4	P_2	P_1

0 2 4 6 8 9 11 12

time →

Context Switching

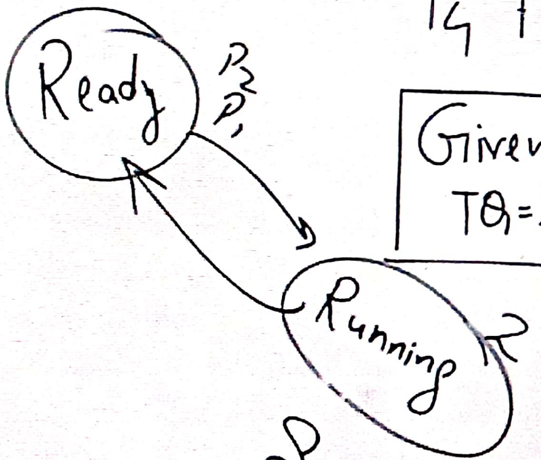
Sequence of Processes in R/Q

L-2.7: Round Robin(RR) CPU Scheduling Algorithm with Example

Round Robin

RR

Process No	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P_1	0	~~5~~ ~~3~~ ~~1~~ 0	12	12	7	
P_2	1	~~4~~ ~~2~~ 0	11	10	6	
P_3	2	~~2~~ 0	6	4	2	
P_4	4	~~1~~ 0	9	5	4	



Given $TQ = 2$

Ready Queue

~~P_1~~	~~P_2~~	~~P_3~~	~~P_1~~	~~P_4~~	~~P_2~~	~~P_1~~

Running Queue (Gantt Chart)

P_1	P_2	P_3	P_1	P_4	P_2	P_1

0 2 4 6 8 9 11 12

time

Context Switching

Sequence of Processes in R/Q

13:38 / 16:22

Priority Scheduling

Priority	Process No	Arrival Time	Burst Time	Completion Time	TAT	WT
10	P_1	0	~~5~~ 4	12	12	7
20	P_2	1	~~4~~ 3	8	7	3
30	P_3	2	~~2~~ ~~1~~ 0	4	2	0
40	P_4	4	~~1~~ 0	5	1	0

Criteria: "Priority"

Mode: "Preemptive"

$TAT = CT - AT$

$WT = TAT - BT$

$\boxed{\text{Higher the no. higher the Priority}}$

P_1	P_2	P_3	P_3	P_4	P_2	P_1

0 1 2 3 4 5 8 12

time

$$\text{Avg TAT} = \frac{22}{4} = 5.5$$

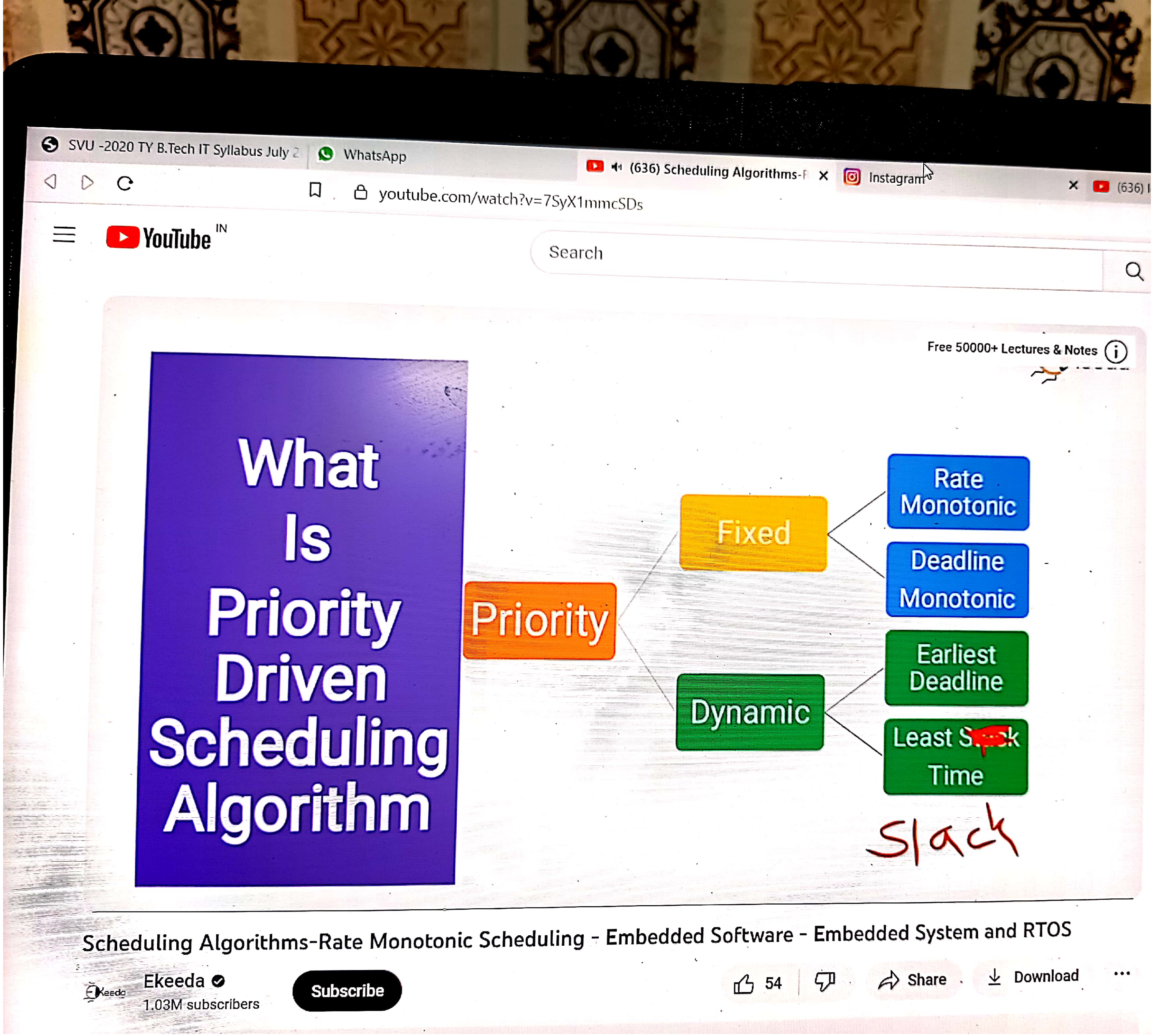
$$\text{Avg WT} = \frac{10}{4} = 2.5$$

What Is Priority Driven Scheduling Algorithm

- It is a non-preemptive algorithm
- Each process is assigned a priority.
- Process with highest priority is to be executed first and so on.
- Processes with same priority are executed on first come first served basis.
- It is having 2 types

→ Fixed

→ Dynamic


SVU -2020 TY B.Tech IT Syllabus July 2
WhatsApp
(636) Scheduling Algorithms-
Instagram
(636)
youtube.com/watch?v=7SyX1mmcSDs
YouTube IN
Search
Free 50000+ Lectures & Notes
What Is Priority Driven Scheduling Algorithm
Priority
Fixed
Dynamic
Rate Monotonic
Deadline Monotonic
Earliest Deadline
Least S k
Time
Slack
Scheduling Algorithms-Rate Monotonic Scheduling - Embedded Software - Embedded System and RTOS
Ekeeda
1.03M subscribers
Subscribe
54
Share
Download

Rate Monotonic Scheduling Algorithm

Process	Capacity (C)	Period (P)
T1	3	20
T2	2	5
T3	2	10

1) How much time to schedule the algorithm

→ Scheduling Time = L.C.M. of Periods = **20**

2) Priority

→ Least Period = High priority = **T2 > T3 > T1**

5:19 / 12:03

Rate Monotonic Schedulin g Algorithm

Process	Capacity (C)	Period (P)
T1	3	20
T2	2	5
T3	2	10

a) For T2:

for every 5 period T2 has to execute 2 units

b) For T3:

for every 10 period T3 has to execute 2 units

c) For T1:

for every 20 period T1 has to execute 3 units

Process	Capacity (C)	Period (P)
T1	3	20
T2	2	5
T3	2	10

PRIORITY	PROCESS
1	T2
2	T3
3	T1

T1 — T1 WILL EXECUTE 3 TIMES BETWEEN 1 TO 20 PERIODS

T3 — T3 WILL EXECUTE 2 TIMES BETWEEN 1-10 | T3 WILL EXECUTE 2 TIMES BETWEEN 10-20

T2 — T2 WILL EXECUTE 2 TIME | T2 WILL EXECUTE 2 TIME | T2 WILL EXECUTE 2 TIME | T2 WILL EXECUTE 2 TIME

T2	T2	T3	T3	T1	T2	T2	T1	T1		T2	T2	T3	T3		T2	T2			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Scheduling Algorithms-Rate Monotonic Scheduling - Embedded Software - Embedded System and RTOS

Deadline Monotonic Scheduling

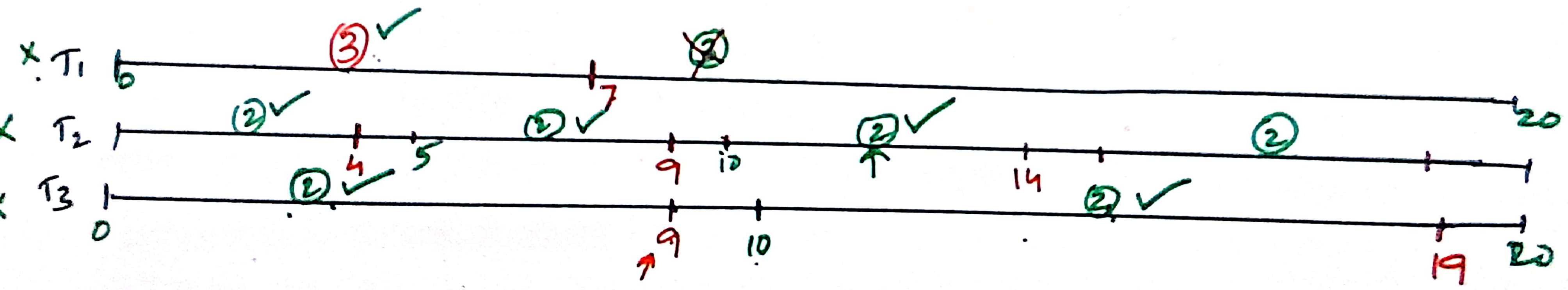
Process	Capacity	Deadline	Period
T_1	3	7	20
T_2	2	4	5
T_3	2	9	10

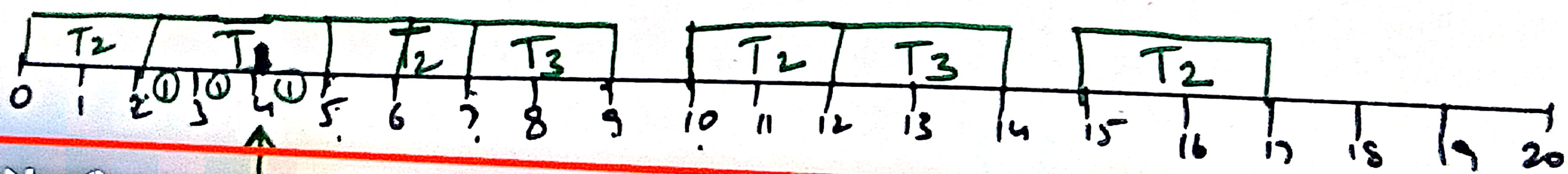
① L.C.M(20,5,10) = 20 units

② Priority

$T_2 > T_1 > T_3$

High … Low





Earliest Deadline First (EDF)

Earliest Deadline First Scheduling

process	Capacity	Deadline	Period
T_1	3	7.	20
T_2	2.	4.	5
T_3	2	8.	10

$$\frac{L.C.M(20,5,10)}{20 \text{ units}}$$