

Select the min. time in machine A and B.

If min. time is of machine B, then their corresponding job is written in the end of sequence (ie 1). and other job corresponding to B-machine is written right to left from end of sequence. If min. time is of machine A then their corresponding job is written in the beginning of job sequence and other job corresponding to A machine is written left to right from the beginning of sequences. If min. time same in machine A and B then take diff. of machine A and B corresponding to same time and job corresponding to less diff. time is written 1st and second min. time and so on corresponding to machine A and B.

To find total elapse time:

Jobs	Machine A	Machine B	Ideal Time of machines
3	0	3	3
4	3	10	3
5	7	15	1
7	13	24	
2	25	33	
6	32	39	
1	39	44	

Total elapse time = 46.

Total elapse time for A machine = 44.

Ideal time for A machine = 46 - 44 = 2

Ideal time for B machine = 3 + 1 = 4

Que 9: Jobs. 1 2 3 4 5 6 7

M ₁	3	12	15	6	10	11	9
M ₂	8	10	10	6	12	1	3

→ This is 7 jobs and 2 machine problem 1st form job sequence.

M ₁	1	5	3	2	4	7	6
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To find total elapse time.

Jobs	Machine A	Machine B	Total or 1 st
1	0	3	3
5	3	10	3
3	13	13	2
2	28	28	2
4	40	40	
7	46	46	
6	55	55	

Total elapse time is = 67.

Total elapse time for machine A = 66.

Ideal time for A machine = $67 - 66 = 1$.

Ideal time for B machine = $3 + 2 + 3 + 2 + 7 = 17$.

1) N-Jobs and three machines (Que 17 to 27)

Job	A	B	C
1	4	5	8
2	9	6	10
3	8	2	6
4	6	3	7
5	5	4	11

OR.

Job	1	2	3	4	5
A	4	9	8	6	5
B	5	6	2	3	4
C	8	10	6	7	11

→ This is 5 jobs and 3-machines problem. Now convert 3 machine into two machine if any one or both condition is satisfied.

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i) $\min(A) \geq \max(B)$

ii) $\min(C) \geq \max(B)$

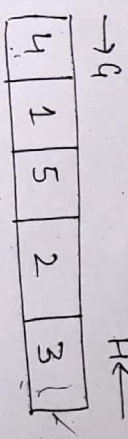
i.e. $\min(A) = 4$, $\max(B) = 6$, $\min(C) = 6$
Hence $\min(C) \geq \max(B)$

Then three machine can be converted into two machine Q and H.

i.e. $Q = A + B$
 $H = B + C$

Job	1	2	3	4	5
Q = (A+B)	9	15	10	9	9
H = (B+C)	13	16	8	10	15

This become 5 jobs and 2 machines problem. Now to form job sequence.



To find elapse time:

Jobs	In time	Out time	In time	Out time	In time	Out time	In time	Out time	Ideal time for C
4	0	6	0	6	0	6	0	6	6
1	6	15	6	15	6	15	6	15	15
5	10	24	10	24	10	24	10	24	24
2	15	24	15	24	15	24	15	24	24
3	24	32	24	32	24	32	24	32	32

Total elapse time = 31.

Ideal time for A = $51 - 32 = 19$

Ideal time for B = $6 + 1 + 0 + 5 + 2 + (51 - 34) = 31$

Ideal time for C = 9.

(c) n -jobs and n -machines (Que 28 to 32).

Que 28.)	Jobs	A	B	C	D
M_1		7	6	5	8
M_2		5	6	4	3
M_3		2	4	5	3
M_4		3	5	6	2
M_5		9	10	8	6

Solⁿ: This is 4-job and 5-machines problem.
 Now convert 5 machines into two machine if any one or both condition is satisfied.

- (i) $\min(m_1) \geq \max(m_2)$.
- (ii) $\min(m_1) \geq \max(m_3)$.
- (iii) $\min(m_1) \geq \max(m_4)$.
- (iv) $\min(m_5) \geq \max(m_2)$.
- (v) $\min(m_5) \geq \max(m_3)$.
- (vi) $\min(m_5) \geq \max(m_4)$.

i.e. $\min(m_1) = 5$, $\min(m_5) = 6$.
 $\max(m_2) = 5$, $\max(m_4) = 6$.
 $\max(m_2) = 6$.

Hence, $\min(m_2) \geq \max(m_3)$.
 $\min(m_5) \geq \max(m_2)$.
 $\min(m_5) \geq \max(m_3)$.
 $\min(m_5) \geq \max(m_4)$.

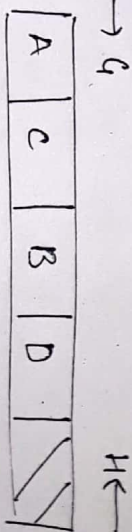
Thus five machine convert into two machine

Q and H.

i.e. $Q = m_1 + m_2 + m_3 + m_4$.
 $H = m_2 + m_3 + m_4 + m_5$.

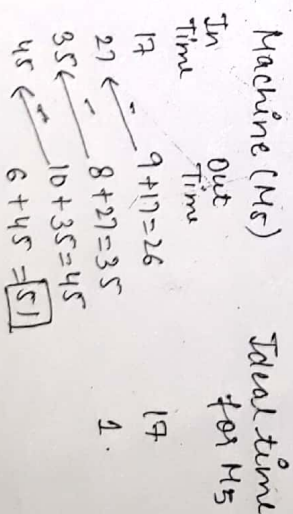
Jobs	A	B	C	D
Q	17	21	20	16
H	19	25	23	14

This become H-Jobs and 2-machines problem.
 Now to form job sequence.



To find elapse time.

Jobs	machine (M ₁)	Machine (M ₂)	Machine (M ₃)	Machine (M ₄)
A	In: 0, Out: 7	In: 7, Out: 12	In: 12, Out: 16	In: 16, Out: 21
B	In: 7, Out: 12	In: 12, Out: 18	In: 18, Out: 24	In: 24, Out: 28
C	In: 12, Out: 18	In: 18, Out: 26	In: 26, Out: 29	In: 29, Out: 31
D	In: 18, Out: 26	In: 26, Out: 29	In: 29, Out: 31	In: 31, Out: 31



Ideal time for M₅

17

1

Total make time = 51.

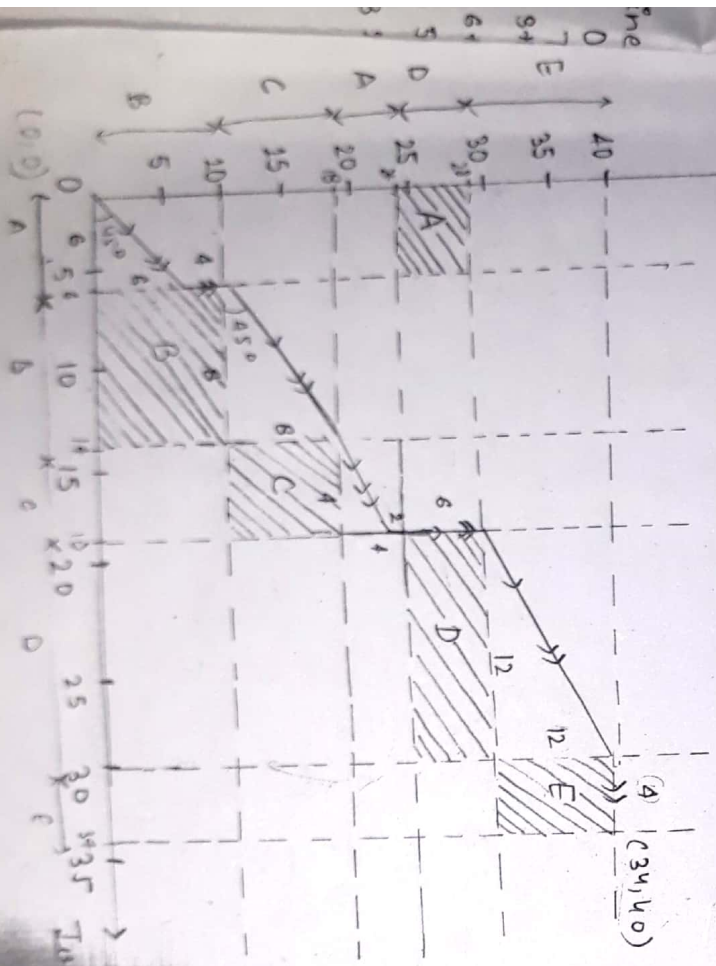
Ideal time for $M_1 = 51 - 26 = 25$

Ideal time for $M_2 = 7 + 2 + 2 + (51 - 29) = 11 + 22 = 33$

Total time for $M_3 = 12 + 2 + 3 + 1 + (51 - 31) = 18 + 20 = 38$

Ideal time for $M_4 = 14 + 4 + 1 + (51 - 35) = 19 + 16 = 35$

Ideal time for $M_5 = 17 + 1 = 18$



Job 1 : $(6 + 8 + 4 + 12 + 4) + 4 + 6$
working time Rest Time

= 44.

Job 2 : $6 + 4 + 8 + 4 + 4 + 6 + 12 + 4 = 44$

Job 1 work first on A before Job 2.

Job 2 work first on B before job 1.

Job 2 work first on C before job 1.

Job 2 work first on D before job 1.

Job 2 work first on E before job 1.