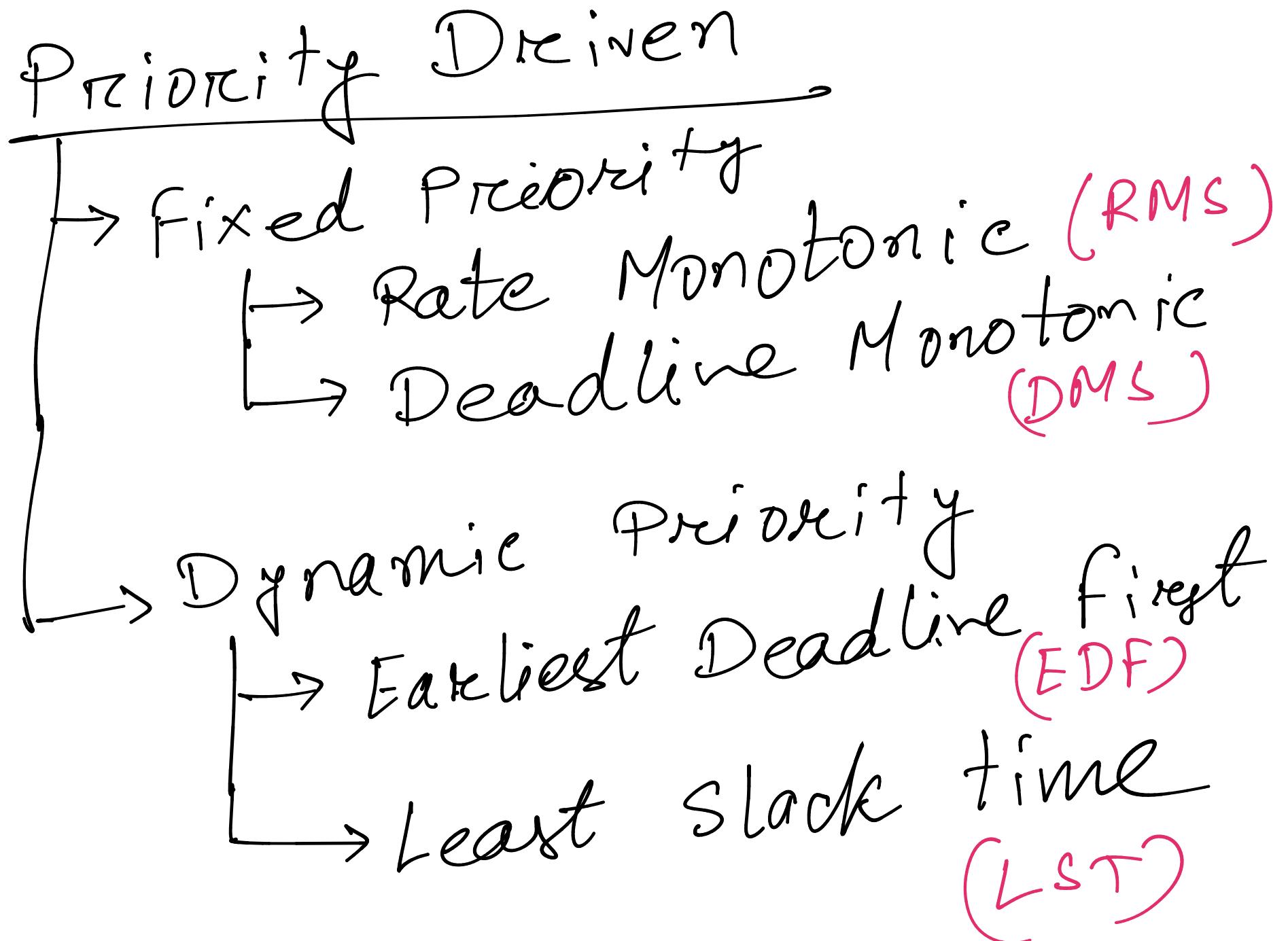


ESD

Scheduling



Specification of Tasks

$$T(\emptyset, P, E, D)$$

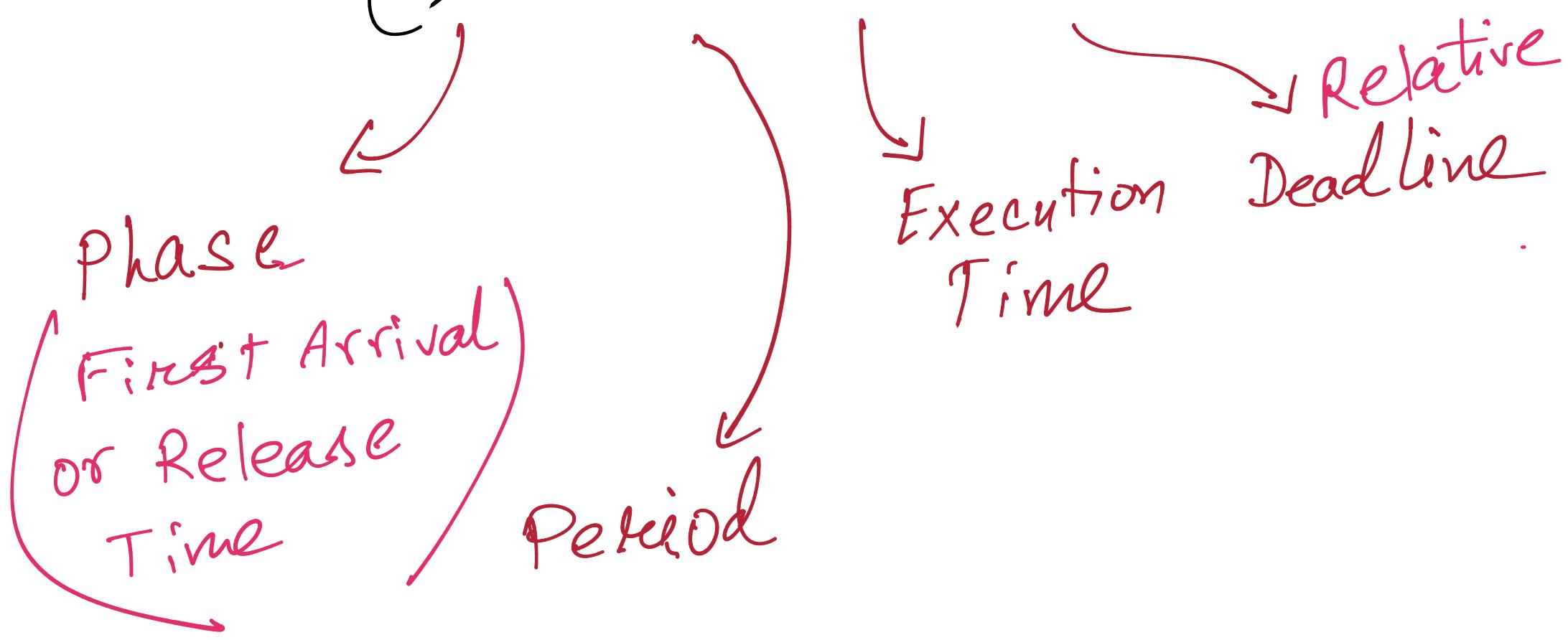
Phase

First Arrival
or Release
Time

Period

Execution Time

Relative Deadline



RMS

$$T(\emptyset, P, E, D)$$

$$T_1 (0, 20, 3, -)$$

$$T_2 (0, 5, 2, -)$$

$$T_3 (0, 10, 2, -)$$

No Deadline

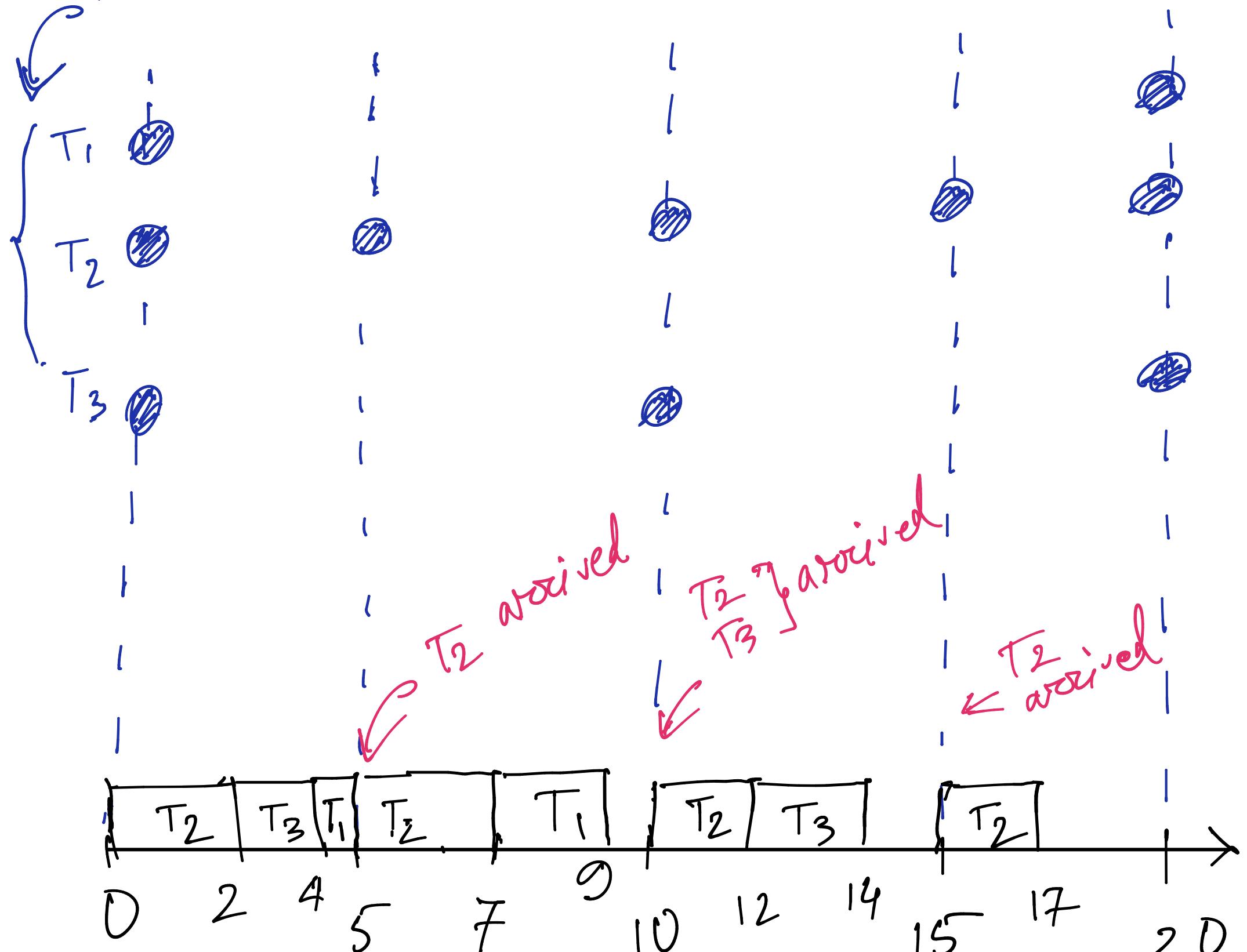
- ① How long should the simulation go on?
- $$\rightarrow \text{LCM}(\text{Periods}) = \text{LCM}(20, 5, 10) = 20$$

- ② Least Period = Highest Rate
= Highest Priority

SO,
Priority

$$T_2 > T_3 > T_1$$

Periodic Arrival



only 2 units

because
T₁ executed
1 unit before

DMS

$T(\emptyset, P, E, D)$

$\xleftarrow{\text{DMS have Relative Deadline}}$

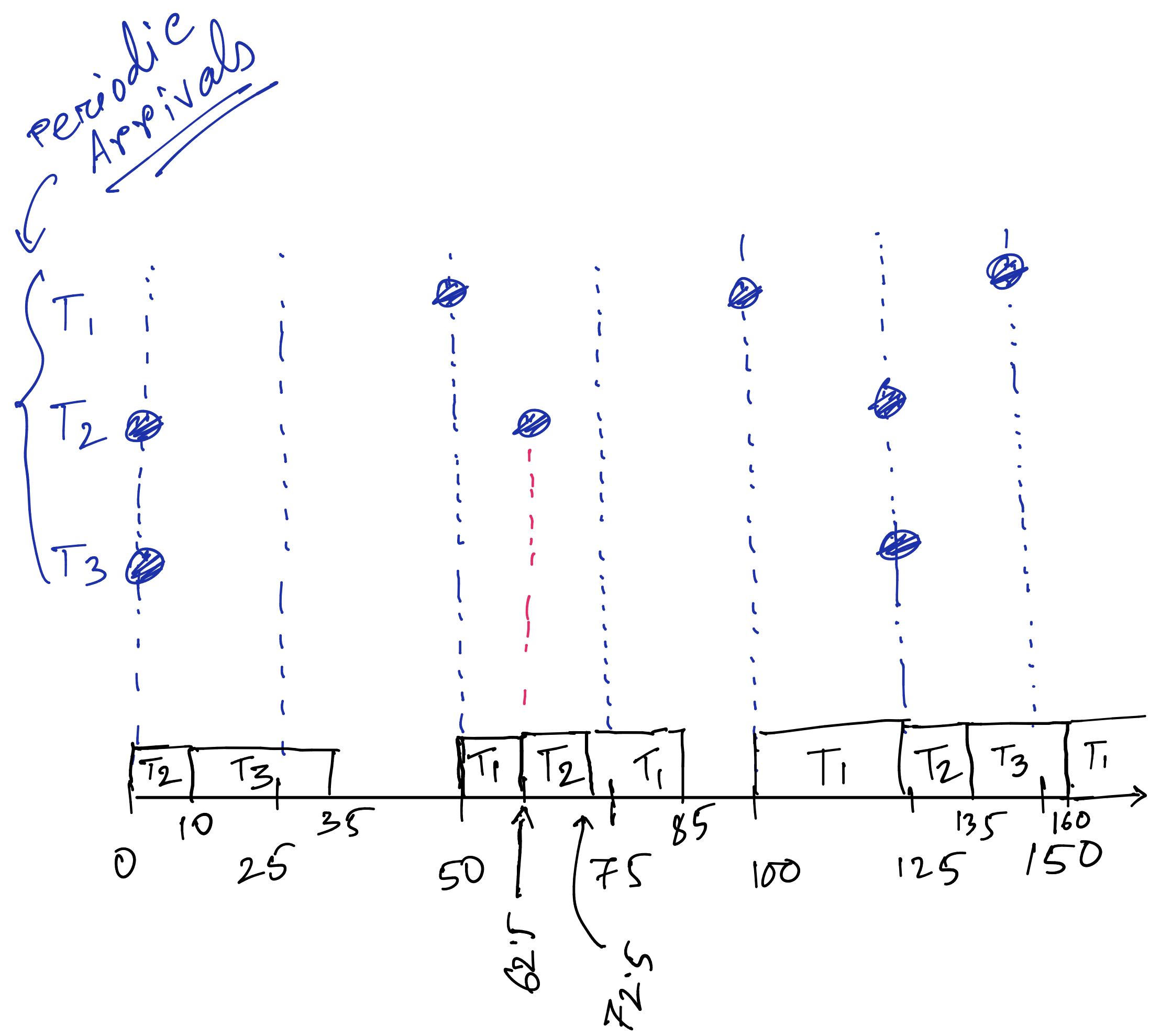
$T_1(50, 50, 25, 100)$

$T_2(0, 62.5, 10, 20)$

$T_3(0, 125, 25, 50)$

$\xrightarrow{\text{Earliest Deadline = Highest Priority}}$

Priority: $T_2 > T_3 > T_1$



EDF

* Relative Deadline • Need
to convert to Absolute
Deadlines

$$T(\emptyset, P, E, D)$$

$$T_1(0, 2, 0.9, 2)$$

$$T_2(0, 5, 2.3, 5)$$

Initial Priority: $T_1 > T_2$

Deadline wise priority

* This is Dynamic.
subject to change

CLOSEST DEADLINE
↓
HIGHEST PRIORITY

Duration of simulation:

LCM (Periods)

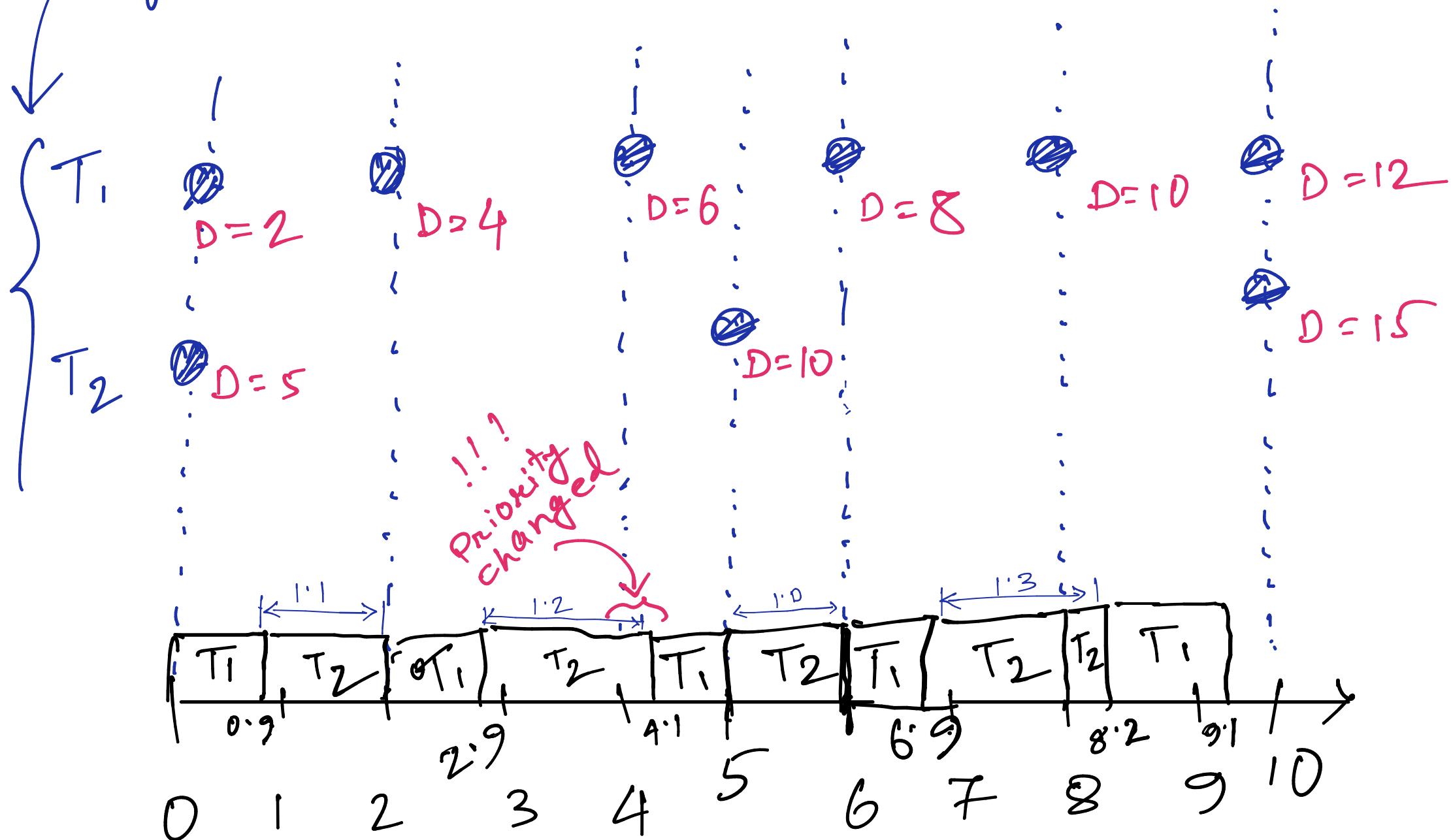
$$= \text{LCM}(2, 5)$$

$$= 10$$

Absolute Deadline
= Arrival + Relative Deadline

Periodic arrivals

$D = \text{Absolute Deadline}$



LST

Slack Time (\downarrow) = Priority (\uparrow)

$$= \boxed{D - t - e'}$$

D = Absolute Deadline
 $= \emptyset +$ Relative Deadline

t = current time

e' = Remaining Execution time

\emptyset, P, E, D

$T_1(0, 20, 3, 7)$

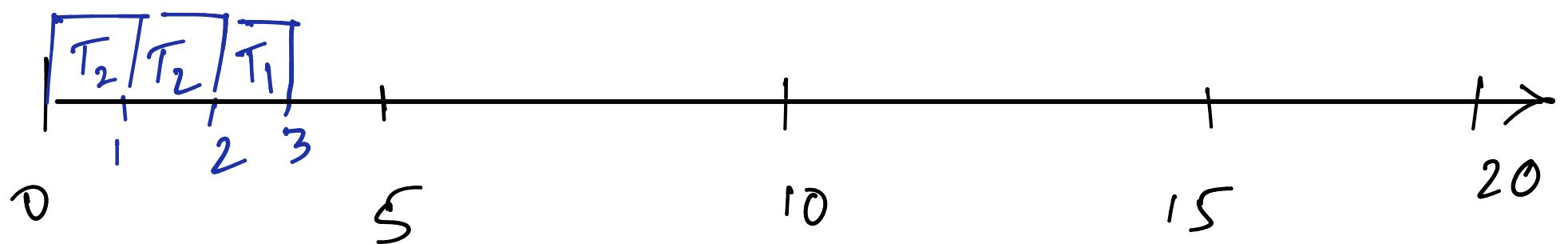
$T_2(0, 5, 2, 4)$

$T_3(0, 10, 2, 8)$

T_1

T_2

T_3



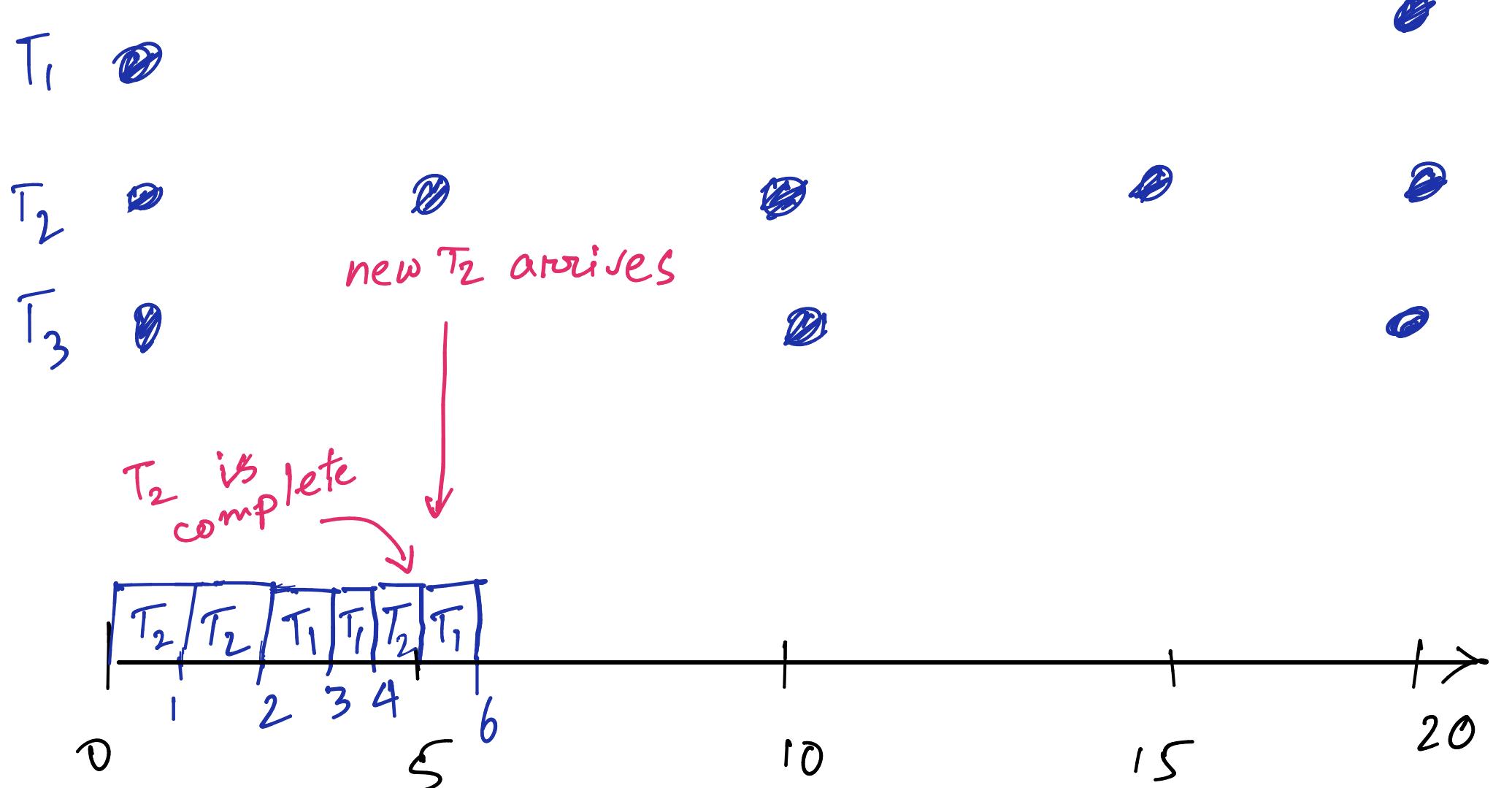
Slack Time Calculation:

	$T=0$	$T=1$	$T=2$
T_1	$7 - 0 - 3 = 4$	$7 - 1 - 3 = 3$	$7 - 2 - 3 = 2$
T_2	$6 - 0 - 3 = 3$	$6 - 1 - 2 = 3$	$6 - 2 - 1 = 3$
T_3	$8 - 0 - 2 = 6$	$8 - 1 - 2 = 5$	$8 - 2 - 2 = 4$

* T_2 has LST

Note: LST of T_1 & T_2 is same. Since T_2 had execution before, so continuing with this task

* Here, T_1 has LST.



Slack Time Calculation:

	T = 3	T = 4	T = 5
T ₁	$7 - 3 - 2 = 2$ *	$7 - 4 - 1 = 2$	$7 - 5 - 1 = 1$ *
T ₂	$6 - 3 - 1 = 2$	$6 - 4 - 1 = 1$ *	$11 - 5 - 3 = 3$
T ₃	$8 - 3 - 2 = 3$	$8 - 4 - 2 = 2$	$8 - 5 - 2 = 1$

* Note: LST of T₁ & T₂ is same. Since T₁ had execution before, so continuing with this task

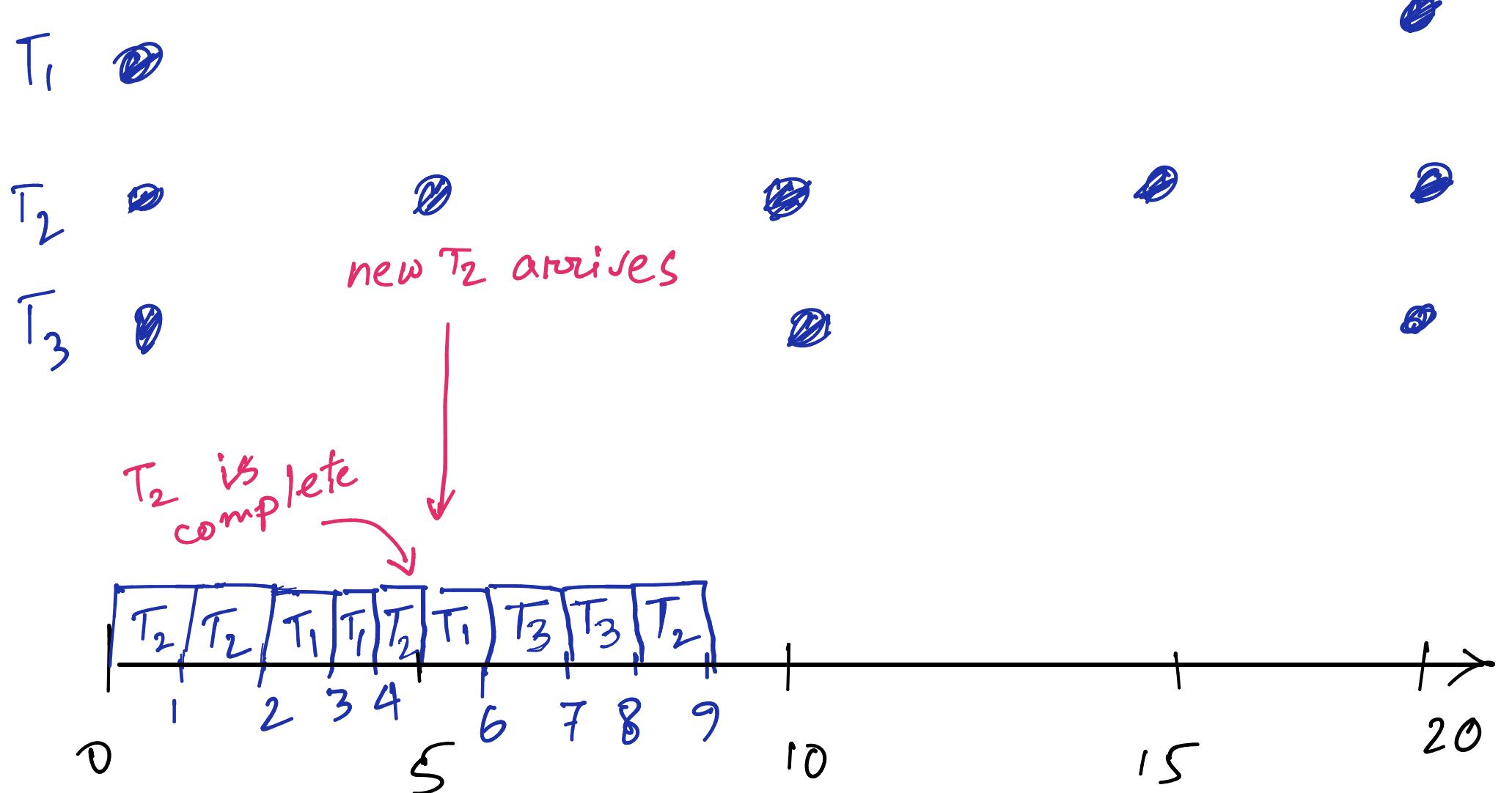
* T₂ is complete

* LST of T₁ & T₃ is same. Choose T₁ for Alphabetical order.

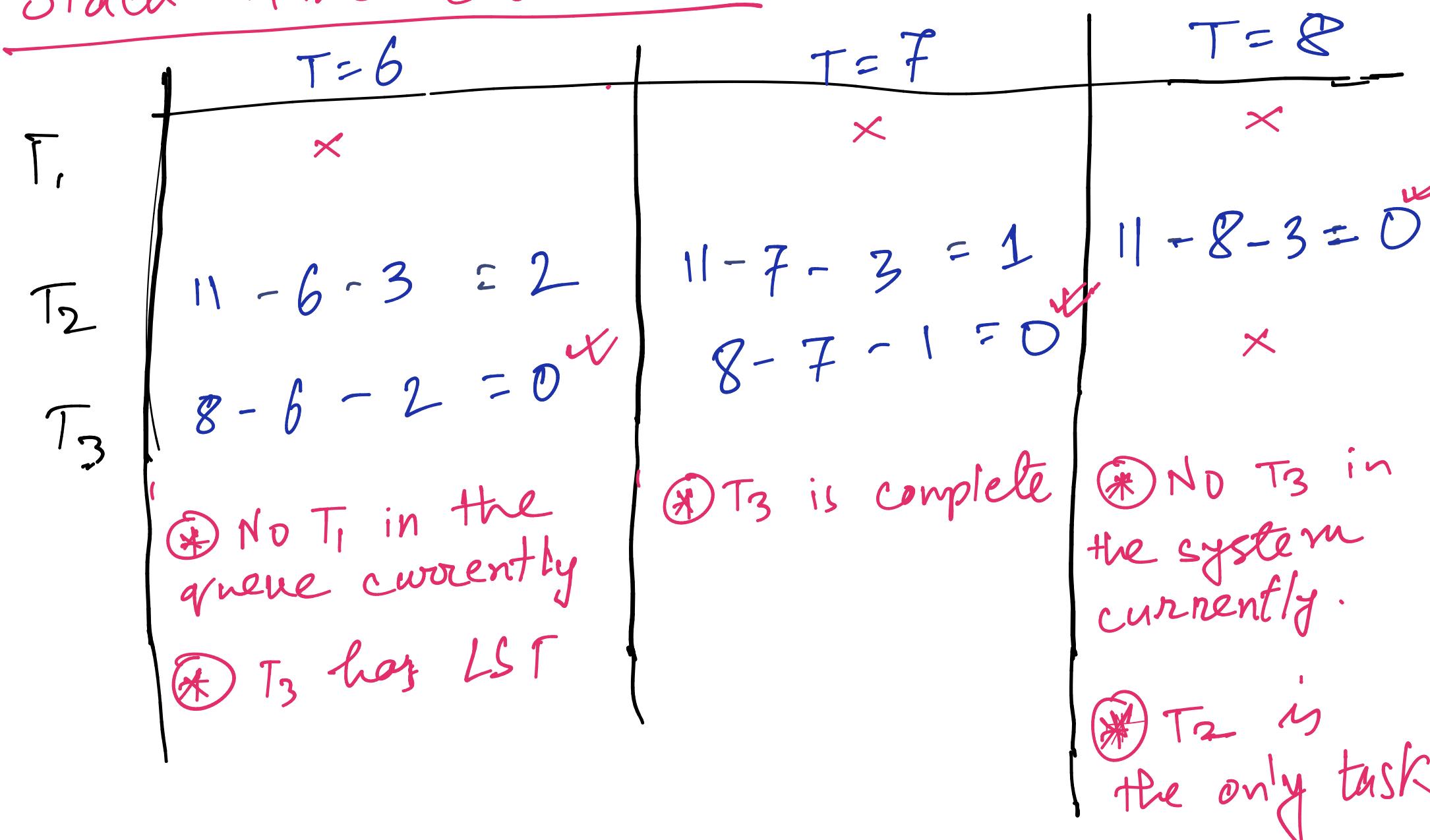
* T₁ complete

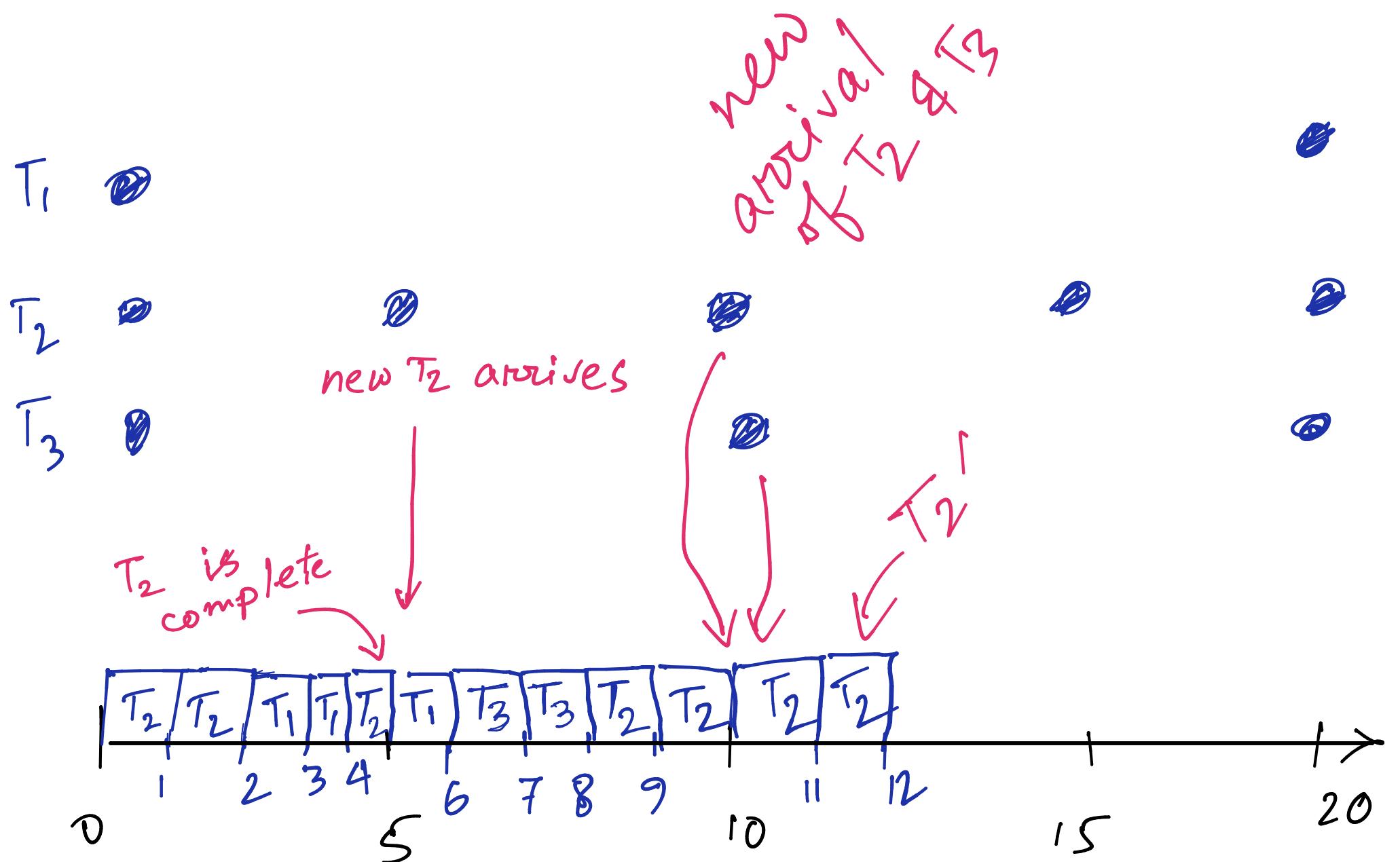
Absolute Deadline of new T₂
= current release time + Relative Deadline
= 5 + 6 = 11

* New T₂ arrives.

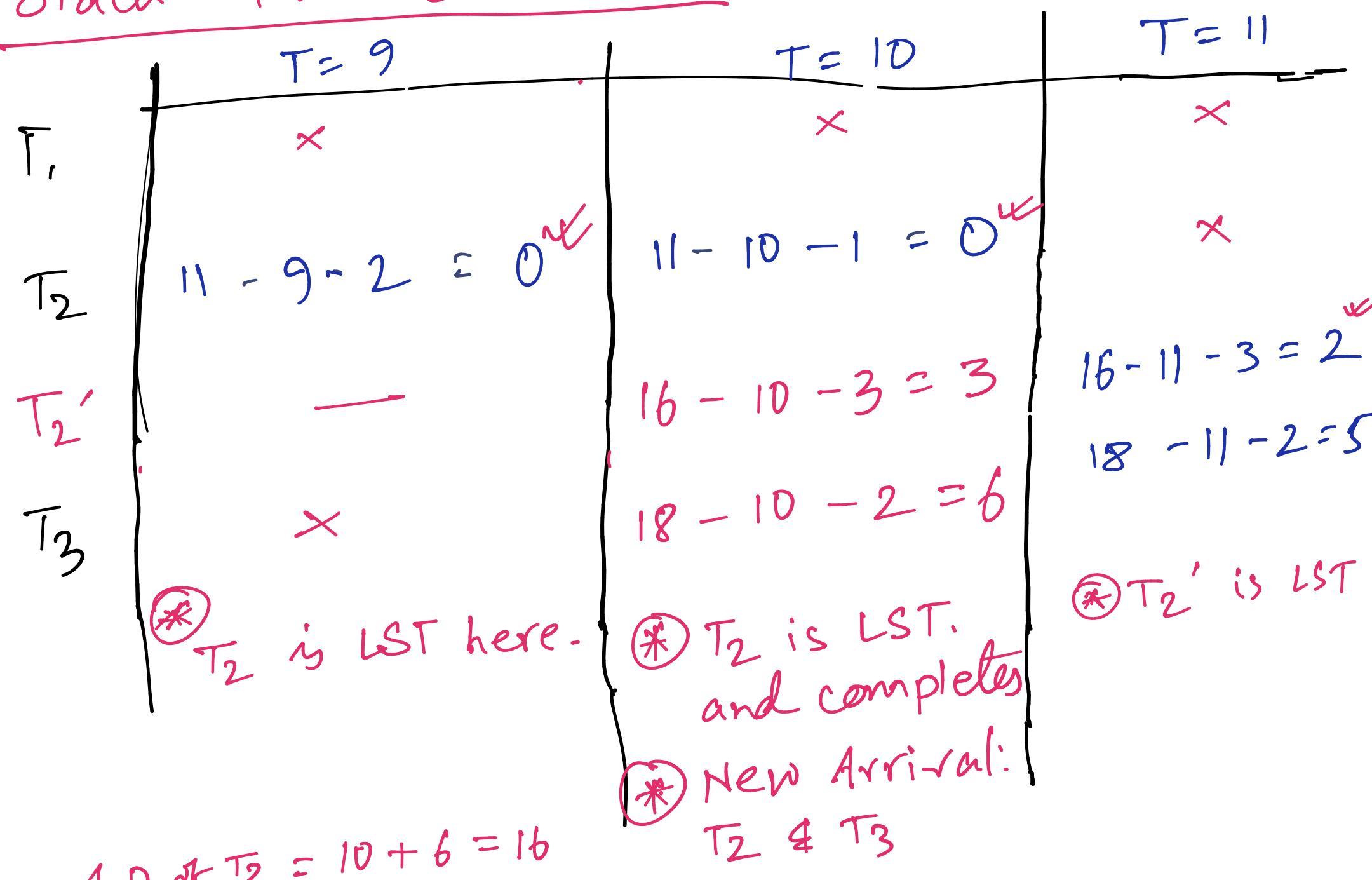


Slack Time Calculation:



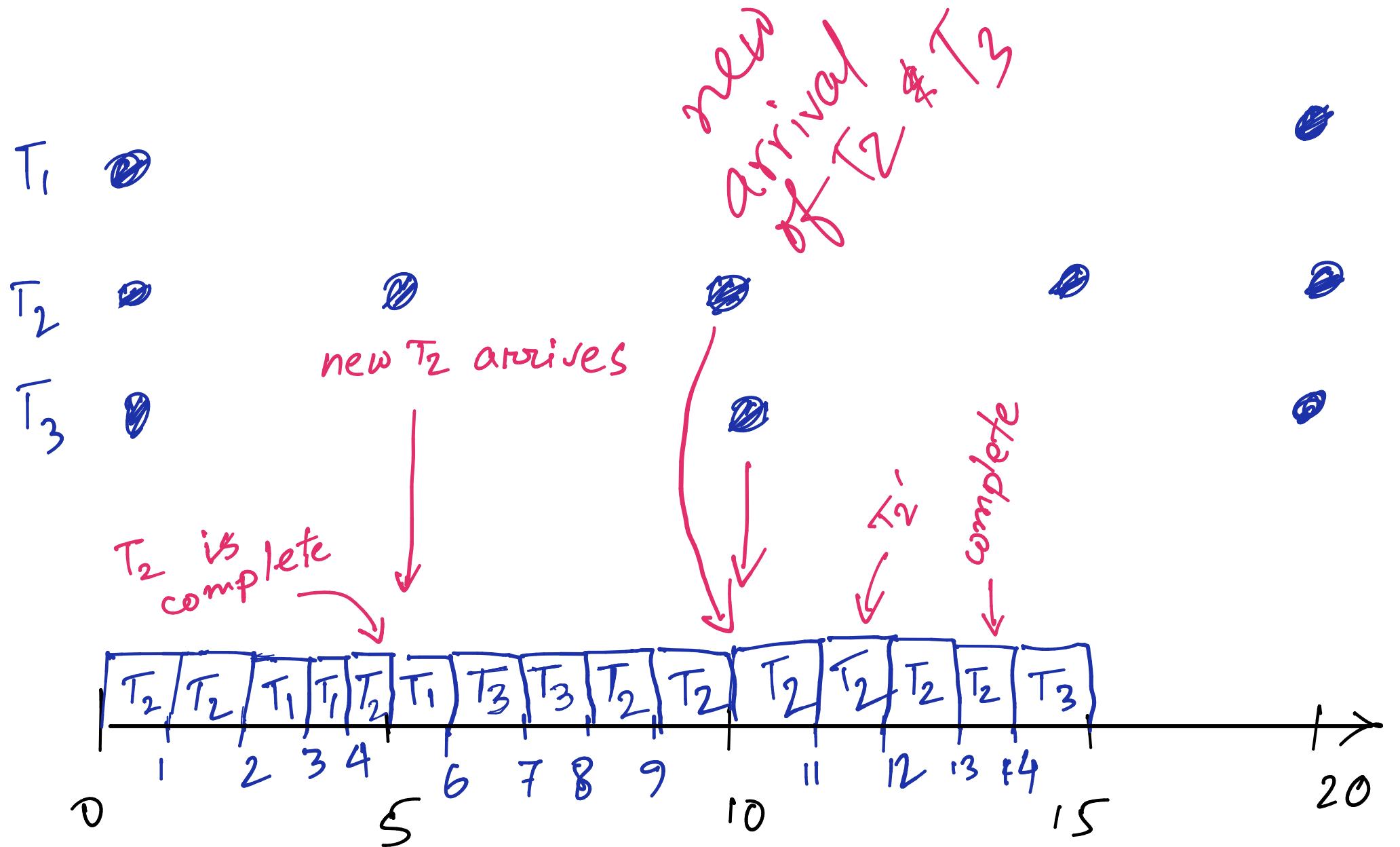


Slack Time Calculation:

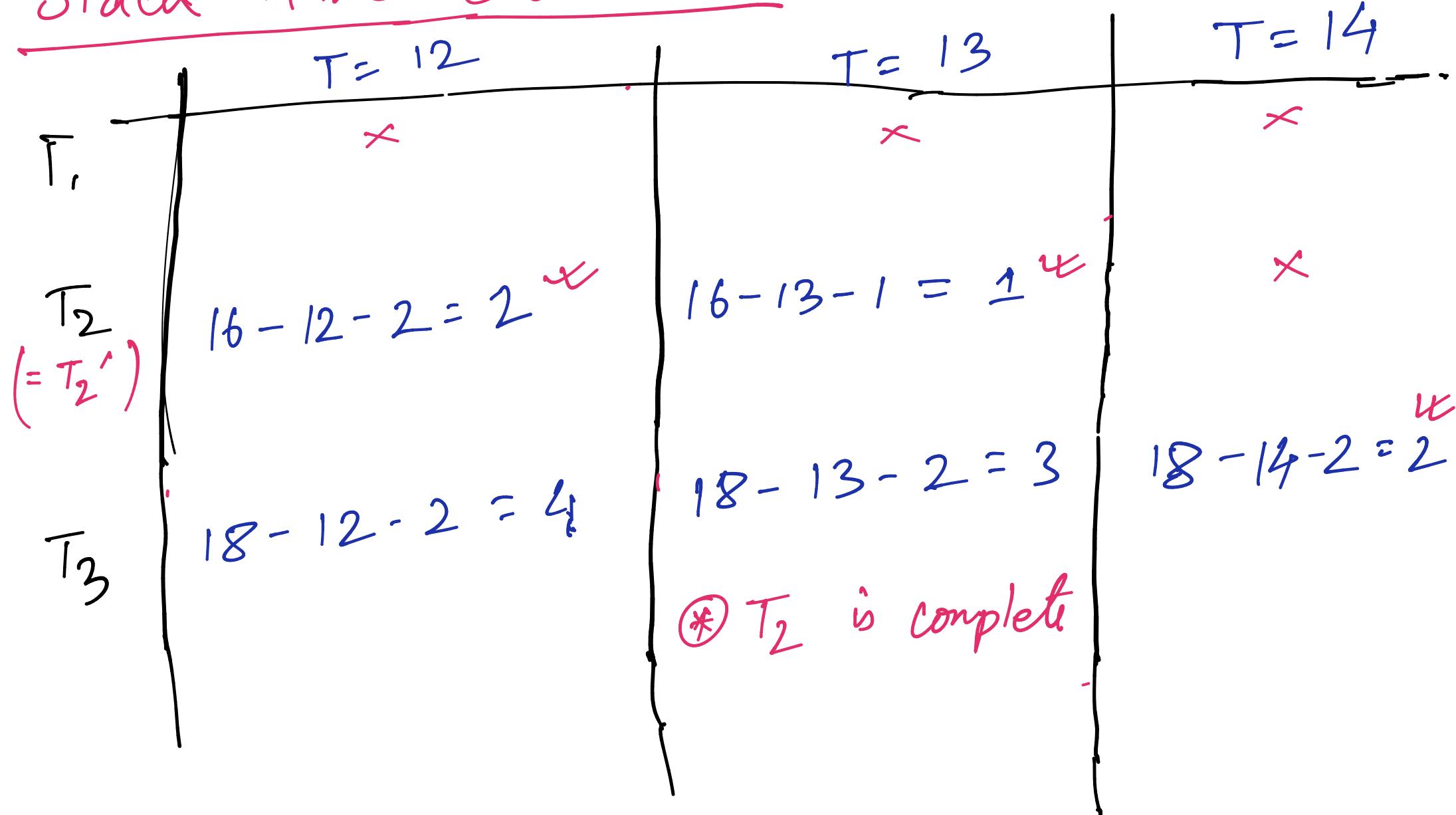


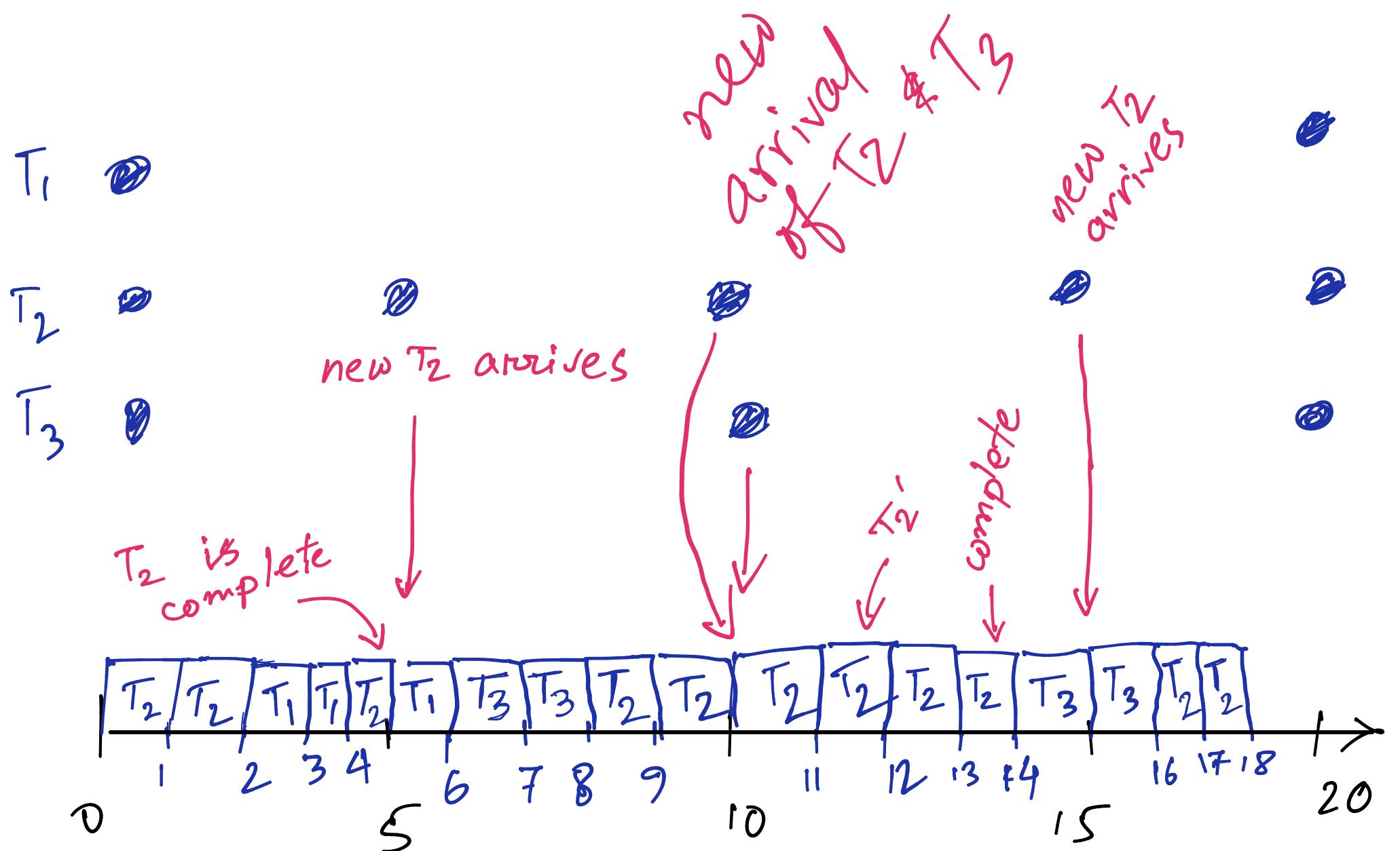
$$A.D. \text{ of } T_2 = 10 + 6 = 16$$

$$A.D. \text{ of } T_3 = 10 + 8 = 18$$

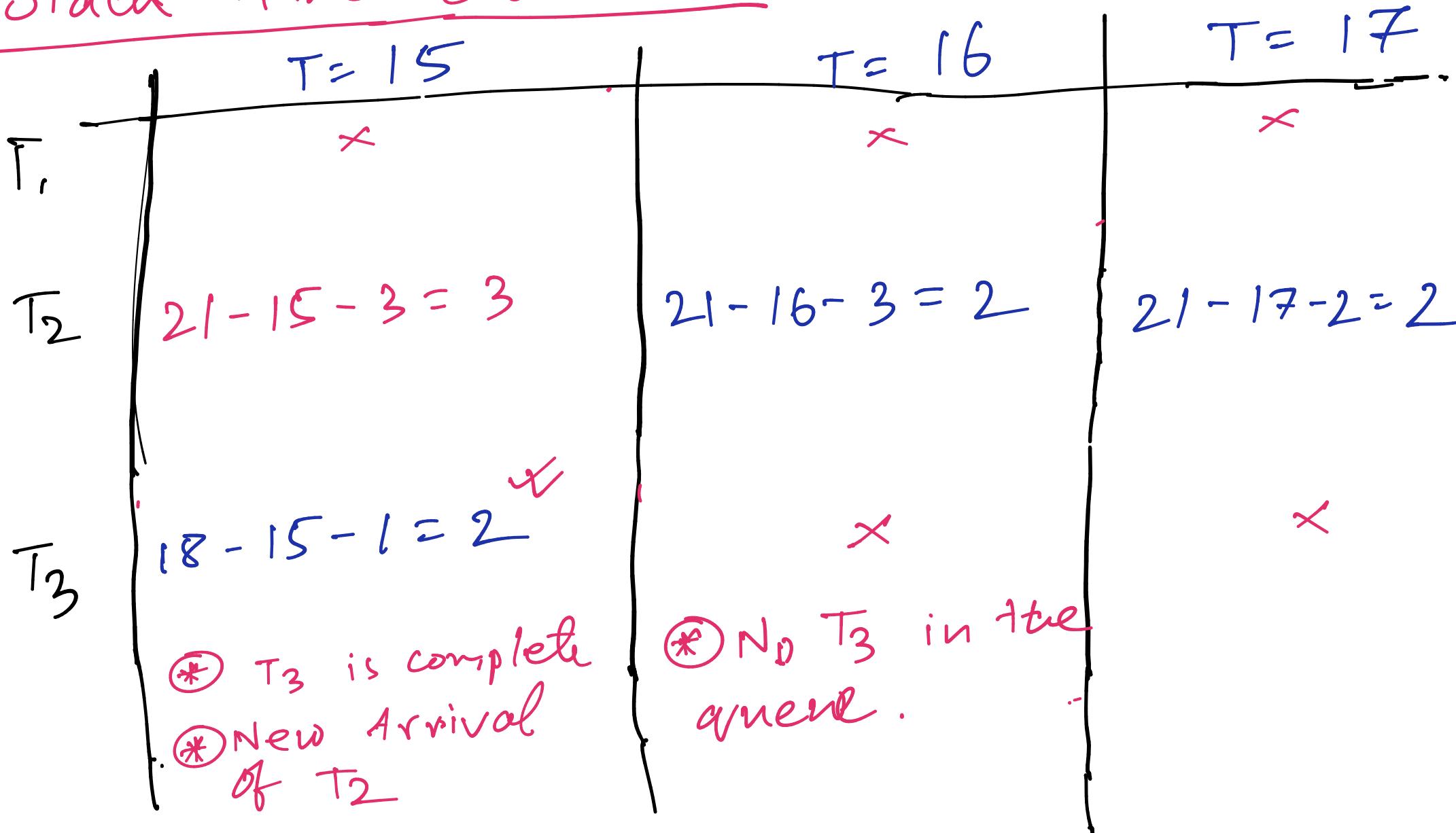


Slack Time Calculation:

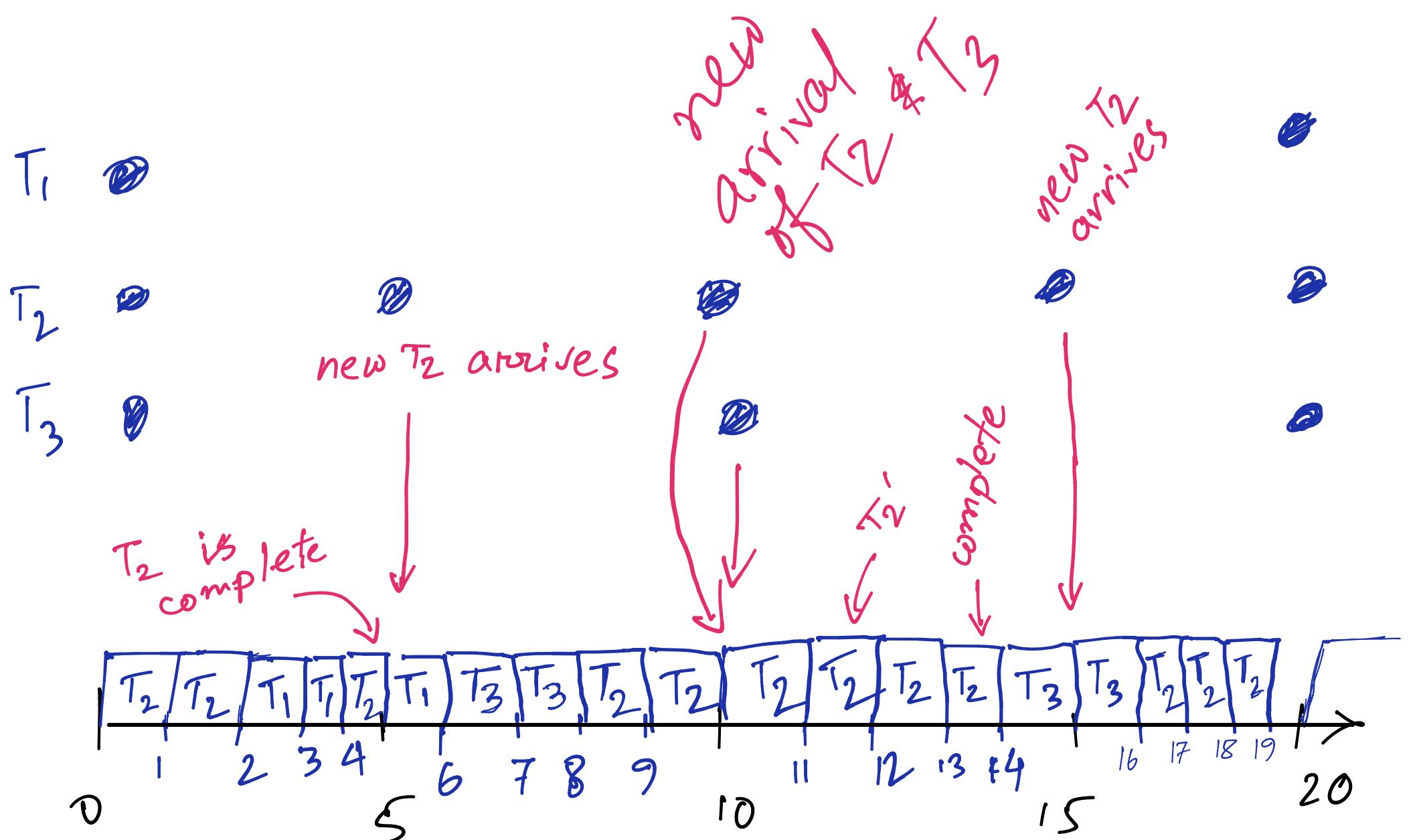




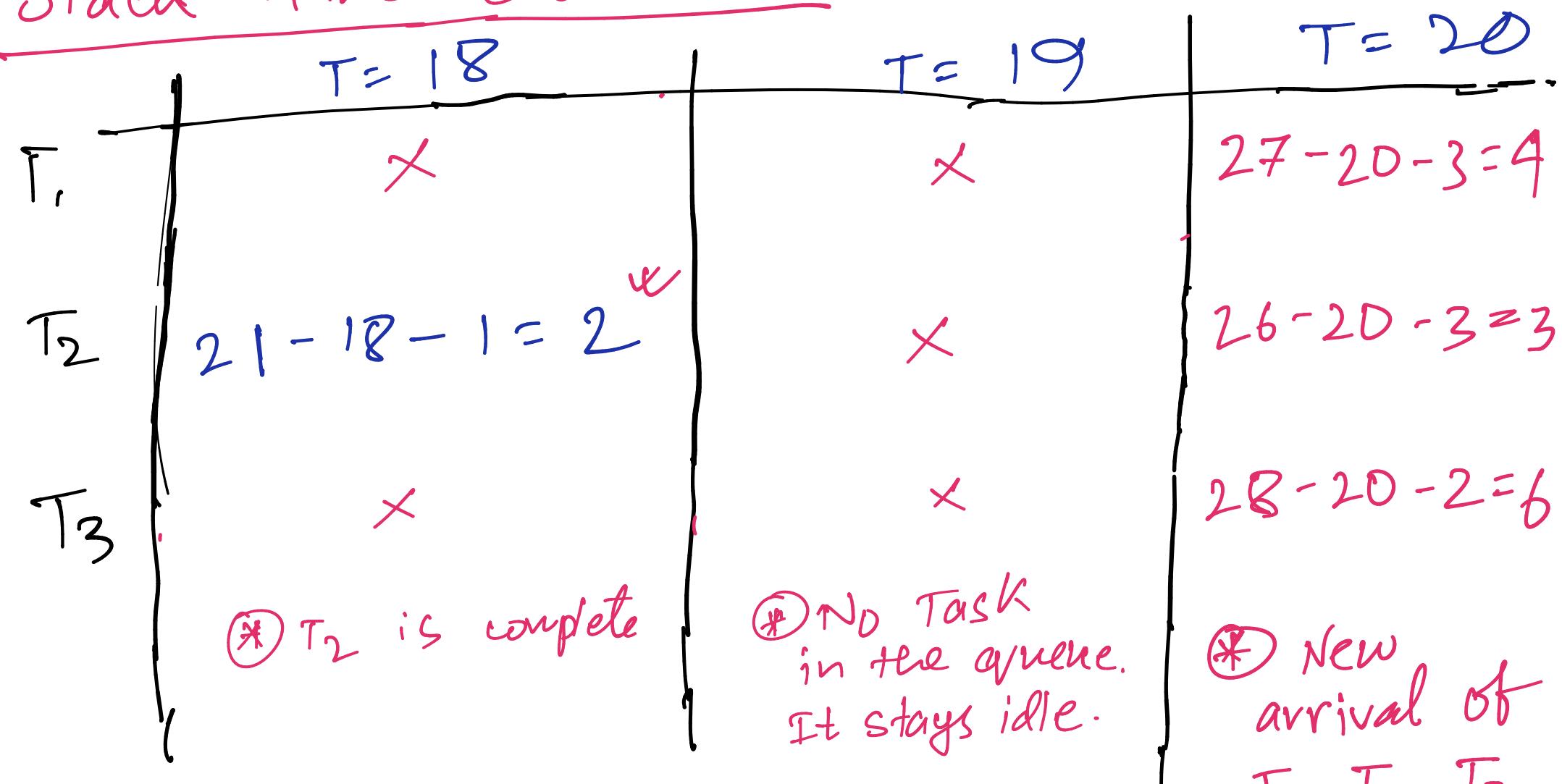
Slack Time Calculation:



Absolute Deadline
of $T_2 = 15 + 6 = 21$



Slack Time Calculation:



$$\text{A.D. of } T_1 = 20 + 7 = 27$$

$$\text{A.D. of } T_2 = 20 + 6 = 26$$

$$\text{A.D. of } T_3 = 20 + 8 = 28$$

