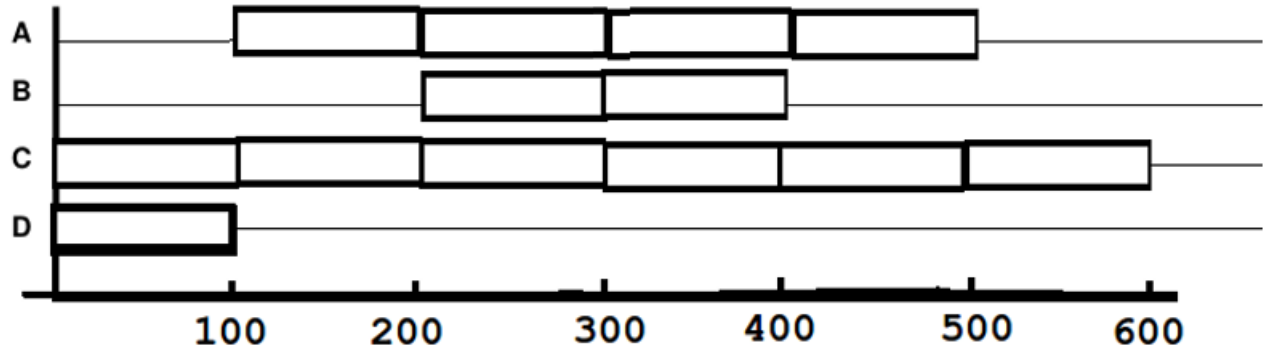
1. **2016-1**

	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.



(a) Berapa waktu CPU (CPU TIME) dari proses A?

(b) Berapa waktu CPU (CPU TIME) dari proses B?

(c) Berapa waktu CPU (CPU TIME) dari proses C?

(d) Berapa waktu CPU (CPU TIME) dari proses D?

(e) Berapa waktu total (TOTAL TIME) dari proses A?

(f) 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:

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

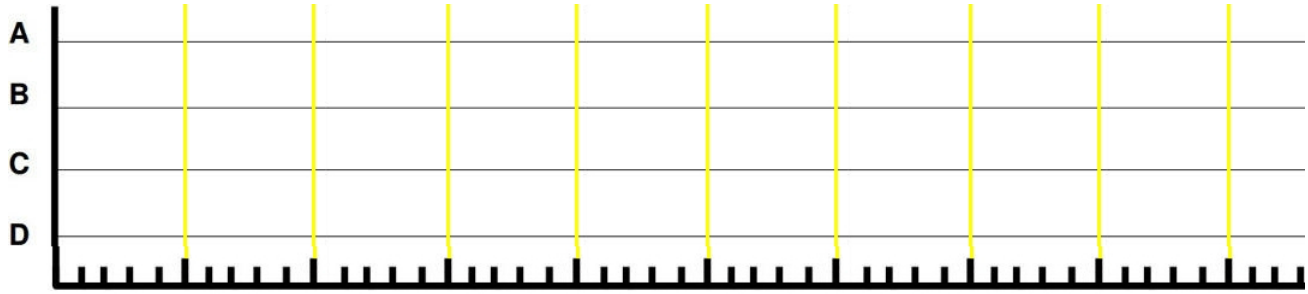
(b) How long will be the total time to run all (4) processes one by one?!

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?

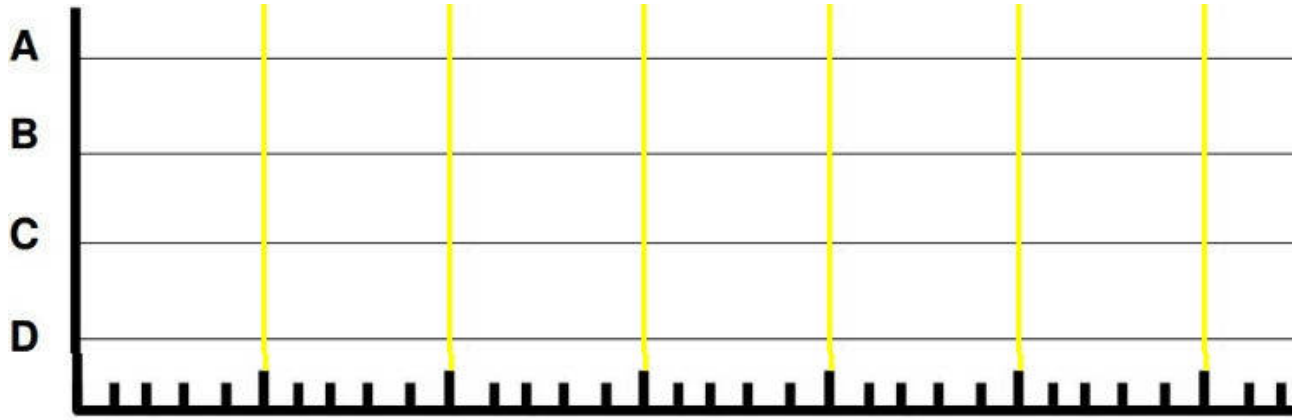
4. **2017-2**

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?