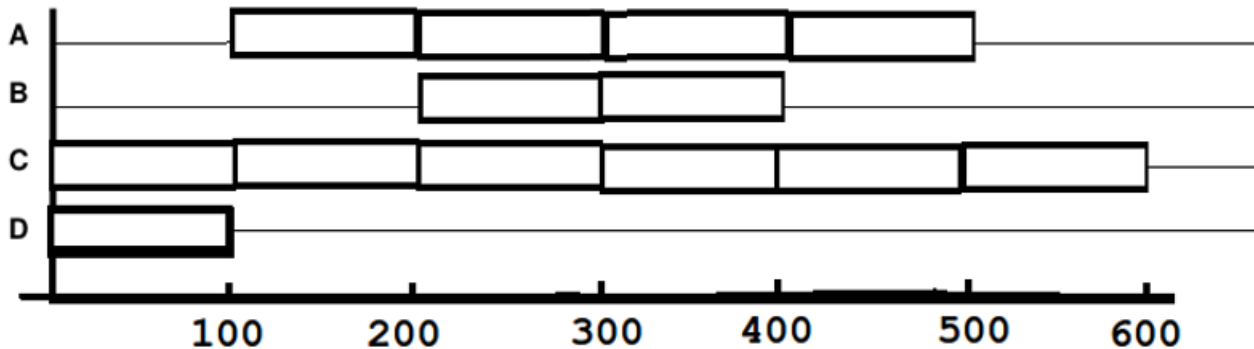


## 1. 2016-1

	Kombinasi Multiprogram (%)														
	A	B	C	D	A+B	A+C	A+D	B+C	B+D	C+D	A+B+C	A+B+D	A+C+D	B+C+D	A+B+C+D
Utilitas CPU per proses A	10	-	-	-	9.3	9.3	9.2	-	-	-	8.3	8.1	7.8	-	7
Utilitas CPU per proses B	-	20	-	-	19	-	-	18	17	-	17	16	-	15	14
Utilitas CPU per proses C	-	-	30	-	-	28	-	26	-	25	25	-	23	22	21
Utilitas CPU per proses D	-	-	-	40	-	-	37	-	35	33	-	32	31	30	28

Diagram berikut ini dibentuk menggunakan data tabel di atas.



- Berapa waktu CPU (CPU TIME) dari proses A?
- Berapa waktu CPU (CPU TIME) dari proses B?
- Berapa waktu CPU (CPU TIME) dari proses C?
- Berapa waktu CPU (CPU TIME) dari proses D?
- Berapa waktu total (TOTAL TIME) dari proses A?
- Circle or cross T if true, and F if false:  
[ **T** / **F** ] Priority scheduling prevents starvation.

## 2. 2016-2

There exists four (4) identical processes, with this following CPU utilization table:

	Multiprogramming Combination (%)			
	A	A + A	A + A + A	A + A + A + A
CPU utilization per proses A	10	9.5	9	8.6

The CPU time of each processes is 43 seconds

Print the output when the system runs:

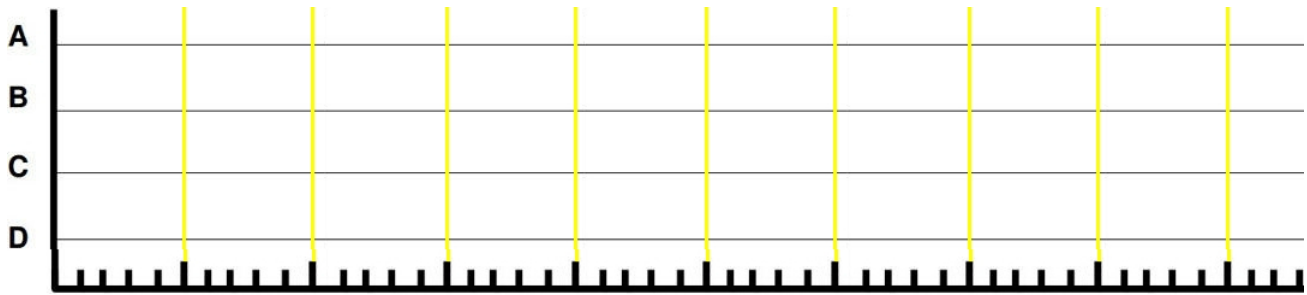
- How long will be the total time to run concurrently all (4) processes together?!
- How long will be the total time to run all (4) processes one by one?!

## 3. 2017-1

	Kombinasi Multiprogram (%)														
	A	B	C	D	A+B	A+C	A+D	B+C	B+D	C+D	A+B+C	A+B+D	A+C+D	B+C+D	A+B+C+D
Utilitas CPU per proses A	10	-	-	-	9.3	9.3	9.2	-	-	-	8.3	8.1	7.8	-	7
Utilitas CPU per proses B	-	20	-	-	19	-	-	18	17	-	17	16	-	15	14
Utilitas CPU per proses C	-	-	30	-	-	28	-	26	-	25	25	-	23	22	21
Utilitas CPU per proses D	-	-	-	40	-	-	37	-	35	33	-	32	31	30	28

Proses A dan B berjalan sejak  $t=0$ . Proses C mulai berjalan saat waktu CPU (*CPU time*) proses B mencapai 38 satuan waktu. Proses A berhenti setelah proses C berjalan selama 200 satuan waktu. Proses D hanya dijalankan setelah proses A berhenti. Semua proses yang masih berjalan berhenti pada saat  $t=600$ .

(a) Lengkapi diagram berikut ini:



- (b) Berapa waktu CPU (*CPU TIME*) proses A?
- (c) Berapa waktu CPU (*CPU TIME*) proses B?
- (d) Berapa waktu CPU (*CPU TIME*) proses C?
- (e) Berapa waktu CPU (*CPU TIME*) proses D?
- (f) Berapa waktu total (*TOTAL TIME*) proses A berjalan?
- (g) Berapa waktu total (*TOTAL TIME*) proses B berjalan?
- (h) Berapa waktu total (*TOTAL TIME*) proses C berjalan?
- (i) Berapa waktu total (*TOTAL TIME*) proses D berjalan?

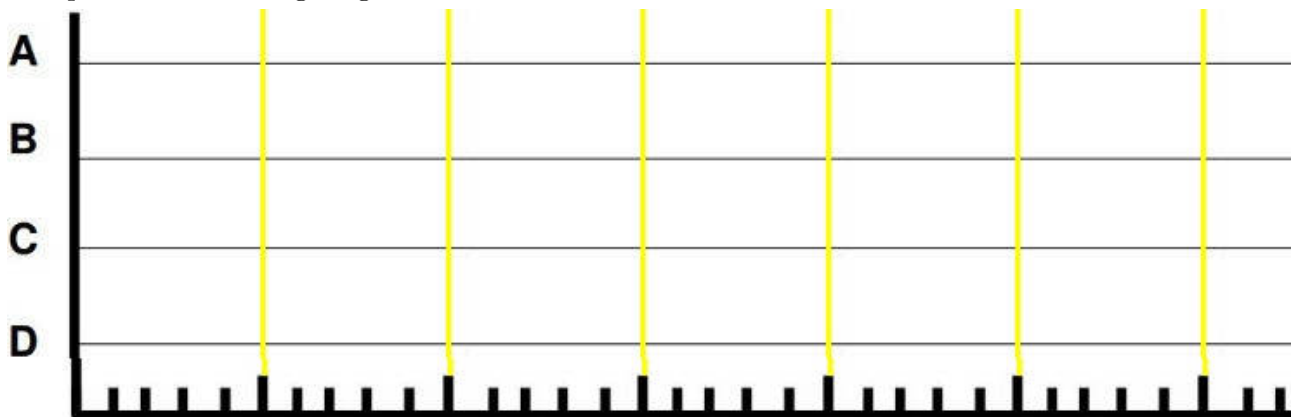
4. 2017-2

Four (4) processes, A(90%, 14), B(80%, 60), C(70%, 64), D(60%, 161); where  $[W(X\%, Y)$ ;  $W$ =process name;  $X$ = I/O Wait(%);  $Y$ =CPU Time] with this following CPU utilization table:

	Multiprogramming Combination (%)														
	A	B	C	D	A+B	A+C	A+D	B+C	B+D	C+D	A+B+C	A+B+D	A+C+D	B+C+D	A+B+C+D
Process A CPU utilization	10	-	-	-	9.3	9.3	9.2	-	-	-	8.3	8.1	7.8	-	7
Process B CPU utilization	-	20	-	-	19	-	-	18	17	-	17	16	-	15	14
Process C CPU utilization	-	-	30	-	-	28	-	26	-	25	25	-	23	22	21
Process D CPU utilization	-	-	-	40	-	-	37	-	35	33	-	32	31	30	28

All processes (A, B, C, and D) terminates at  $t=500$ . Process D starts at  $t=0$ . Processes A, B, and C start after process D.

(a) Complete this following diagram:



- (b) Calculate at what time processes A, B, and C start!
- (c) How long will be the TOTAL TIME of process D, if the process (D) runs alone?