



Department of CSE

Critical Path Method and Gantt Chart

Course Name: IT Project Management and Entrepreneurship

Course Code: CSE 495

Section: 02

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Submitted To:

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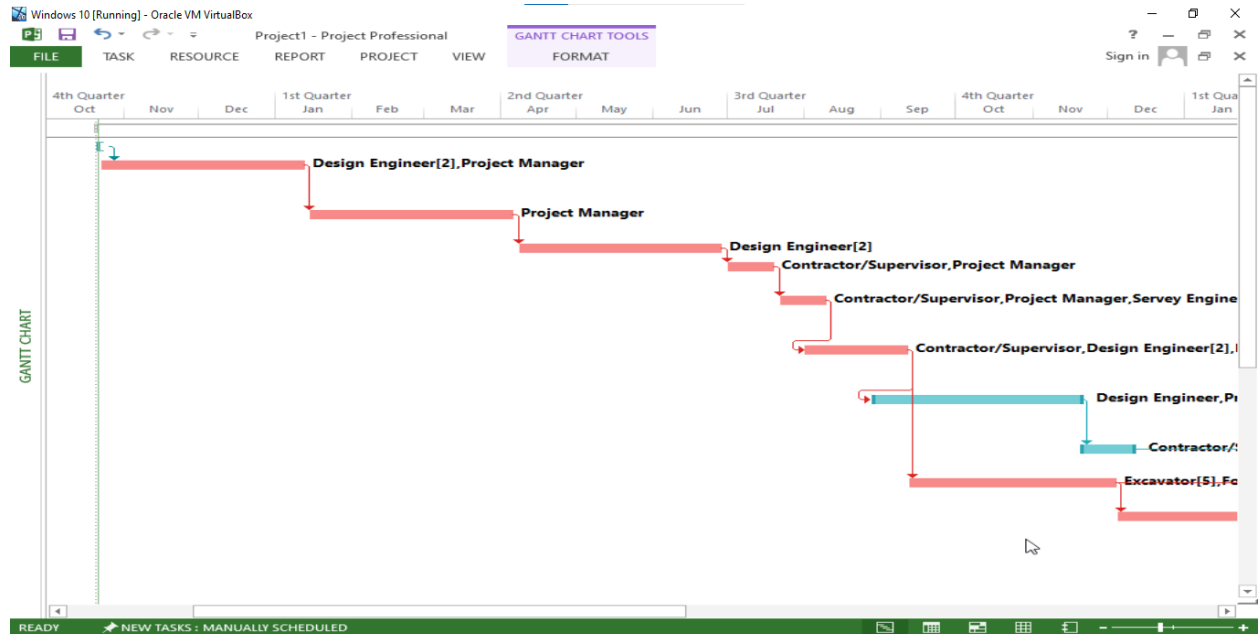
[Note: The last two digits of my ID are 11, that's why I consider that the duration of task no 13 is $(30+11)/41$ days everywhere]

1. Preparing the Gantt chart using software:

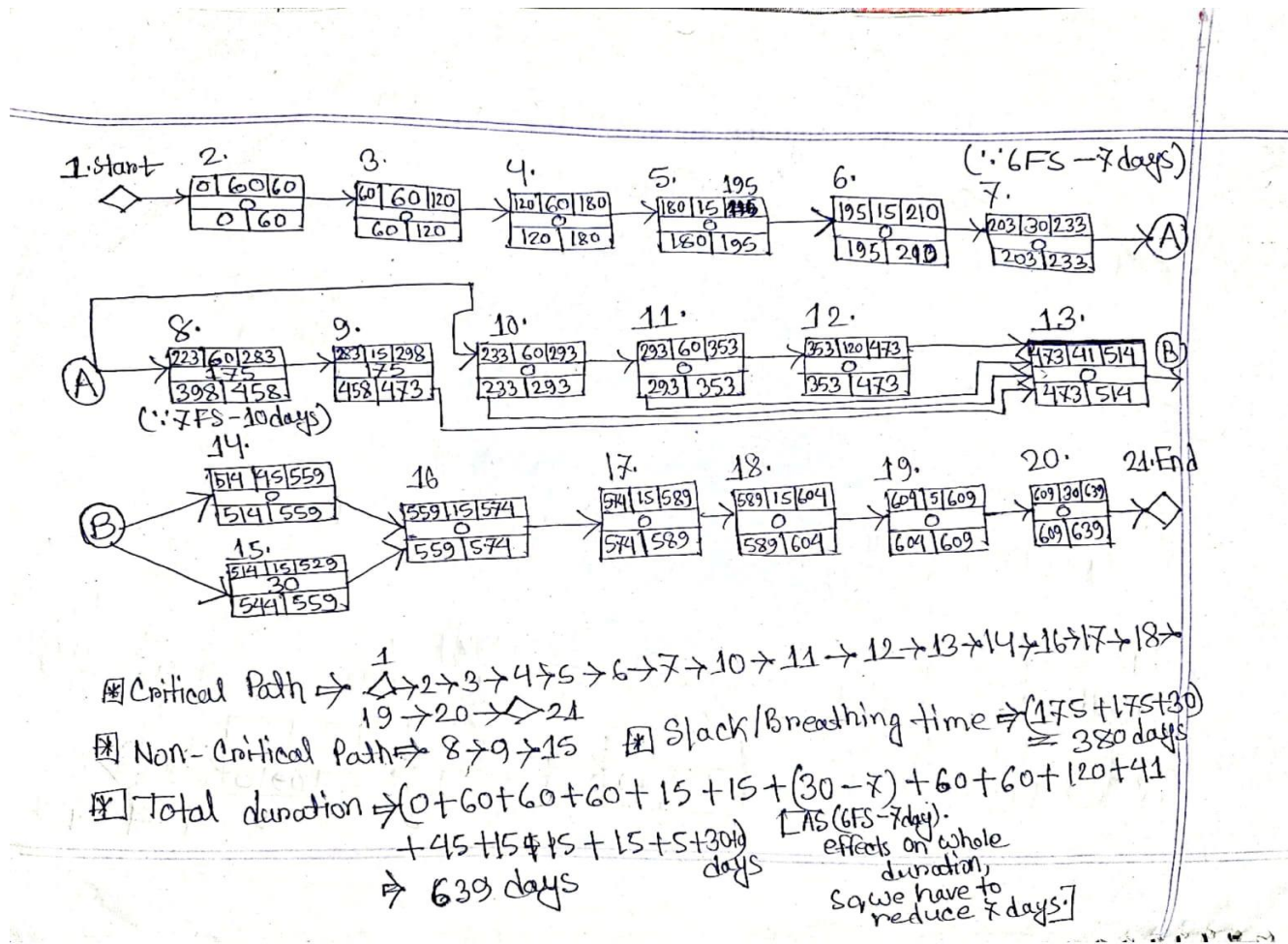
Assigning tasks, duration, Predecessors, and Successors:

	Task Name	Duration	Start	Finish	Precedence	Resource Names	Successors
0	Project1	639 day	Sat 10/2	Thu 4/2/26			
1	Start		Sat 10/21,				2
2	Bid Documt	60 days	Mon 10/2	Fri 12/24/21		Design Engineer[2],Project Manager	3
3	Tender Floo	60 days	Mon 1/15	Fri 4/5/24	2	Project Manager	4
4	Bid Evaluatc	60 days	Mon 4/8/	Fri 6/28/24	3	Design Engineer[2]	5
5	Contract Sig	15 days	Mon 7/1/	Fri 7/19/24	4	Contractor/Supervisor,Project Manager	6
6	Route Serv	15 days	Mon 7/22	Fri 8/9/24	5	Contractor/Supervisor,Project Manager,Ser	7FS-7 days
7	Design and	30 days	Thu 8/1/2	Wed 9/11/24	6FS-7	Contractor/Supervisor,Design Engineer[2],F	8FS-10 days
8	Material Pn	60 days	Thu 8/29/	Wed 11/2/24	7FS-10	Design Engineer,Project Manager,Site Engi	9
9	Material M	15 days	Thu 11/21	Wed 12/11/24		Contractor/Supervisor,Laborer[10],Site Engi	13
10	Excavation	60 days	Thu 9/12/	Wed 12/4/24	7	Excavator[5],Foreman[5],Laborer[25],Site E	11,13
11	Sand Bed Fi	60 days	Thu 12/5/	Wed 2/26/25	10	Foreman[3],Laborer[10]	12,13
12	Cable Tranc	120 days	Thu 2/27/	Wed 8/13/25	11	Laborer[5],Mason[5],Project Manager,Site E	13
13	Cable Layin	41 days	Thu 8/14/	Thu 10/9/25	12,9,11	Laborer[10],Foreman[2],Site Engineer	14,15
14	Cable Joint	45 days	Fri 10/10/	Thu 12/11/25	13	Cable Joint Expert[2],Contractor/Supervisor	16
15	Black Filling	15 days	Fri 10/10/	Thu 10/30/25	13	Foreman[2],Laborer[20],Site Engineer	16
16	Cable Term	15 days	Fri 12/2/	Thu 1/1/26	14,15	Cable Joint Expert[2],Foreman[2],Laborer[5]	17
17	Pre-Comm	15 days	Fri 1/16/26	Thu 1/22/26	16	Contractor/Supervisor,Design Engineer[2],F	18
18	Defect Rect	15 days	Fri 1/23/2	Thu 2/12/26	17	Foreman[2],Laborer[5],Site Engineer[3]	19
19	Commission	5 days	Fri 2/13/2	Thu 2/19/26	18	Contractor/Supervisor,Design Engineer[2],F	20
20	Project Clo	30 days	Fri 2/20/2	Thu 4/2/26	19	Contractor/Supervisor,Project Manager	21
21	END	0 days	Thu 4/2/2	Thu 4/2/26	20		

Preparing the Gantt chart by viewing the critical path:



2. Preparing the Gantt chart manually mentioning slack time on each task:



3. Determination:

a) Critical path:

1 → 2 → 3 → 4 → 5 → 6 → 7 → 10 → 11 → 12 → 13 → 14 → 16 → 17 → 18 → 19 → 20 → 21

b) Project Duration:

Total duration: (0+60+60+60+15+15+ (30-7)

+60+60+120+41+45+15+15+15+5+30+0) days = 639 days. [As for task no.7

Predecessors is 6FS - 7 days (It means task 7 has to start seven days earlier before task 6 has finished.), it impacts the whole duration of the project, so 7 days have to be reduced.]

c) Non-critical tasks along with slack time:

Non-critical tasks: 8 → 9 → 15

Slack time/Breathing time of non-critical tasks: (175+175+30) days = 380 days

d) Tasks that can be crashed/fast-tracked to save time:

Task no. 8 & 9 and 14 & 15 can only be crashed/fast-tracked to save time. Other tasks are included in the critical path. Therefore, there is no way to crash any other multiple tasks.

4. Allocating resources and checking for over-allocation. Trying to mitigate the problem of over-allocation:

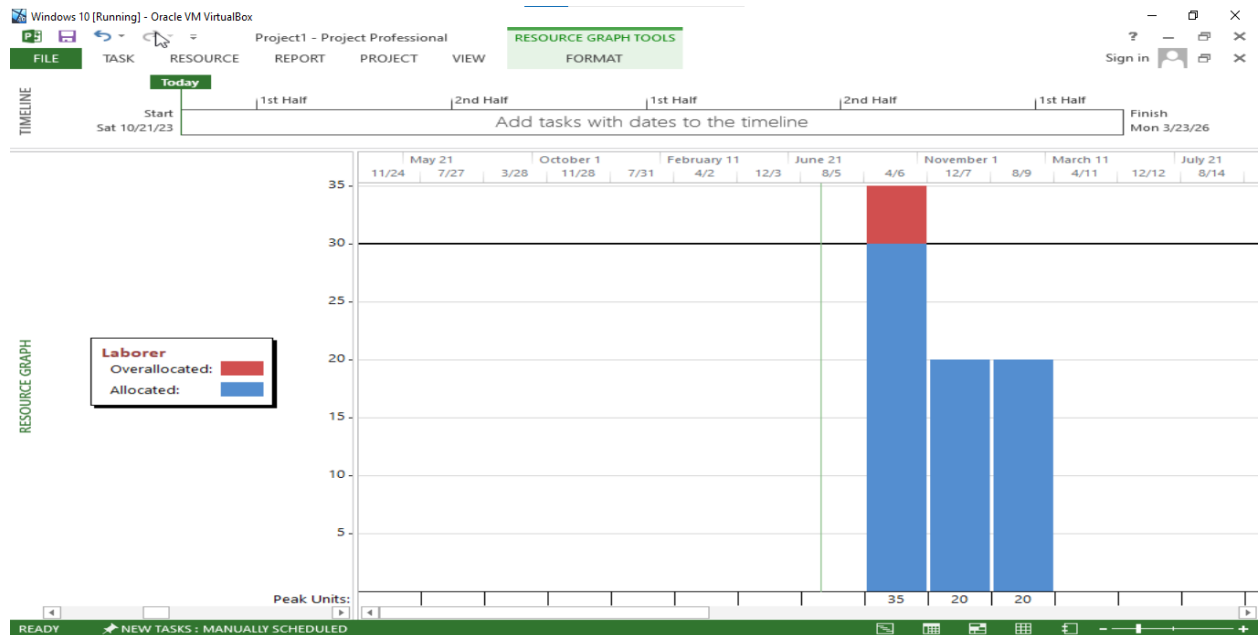
In this portion of the project, first I set the resources on the 'Resource Sheet' page, set the maximum number of resources, and set the standard rate of each resource in BDT/month. Then, I allocate the resources for each task in the 'Task Sheet' and also allocate the necessary number of resources which are needed for completing tasks without any problems.

Task Name	Duration	Start	Finish	Predecessors	Resource Names	Successors
0 Project1	639 day	Sat 10/2	Thu 4/2/2			
1 Start		Sat 10/21				2
2 Bid Documt	60 days	Mon 10/2	Fri 1/12/24	1	Design Engineer[2], Project Manager	3
3 Tender Floz	60 days	Mon 1/15	Fri 4/5/24	2	Project Manager	4
4 Bid Evalutic	60 days	Mon 4/8/	Fri 6/28/24	3	Design Engineer[2]	5
5 Contract Sig	15 days	Mon 7/1/	Fri 7/19/24	4	Contractor/Supervisor, Project Manager	6
6 Route Servi	15 days	Mon 7/22	Fri 8/9/24	5	Contractor/Supervisor, Project Manager, Ser	7FS-7 days
7 Design and	30 days	Thu 8/1/2	Wed 9/11/	6FS-7	Contractor/Supervisor, Design Engineer[2], F	8FS-10 days
8 Material Pr	60 days	Thu 8/29/	Wed 11/2/	7FS-10	Design Engineer, Project Manager, Site Engi	9
9 Material M	15 days	Thu 11/21	Wed 12/11	8	Contractor/Supervisor, Laborer[10], Site Engi	13
10 Excavation	60 days	Thu 9/12/	Wed 12/4/	7	Excavator[5], Foreman[5], Laborer[25], Site E	11,13
11 Sand Bed Fi	60 days	Thu 12/5/	Wed 2/26/	10	Foreman[3], Laborer[10]	12,13
12 Cable Tranc	120 days	Thu 2/27/	Wed 8/13/	11	Laborer[5], Mason[5], Project Manager, Site E	13
13 Cable Layin	41 days	Thu 8/14/	Thu 10/9/2	12,9,1	Laborer[10], Foreman[2], Site Engineer	14,15
14 Cable Joint	45 days	Fri 10/10/	Thu 12/11/	13	Cable Joint Expert[2], Contractor/Supervisor	16
15 Black Filling	15 days	Fri 10/10/	Thu 10/30/	13	Foreman[2], Laborer[20], Site Engineer	16
16 Cable Term	15 days	Fri 12/12/	Thu 1/1/2	14,15	Cable Joint Expert[2], Foreman[2], Laborer[5]	17
17 Pre-Comm	15 days	Fri 1/2/26	Thu 1/22/2	16	Contractor/Supervisor, Design Engineer[2], F	18
18 Defect Rect	15 days	Fri 1/23/2	Thu 2/12/2	17	Foreman[2], Laborer[5], Site Engineer[3]	19
19 Commission	5 days	Fri 2/13/2	Thu 2/19/2	18	Contractor/Supervisor, Design Engineer[2], F	20
20 Project Clo	30 days	Fri 2/20/2	Thu 4/2/2	19	Contractor/Supervisor, Project Manager	21
21 END	0 days	Thu 4/2/2	Thu 4/2/2	20		

After resource allocation, I checked the 'Resource Sheet', and then I saw these red markings. It means that the over-allocation problem has occurred.

Resource Name	Type	Material Label	Initials	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1 Project Manager	Work	P		1	80,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
2 Design Engineer	Work	D		2	63,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
3 Contractor/Supervisor	Work	C		1	70,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
4 Laborer	Work	L		30	24,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
5 Excavator	Work	E		5	30,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
6 Cable Joint Expert	Work	C		2	63,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
7 Foreman	Work	F		6	24,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
8 Site Engineer	Work	S		3	63,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
9 Mason	Work	M		5	30,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	
10 Servey Engineer	Work	S		1	35,000.00₹/mon	0.00₹/hr	0.00₹	Prorated	Standard	

Then I checked the 'Resource Graph' page to know the limit of the maximum number of resources.



To mitigate the problem of over-allocation, I changed the maximum number of resources for each resource to the limit shown on the 'Resource Graph' page.

Resource Name	Type	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1 Project Manager	Work	2	80,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
2 Design Engineer	Work	3	63,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
3 Contractor/Supervisor	Work	2	70,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
4 Laborer	Work	35	24,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
5 Excavator	Work	5	30,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
6 Cable Joint Expert	Work	2	63,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
7 Foreman	Work	6	24,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
8 Site Engineer	Work	3	63,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
9 Mason	Work	5	30,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	
10 Survey Engineer	Work	1	35,000.00\$/mon	0.00\$/hr	0.00\$/hr	Prorated	Standard	

5. Determination of the total project cost and task-wise project cost:

Here is the total cost of the whole project:

Project Statistics for 'Project1'			
	Start	Finish	
Current	Sat 10/21/23	Thu 4/2/26	
Baseline	NA	NA	
Actual	NA	NA	
Variance	0d	0d	
	Duration	Work	Cost
Current	639d	301.38mo	10,747,750.00₹
Baseline	0d	0mo	0.00₹
Actual	0d	0mo	0.00₹
Remaining	639d	301.38mo	10,747,750.00₹
Percent complete:			
Duration: 0%		Work: 0%	
			Close

Here is the task-wise project cost:

Project1 - Project Professional									
TASK SHEET TOOLS									
FORMAT									
FILE	TASK	RESOURCE	REPORT	PROJECT	VIEW				
Task Name	Duration	Start	Finish	Prec	Resource Names	Successors	Cost	Add New Column	
0 Project1	639 day	Sat 10/21/23	Thu 4/2/26				10,747,750.00₹		
1 Start		Sat 10/21/23				2	0.00₹		
2 Bid Document	60 days	Mon 10/2/23	Fri 1/12/24	1	Design Engineer[2], Project Manager	3	515,000.00₹		
3 Tender Flow	60 days	Mon 1/15/24	Fri 4/5/24	2	Project Manager	4	200,000.00₹		
4 Bid Evaluation	60 days	Mon 4/8/24	Fri 6/28/24	3	Design Engineer[2]	5	315,000.00₹		
5 Contract Sign	15 days	Mon 7/1/24	Fri 7/19/24	4	Contractor/Supervisor, Project Manager	6	93,750.00₹		
6 Route Survey	15 days	Mon 7/22/24	Fri 8/9/24	5	Contractor/Supervisor, Project Manager, Surveyor	7FS-7 days	155,000.00₹		
7 Design and Detail	30 days	Thu 8/1/24	Wed 9/11/24	6FS-7 days	Contractor/Supervisor, Design Engineer[2], Foreman[10]	8FS-10 days	423,750.00₹		
8 Material Procurement	60 days	Thu 8/29/24	Wed 11/20/24	7FS-10 days	Design Engineer, Project Manager, Site Engineer	9	515,000.00₹		
9 Material Mobilization	15 days	Thu 11/21/24	Wed 12/11/24	8	Contractor/Supervisor, Laborer[10], Site Engineer	13	233,125.00₹		
10 Excavation	60 days	Thu 9/12/24	Wed 12/4/24	7	Excavator[5], Foreman[5], Laborer[25], Site Engineer	11,13	2,490,000.00₹		
11 Sand Bed Formation	60 days	Thu 12/5/24	Wed 2/26/25	10	Foreman[3], Laborer[10]	12,13	780,000.00₹		
12 Cable Tranching	120 days	Thu 2/27/25	Wed 8/13/25	11	Laborer[5], Mason[5], Project Manager, Site Engineer	13	2,380,000.00₹		
13 Cable Laying	41 days	Thu 8/14/25	Thu 10/9/25	12,9,10	Laborer[10], Foreman[2], Site Engineer	14,15	599,625.00₹		
14 Cable Jointing	45 days	Fri 10/10/25	Thu 12/11/25	13	Cable Joint Expert[2], Contractor/Supervisor	16	738,750.00₹		
15 Backfilling	15 days	Fri 10/10/25	Thu 10/30/25	13	Foreman[2], Laborer[20], Site Engineer	16	369,375.00₹		
16 Cable Termination	15 days	Fri 12/12/25	Thu 1/1/26	14,15	Cable Joint Expert[2], Foreman[2], Laborer[5]	17	223,125.00₹		
17 Pre-Commissioning	15 days	Fri 1/2/26	Thu 1/22/26	16	Contractor/Supervisor, Design Engineer[2], Foreman[2]	18	211,875.00₹		
18 Defect Rectification	15 days	Fri 1/23/26	Thu 2/12/26	17	Foreman[2], Laborer[5], Site Engineer[3]	19	223,125.00₹		
19 Commissioning	5 days	Fri 2/13/26	Thu 2/19/26	18	Contractor/Supervisor, Design Engineer[2], Foreman[2]	20	93,750.00₹		
20 Project Closeout	30 days	Fri 2/20/26	Thu 4/2/26	19	Contractor/Supervisor, Project Manager	21	187,500.00₹		
21 END	0 days	Thu 4/2/26	Thu 4/2/26	20			0.00₹		