PLANNING AND SCHEDULING OF COMMERCIAL BUILDING PROJECT USING PRIMAVERA

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Abstract: To understand the scheduling and planning of a High-Rise building and schedule the list of the planned activities using computer applications. Indian cities are witnessing immense demographic expansion due to migration from surrounding villages, leading to urban sprawl, housing demand, rise in cost of land. Many citizens allover India migrate to the cities for better jobs and education. Industries, trade and commerce activities and number of educational centers in cities attract floating population from all their surrounding villages and districts. This has expanded the cities in all directions and all aspects of development. With an urban sprawl of kilometers, these face the problems of congestion, pollution, everyday commuting to workplace, competition, deforestation etc. Thus, there is a necessity that for a young nation like India, its Civil Engineers must be well equipped with the knowledge of high-rise buildings, since their proficiency in such structures is directly reflected on the overall infrastructure of the country.

Index Terms –PLANNING, SCHEDULING, PRIMAVERA,

I. INTRODUCTION

Planning and scheduling play pivotal roles in the successful execution of complex commercial building projects, ensuring that intricate processes are harmonized to meet project goals efficiently and within stipulated timelines. In this context, Primavera P6 emerges as an indispensable tool, empowering project managers and teams to navigate the intricacies of project management with precision and foresight. Primavera P6, a leading project management software, offers an integrated platform to strategize, monitor, and control various aspects of commercial building projects [1]. The software's robust features enable comprehensive planning, resource allocation, and scheduling, allowing stakeholders to align their efforts seamlessly. By facilitating the creation of detailed project plans, defining project scopes, and establishing realistic timelines, Primavera P6 sets the foundation for a coherent roadmap [2].

Commercial building projects demand meticulous coordination among diverse stakeholders, ranging from architects and engineers to contractors and suppliers. Primavera P6 fosters effective communication and collaboration by providing a centralized repository of project data, thereby promoting transparency and informed decision-making [3]. Through its advanced scheduling capabilities, the software empowers project managers to optimize resource utilization, identify potential bottlenecks, and proactively devise solutions, ensuring the project's progress remains on track. Primavera Systems, Inc. was a private company providing Project Portfolio Management (PPM) software to help project-intensive organizations identify, prioritize, and select project investments and plan, manage, and control projects and project portfolios of all sizes. On January 1, 2009 Oracle Corporation took legal ownership of Primavera. Primavera Systems, Inc. was founded on May 1, 1983 by Joel Koppelman and Dick Faris. It traded as a private company based in Pennsylvania (USA), developing software for the Project Portfolio Management market [4]. To help expand its product capabilities, Primavera acquired Eagle Ray Software Systems in 1999, Evolve Technologies (a professional services automation vendor) in 2003, Pro Sight (an IT portfolio management software vendor) in 2006, and, in the same year, Pert master (a project risk management software vendor) [5]. In 2008, Oracle announced it was acquiring Primavera, turning it into the Primavera Global Business Unit (PGBU). Oracle Corporation announced the release of version 8.3 of Primavera P6 Enterprise Project Portfolio Management. This version was stated to enhance and extend previous work, improved reporting, and user experience and application integrations. This version incorporated material from Oracle acquisitions of Skire and Instantis in 2012. In 2008, Oracle announced it was acquiring Primavera, turning it into the Primavera Global Business Unit (PGBU). Oracle Corporation announced the release of version 8.3 of Primavera P6 Enterprise Project Portfolio Management. This version was stated to enhance and extend previous work, improved reporting, and user experience and application integrations. This version incorporated material from Oracle acquisitions of Skire and Instantis in 2012[6]. In 2012 Primavera P6 EPPM, upgrade Release 8.2, added capabilities for governance, project-team participation, and project visibility. In addition, Primavera P6 Analytics Release 2.0 gained new enterprise-reporting tools and dashboards for monitoring and analyzing performance data, including geospatial analysis. Organizations could also investigate comparative trends and cause-and effect in multiple projects with Primavera Contract Management Release 14 as it now includes the report-writing capabilities of Oracle Business Intelligence Publisher[7].

Fig. 2.4.1.1 Primavera (Source Google)

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Commercial building projects demand meticulous coordination among diverse stakeholders, ranging from architects and engineers to contractors and suppliers. Primavera P6 fosters effective communication and collaboration by providing a centralized repository of project data, thereby promoting transparency and informed decision-making. Through its advanced scheduling capabilities, the software empowers project managers to optimize resource utilization, identify potential bottlenecks, and proactively devise solutions, ensuring the project's progress remains on track. Before implementing Primavera to schedule projects, team members and other project participants should understand the processes involved in project management and the associated recommendations that help smooth the Primavera implementation that supports your corporate mission. If you were driving to a place, you had never seen, would you get in the car without directions or a map? Probably not. More than likely you 'd take the time to plan your trip, consider alternate routes, and estimate your time of arrival. Planning the drive before you even left would help your trip be more successful. And, along the way, should you encounter roadblocks or traffic delays, you would have already identified alternate ways to reach your destination [9].

Project management follows the same methodology and purpose—to achieve each projects goals, you need to plan them in advance. Good project management is no longer an option in today 's corporate world. It is a critical tool to help your company stay on target and accomplish its goals. Simply stated, project management is the process of achieving set goals within the constraints of time, budget, and staffing restrictions. It allows you to get the most out of your available resources [10].

Project portfolio management factors in all of these variables across multiple projects, enabling project managers and company executives to see an accurate picture of how each project 's resource use affects other projects. The process of project management is guided by three key principles: Controlling a project once you have built your project and estimated your budgeting needs, you save this original plan as a baseline, or target schedule, to help you control the project. Primavera - Project Management Effective project control reaps many benefits. It allows you to keep a close eye on possible problems before they become critical. It lets the project team and senior management view cost and scheduling timeframes based on the reality of the schedule.

II. RELATED WORK

In the realm of planning and scheduling for commercial building projects, the utilization of tools like Primavera P6 has garnered significant attention within the construction management and project scheduling community. Primavera P6, a robust project management software, offers advanced features tailored to the complexities of commercial building endeavors [11].

Numerous research efforts have been directed towards optimizing the planning and scheduling processes using Primavera P6. Researchers have explored various aspects, including project scope definition, resource allocation, time and cost estimation, risk management, and progress tracking. By employing Primavera P6's comprehensive suite of tools, project managers can create detailed project plans, define work breakdown structures, allocate resources efficiently, and establish realistic timelines [12].

The integration of Primavera P6 with Building Information Modeling (BIM) technology has also gained traction in recent studies. This integration enables enhanced visualization and collaboration, facilitating better communication among stakeholders and aiding in clash detection, thereby reducing rework and delays[13].

Furthermore, research has delved into the implementation challenges and benefits of adopting Primavera P6 for commercial building projects. Studies have examined issues related to data input accuracy, software customization, training requirements, and the overall impact on project outcomes. Lessons learned from successful case studies have provided valuable insights for improving project management practices in the context of commercial construction.

III. PROBLEM STATEMENT

Efficient planning and scheduling are critical components in the realm of commercial building projects, often marred by complexities and challenges that hinder seamless execution. The problem at hand lies in the intricate nature of these projects, where numerous variables such as diverse stakeholder interests, resource constraints, and stringent timelines intersect. Traditional planning methods often fall short in addressing these complexities, leading to delays, cost overruns, and compromised quality. As a result, there is an urgent need for a comprehensive solution that can mitigate these challenges and optimize the planning and scheduling processes.

Primavera, a widely recognized project management software, presents itself as a potential solution. However, the problem persists in effectively integrating Primavera into the commercial building project context. While Primavera offers a range of tools for planning, scheduling, and resource allocation, the challenge lies in tailoring its functionalities to the unique demands of commercial

building projects. This necessitates a deep understanding of the software's capabilities and the project's intricacies, as well as the ability to align them harmoniously.

IV. PROPOSED METHODOLOGY

The proposed methodology for real-time face detection using FPGA involves a multi-step approach that harnesses the FPGA's hardware parallelism and reconfigurable nature to achieve efficient and low-latency face detection. Firstly, the project team would begin by conducting a comprehensive analysis of the project's scope, objectives, and stakeholders' needs. This assessment would guide the customization of Primavera's features to align with the project's unique characteristics. Next, a detailed work breakdown structure (WBS) would be developed to break down the project into manageable tasks. These tasks would then be assigned resources, durations, and dependencies using Primavera's scheduling tools. The critical path method (CPM) would be employed to identify the sequence of tasks that dictate the project's overall timeline. Additionally, resource allocation and leveling would be optimized to ensure efficient utilization and to mitigate potential bottlenecks.

Secondly, communication and collaboration mechanisms would be established among project stakeholders using Primavera's integrated platform. Regular project updates, progress reports, and potential issues would be shared in real-time, fostering transparency and enabling timely decision-making. The software's reporting and visualization tools would be utilized to create insightful dashboards and Gantt charts that provide a clear overview of project status. Furthermore, scenario analysis and "what-if" simulations could be conducted to assess the impact of changes on the project schedule. By combining these technical and collaborative elements, the proposed methodology aims to leverage Primavera's strengths in tandem with effective project management practices, leading to successful planning and scheduling of commercial building projects. For the purpose of planning and scheduling, we made our own plan and elevation to make our project unique. As it is not similar to any ongoing projects, we have made a list of all the activities by doing extensive surveys and interviews with the professionals.

The following steps are included in the process of scheduling via Primavera:

4.1 Creating EPS

The EPS is a hierarchy used to organize projects, and to associate Organizational level security with that project structure. When we create the enterprises project structure, you must identify an OBS element, or person responsible for each node and project within EPS.A default root node displays in the top left position in the hierarchy. All project listed below it are the part of same structure. You can also define multi root nodes to separate various component of you of your enterprises. For example, you might want to exclude inactive or what-if project from the main enterprises. To define root node, click the left arrow key to move an EPS element to top left position in the hierarchy, and then add the hierarchy of project below this node. Firstly, we had created the EPS of our project i.e. Enterprise Project Structure.

Steps:

- From the Enterprise column select EPS.
- Create a new EPS by giving proper name and ID.
- Go in project select the created EPS and add new project.
- From the file command select New.
- There will a dialogue box of select an EPS, select the created EPS.
- Give a name and an ID to the project.
- Specify start and must finish date of the project.
- Select a responsible manager for the project.
- Assign the rate type of the items.
- It will ask for project architect, Yes or No if we are only planning then select No option.
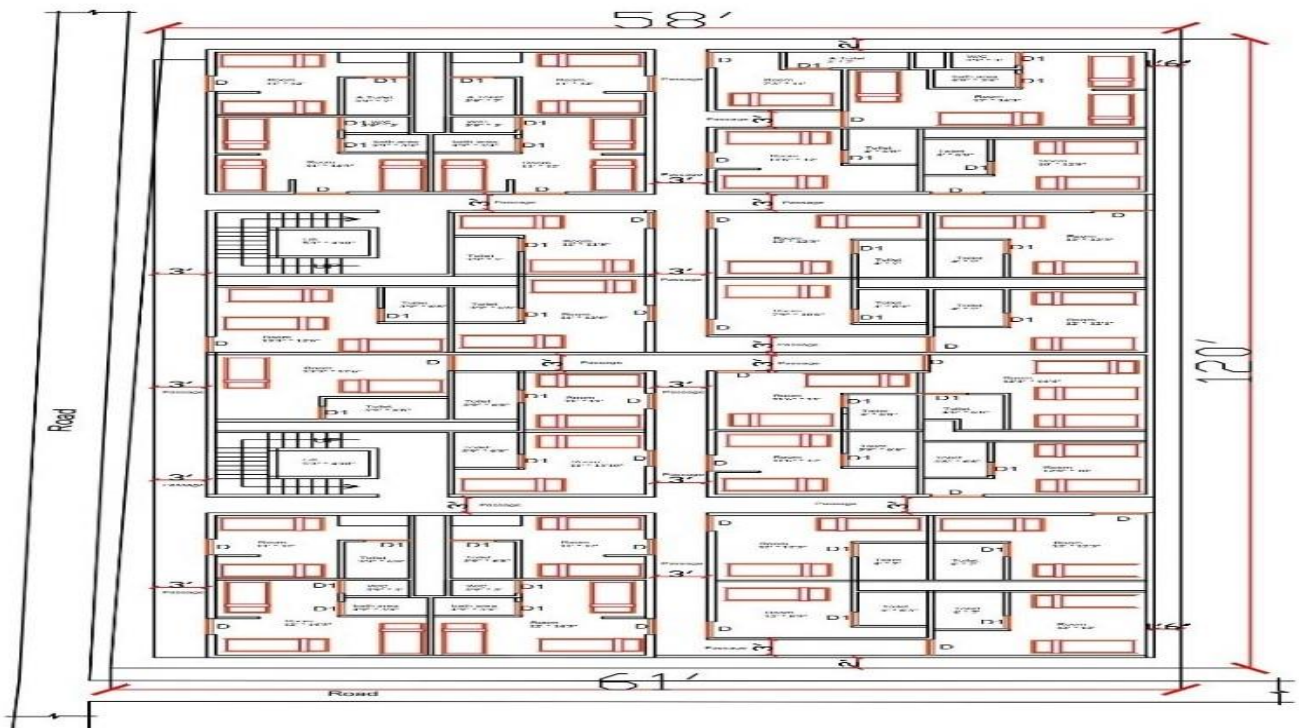
Typical floor plan
1st, 2nd, 3rd, 4th, 5th, 6th floor
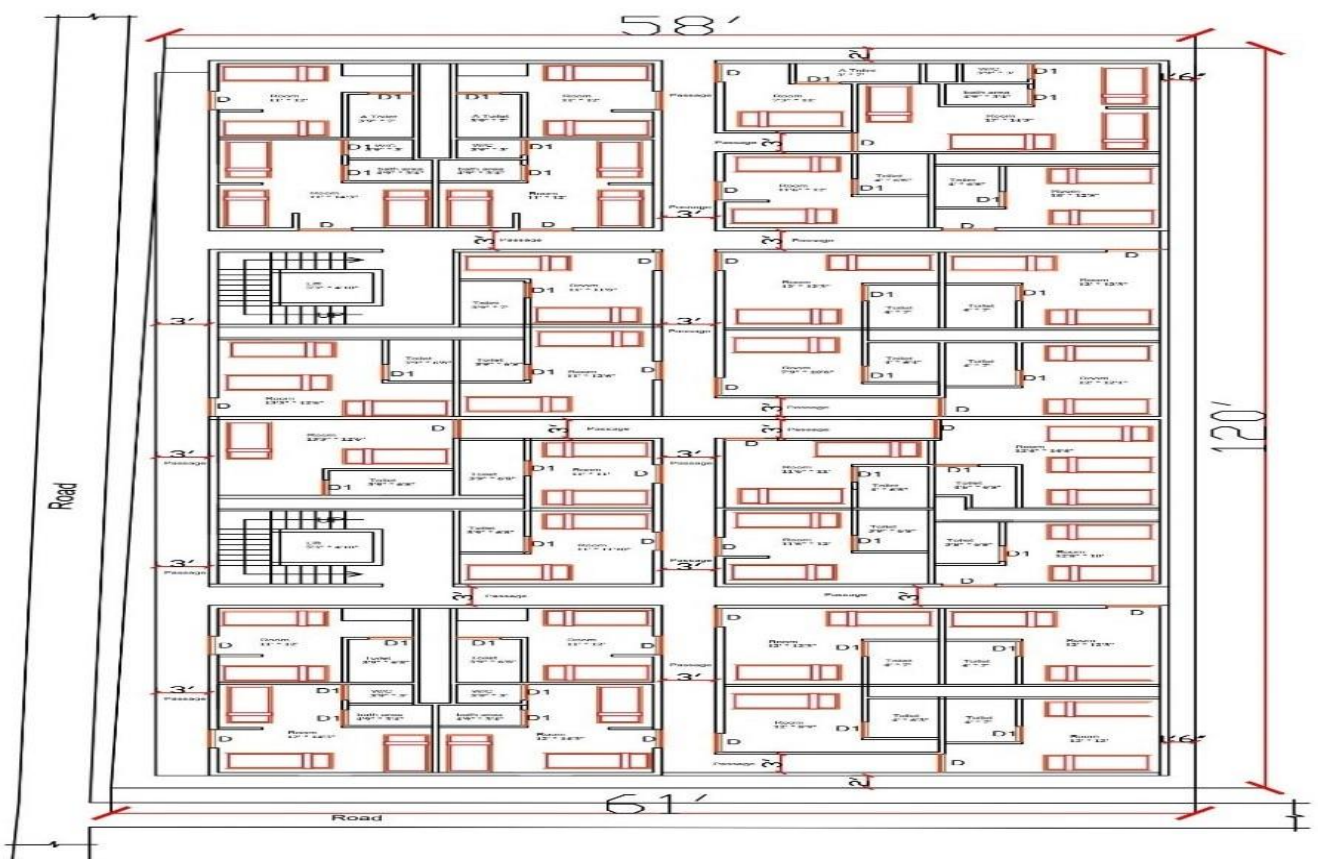
Ground floor plan

4.2 SCHEDULING

Scheduling is the process of determining the sequential order of the planned activities, assigning realistic durations to each activity and determining the start and finish dates of each activity. The project schedule provides a graphical representation of predicted task, milestone, dependencies, resources requirement, task duration and deadlines. The project schedule should be detailed to show each WBS to be performed, the name of the person responsible to completing the task, the start and end date of each task, and the expected duration of the task. Like the development of each of the project plan components, developing a schedule is an iterative process.

Milestone may suggest additional task, task may require additional resources, and task completion may be measured by additional milestone. For large, complex project, detailed sub-schedules may be required to show an adequate level of detail for each task.

Below mentioned are the Bar Charts generated in our project after scheduling the activities.
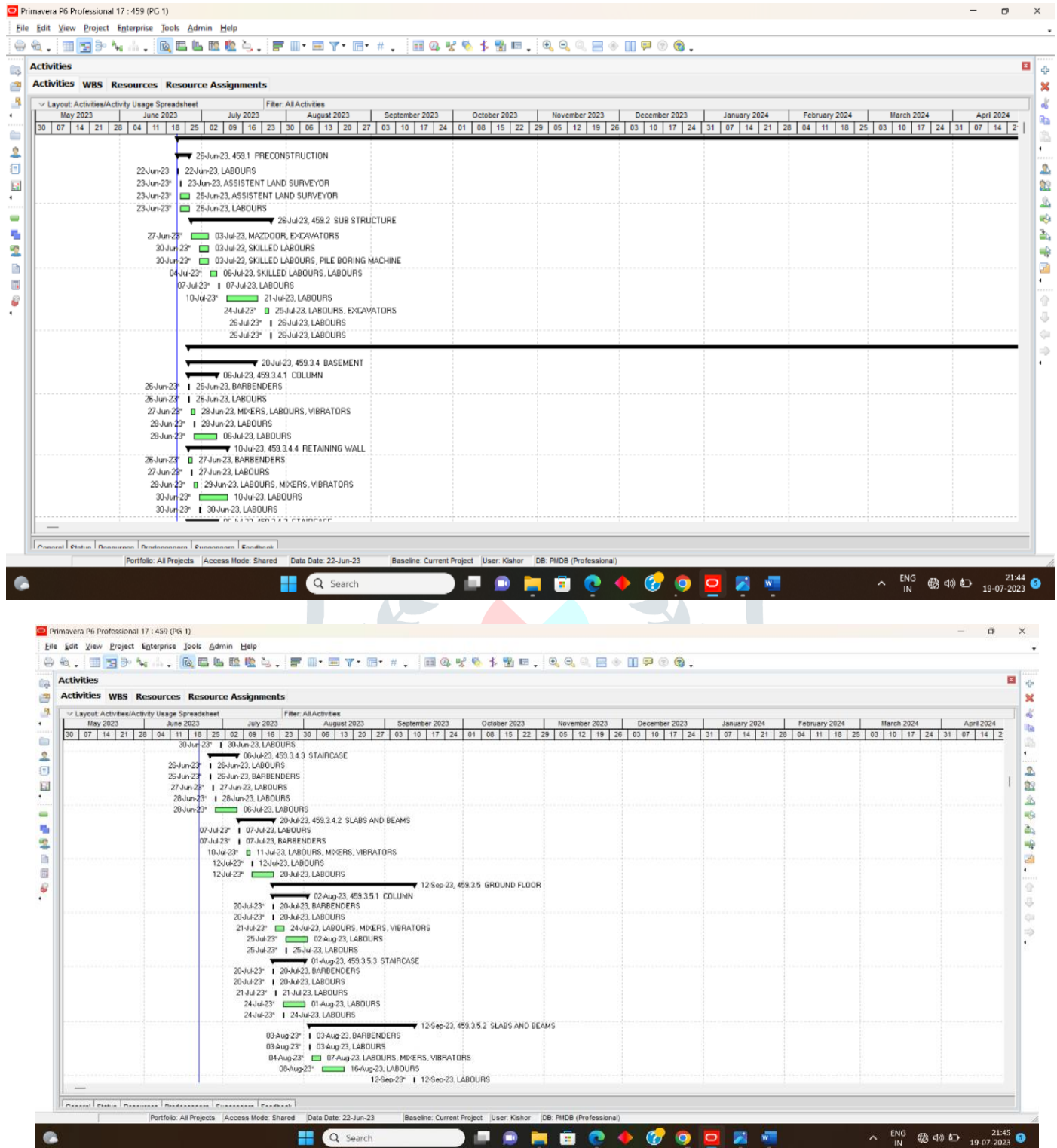
Fig. 4.1.1 Gantt Bar Chart of Project G + 6 storey structure

During the life of the project, actual progress is frequently compared with the original schedule. This allows for evaluation of development activities. The accuracy of planning process can also be assessed. Basic efforts associated with the developing a project schedule including the following: The type of schedule associated with project relates the complexity of the implementation. In project management, a schedule is a listing of a project's milestones, activities, and deliverables, usually with intended start and finish dates. Those items are often estimated by other information included in the project schedule of resource allocation, budget, task duration, and linkages of dependencies and scheduled events. A schedule is commonly used in the project planning and project portfolio management parts of project management. Elements on a schedule may be closely related to the work breakdown structure (WBS) terminal elements, the Statement of work, or a Contract Data Requirements List.

In many industries, such as engineering and construction, the development and maintenance of the project schedule is the responsibility of a full-time scheduler or team of schedulers, depending on the size of the project. Though the techniques of scheduling are well developed, they are inconsistently applied throughout industry. Standardization and promotion of scheduling best practices are being pursued by the Association for the Advancement of Cost Engineering (AACE), the Project Management Institute (PMI),

and the US Government for acquisition and accounting purposes. Establishing a project management schedule involves listing milestones, activities, and deliverables with intended start and finish dates, of which the scheduling of employees may be an element.

Thus, if the start of one activity lags behind the start of another, or if one must lead the other by a period of time, these Construction scheduling is intended to give us an understanding of when activities are to start and finish so crews, materials, and equipment can be effectively managed to complete a project on time and on budget. Schedule logic indicates which activity or activities must be completed before another or others can start. Originally, Critical Path Method (CPM) schedules (Activity on Node (AON) and Activity on Arrow (AOA)) had only Finish-to-Start (FS) relationships. Construction scheduling software manufacturers responded to the need for flexibility in activity relationships in a schedule by creating features permitting construction schedulers to create much more than simple Finish-to-Start networks. Along with the typical Finish-to-Start relationship, other types of relationships (Start to-Start, Finish-to-Finish, and Start-to-Finish) are available to define the logic between work activities. In addition, these relationships may be customized to further define the relationship between the activities, known as lag or lead time.

For example, after footings are complete, structural steel can start and once the structural steel is complete, then the building envelope can proceed. Finally, when the envelope is complete, interior finishes can begin. However, this is not the manner in which projects are typically constructed. More typically, the schedule is developed to a level of detail that permits only FS relationships, nor is it typically feasible to do this. Scheduling mechanical, electrical, and plumbing trades (MEP) on an apartment building is typically done with a SS and lag to the next trade, with the activity defined to a floor or a reasonable number of units. If these trades were scheduled FS, then the detail would have to be far greater in order to allow the trades to perform their work within the contractual time, while not performing work in the same place as other trades. The use of only FS relationships has the potential to increase the number of activities to unmanageable levels. Lags and Leads may be used to customize the schedule logic. A Lag/Lead tie permits a scheduler to link activity relationships in a way that approximates the degree to which one activity must not be finished before another can start or the degree to which an activity should precede other relationships can be incorporated into the schedule. This means that the plumbing crew can have a SS relationship to the electrical crew, with a short lag to allow the electrical crew to follow the plumbing crew shortly after they start, instead of waiting for their completion. The use of Lag/Lead ties is a common software schedule feature used with various types of ties; however, caution must be used to avoid mistakes. One such mistake is the creation of non-overlapping Lags. This happens when a rough schedule is developed or a template is used where lags exist.

V. RESULTS AND DISCUSSION

The Report Wizard in Primavera P6 allows for the inclusion of detailed information about the schedule. This data can be organized in columns, which may then be further sorted and filtered. Both simple and complex filters may be created to display the activities of interest, such as Completed or In Progress activities. In this chapter, we have generated logic report of our project. Its shows some of the reports generated in the project including the start and finish dates of the activities.

5.1 First Iteration results:

APARTMENT		Activities/Activity Usage Spreadsheet			17-Jul-23 13:53	
#	Activity ID	Activity Name	Original Duration	Start	Finish	
1	459 APARTMENT		762	22-Jun-23	22-May-26	
2	459.1 PRECONSTRUCTION		7	22-Jun-23	30-Jun-23	
3	A1000	SITE CLEARANCE	2	22-Jun-23	23-Jun-23	
4	A1010	SURVEYING	1	26-Jun-23*	26-Jun-23	
5	A1020	LAYOUT MARKING	2	27-Jun-23*	28-Jun-23	
6	A1030	WATER ARRANGEMENT	2	29-Jun-23*	30-Jun-23	
7	459.2 SUB STRUCTURE		45	03-Jul-23	01-Sep-23	
8	A1040	EARTHWORK EXCAVATION	7	03-Jul-23*	11-Jul-23	
9	A1060	PILE BORING	5	12-Jul-23*	18-Jul-23	
10	A1050	SOLING	2	19-Jul-23*	20-Jul-23	
11	A1070	PILE CAP CONSTRUCTION	5	21-Jul-23*	27-Jul-23	
12	A1080	BACK FILLING	3	28-Jul-23*	01-Aug-23	
13	A1090	PLINTH BEAM	14	02-Aug-23*	21-Aug-23	
14	A1100	EARTH FILLING	3	22-Aug-23*	24-Aug-23	
15	A1120	DPC	4	25-Aug-23*	30-Aug-23	
16	A1110	TERMITE TREATMENT	2	31-Aug-23*	01-Sep-23	
17	459.3 SUPER STRUCTURE		710	04-Sep-23	22-May-26	
18	459.3.4 BASEMENT		56	04-Sep-23	20-Nov-23	
19	459.3.4.1 COLUMN		18	04-Sep-23	27-Sep-23	
20	A1130	REINFORCEMENT	3	04-Sep-23*	06-Sep-23	
21	A1140	SHUTTERING	2	07-Sep-23*	08-Sep-23	
22	A1150	CONCRETING	5	11-Sep-23*	15-Sep-23	
23	A1160	DESHUTTERING	1	18-Sep-23*	18-Sep-23	
24	A1170	CURING	7	19-Sep-23*	27-Sep-23	
25	459.3.4.2 SLABS AND BEAMS		31	28-Sep-23	09-Nov-23	
26	A1180	SHUTTERING	2	28-Sep-23*	29-Sep-23	
27	A1190	REINFORCEMENT	5	02-Oct-23*	06-Oct-23	
28	A1200	CONCRETING	8	09-Oct-23*	18-Oct-23	
29	A1210	DESHUTTERING	2	19-Oct-23*	20-Oct-23	
30	A1220	CURING	14	23-Oct-23*	09-Nov-23	
31	459.3.4.3 STAIRCASE		14	10-Oct-23	27-Oct-23	
32	A1230	SHUTTERING	2	10-Oct-23*	11-Oct-23	
33	A1240	REINFORCEMENT	2	12-Oct-23*	13-Oct-23	
34	A1250	CONCRETING	2	16-Oct-23*	17-Oct-23	
35	A1260	DESHUTTERING	1	18-Oct-23*	18-Oct-23	
36	A1270	CURING	7	19-Oct-23*	27-Oct-23	
37	459.3.4.4 RETAINING WALL		16	30-Oct-23	20-Nov-23	
38	A1280	REINFORCEMENT	2	30-Oct-23*	31-Oct-23	
39	A1290	SHUTTERING	1	01-Nov-23*	01-Nov-23	
40	A1300	CONCRETING	5	02-Nov-23*	08-Nov-23	
41	A1320	DESHUTTERING	1	09-Nov-23*	09-Nov-23	
42	A1310	CURING	7	10-Nov-23*	20-Nov-23	
43	459.3.5 GROUND FLOOR		63	21-Nov-23	15-Feb-24	
44	459.3.5.1 COLUMN		18	21-Nov-23	14-Dec-23	
45	A1360	REINFORCEMENT	3	21-Nov-23*	23-Nov-23	
46	A1370	SHUTTERING	2	24-Nov-23*	27-Nov-23	
47	A1330	CONCRETING	5	28-Nov-23*	04-Dec-23	
48	A1350	DESHUTTERING	1	05-Dec-23*	05-Dec-23	
49	A1340	CURING	7	06-Dec-23*	14-Dec-23	
50	459.3.5.2 SLABS AND BEAMS		31	15-Dec-23	26-Jan-24	

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APARTMENT   Activities/Activity Usage Spreadsheet   17-Jul-23 14:00

#	Activity ID	Activity Name	Original Duration	Start	Finish	Resources
1	459 APARTMENT		222	22-Jun-23	26-Apr-24	
2	459.1 PRECONSTRUCTION		3	22-Jun-23	26-Jun-23	
3	A1000	SITE CLEARANCE	1	22-Jun-23	22-Jun-23	LABOURS
4	A1010	SURVEYING	1	23-Jun-23*	23-Jun-23	ASSISTENT LAND SURVEYOR
5	A1020	LAYOUT MARKING	2	23-Jun-23*	26-Jun-23	ASSISTENT LAND SURVEYOR
6	A1030	WATERARRANGEMENT	2	23-Jun-23*	26-Jun-23	LABOURS
7	459.2 SUB STRUCTURE		22	27-Jun-23	26-Jul-23	
8	A1040	EARTHWORK EXCAVATION	5	27-Jun-23*	03-Jul-23	MAZDOOR, EXCAVATORS
9	A1050	SOLING	2	30-Jun-23	03-Jul-23	SKILLED LABOURS
10	A1060	PILE BORING	2	30-Jun-23	03-Jul-23	SKILLED LABOURS, PILE BORING MAC
11	A1070	PILE CAP CONSTRUCTION	3	04-Jul-23*	06-Jul-23	SKILLED LABOURS, LABOURS
12	A1080	BACK FILLING	1	07-Jul-23*	07-Jul-23	LABOURS
13	A1090	PLINTH BEAM	10	10-Jul-23*	21-Jul-23	LABOURS
14	A1100	EARTH FILLING	2	24-Jul-23*	25-Jul-23	LABOURS, EXCAVATORS
15	A1110	TERMITE TREATMENT	1	26-Jul-23*	26-Jul-23	LABOURS
16	A1120	DPC	1	26-Jul-23*	26-Jul-23	LABOURS
17	459.3 SUPER STRUCTURE		220	26-Jun-23	26-Apr-24	
18	459.3.4 BASEMENT		19	26-Jun-23	20-Jul-23	
19	459.3.4.1 COLUMN		9	26-Jun-23	06-Jul-23	
20	A1130	REINFORCEMENT	1	26-Jun-23	26-Jun-23	BARBENDERS
21	A1140	SHUTTERING	1	26-Jun-23*	26-Jun-23	LABOURS
22	A1150	CONCRETING	2	27-Jun-23*	28-Jun-23	MIXERS, LABOURS, VIBRATORS
23	A1160	DESHUTTERING	1	28-Jun-23*	28-Jun-23	LABOURS
24	A1170	CURING	7	28-Jun-23*	06-Jul-23	LABOURS
25	459.3.4.4 RETAINING WALL		11	26-Jun-23	10-Jul-23	
26	A1280	REINFORCEMENT	2	26-Jun-23*	27-Jun-23	BARBENDERS
27	A1290	SHUTTERING	1	27-Jun-23*	27-Jun-23	LABOURS
28	A1300	CONCRETING	2	28-Jun-23*	29-Jun-23	LABOURS, MIXERS, VIBRATORS
29	A1310	CURING	7	30-Jun-23	10-Jul-23	LABOURS
30	A1320	DESHUTTERING	1	30-Jun-23*	30-Jun-23	LABOURS
31	459.3.4.3 STAIRCASE		9	26-Jun-23	06-Jul-23	
32	A1230	SHUTTERING	1	26-Jun-23*	26-Jun-23	LABOURS
33	A1240	REINFORCEMENT	1	26-Jun-23*	26-Jun-23	BARBENDERS
34	A1250	CONCRETING	1	27-Jun-23*	27-Jun-23	LABOURS
35	A1260	DESHUTTERING	1	28-Jun-23*	28-Jun-23	LABOURS
36	A1270	CURING	7	28-Jun-23*	06-Jul-23	LABOURS
37	459.3.4.2 SLABS AND BEAMS		10	07-Jul-23	20-Jul-23	
38	A1180	SHUTTERING	1	07-Jul-23*	07-Jul-23	LABOURS
39	A1190	REINFORCEMENT	1	07-Jul-23*	07-Jul-23	BARBENDERS
40	A1200	CONCRETING	2	10-Jul-23*	11-Jul-23	LABOURS, MIXERS, VIBRATORS
41	A1210	DESHUTTERING	1	12-Jul-23*	12-Jul-23	LABOURS
42	A1220	CURING	7	12-Jul-23*	20-Jul-23	LABOURS
43	459.3.5 GROUND FLOOR		39	20-Jul-23	12-Sep-23	
44	459.3.5.1 COLUMN		10	20-Jul-23	02-Aug-23	
45	A1360	REINFORCEMENT	1	20-Jul-23*	20-Jul-23	BARBENDERS
46	A1370	SHUTTERING	1	20-Jul-23*	20-Jul-23	LABOURS
47	A1330	CONCRETING	2	21-Jul-23*	24-Jul-23	LABOURS, MIXERS, VIBRATORS
48	A1340	CURING	7	25-Jul-23*	02-Aug-23	LABOURS
49	A1350	DESHUTTERING	1	25-Jul-23*	25-Jul-23	LABOURS
50	459.3.5.3 STAIRCASE		9	20-Jul-23	01-Aug-23	

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APARTMENT   Activities/Activity Usage Spreadsheet   17-Jul-23 13:53

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52	A1410	REINFORCEMENT	5	19-Dec-23*	25-Dec-23
53	A1380	CONCRETING	8	26-Dec-23	04-Jan-24
54	A1400	DESHUTTERING	2	05-Jan-24*	08-Jan-24
55	A1390		14	09-Jan-24*	26-Jan-24
56	459.3.5.3 STAIRCASE		14	29-Jan-24	15-Feb-24
57	A1470	SHUTTERING	2	29-Jan-24*	30-Jan-24
58	A1460	REINFORCEMENT	2	31-Jan-24*	01-Feb-24
59	A1430	CONCRETING	2	02-Feb-24*	05-Feb-24
60	A1490	DESHUTTERING	1	06-Feb-24*	06-Feb-24
61	A1480	CURING	7	07-Feb-24*	15-Feb-24
62	459.3.1 FIRST FLOOR		63	16-Feb-24	14-May-24
63	459.3.1.2 COLUMN		18	16-Feb-24	12-Mar-24
64	A1530	REINFORCEMENT	3	16-Feb-24*	20-Feb-24
65	A1540	SHUTTERING	2	21-Feb-24*	22-Feb-24
66	A1500	CONCRETING	5	23-Feb-24*	29-Feb-24
67	A1520	DESHUTTERING	1	01-Mar-24*	01-Mar-24
68	A1510	CURING	7	04-Mar-24*	12-Mar-24
69	459.3.1.4 SLABS AND BEAMS-1		31	13-Mar-24	24-Apr-24
70	A4000	SHUTTERING	2	13-Mar-24*	14-Mar-24
71	A3990	REINFORCEMENT	5	15-Mar-24*	21-Mar-24
72	A3960	CONCRETING	8	22-Mar-24*	02-Apr-24
73	A3980	DESHUTTERING	2	03-Apr-24*	04-Apr-24
74	A3970	CURING	14	05-Apr-24*	24-Apr-24
75	459.3.1.3 STAIRCASE		14	25-Apr-24	14-May-24
76	A1620	SHUTTERING	2	25-Apr-24*	26-Apr-24
77	A1610	REINFORCEMENT	2	29-Apr-24*	30-Apr-24
78	A1600	CONCRETING	2	01-May-24*	02-May-24
79	A1640	DESHUTTERING	1	03-May-24*	03-May-24
80	A1630	CURING	7	06-May-24*	14-May-24
81	459.3.2 SECOND FLOOR		63	15-May-24	09-Aug-24
82	459.3.2.2 COLUMN		18	15-May-24	07-Jun-24
83	A1680	REINFORCEMENT	3	15-May-24*	17-May-24
84	A1690	SHUTTERING	2	20-May-24*	21-May-24
85	A1650	CONCRETING	5	22-May-24*	28-May-24
86	A1670	DESHUTTERING	1	29-May-24*	29-May-24
87	A1660	CURING	7	30-May-24*	07-Jun-24
88	459.3.2.1 SLABS AND BEAMS		31	10-Jun-24	22-Jul-24
89	A1740	SHUTTERING	2	10-Jun-24*	11-Jun-24
90	A1730	REINFORCEMENT	5	12-Jun-24*	18-Jun-24
91	A1700	CONCRETING	8	19-Jun-24*	28-Jun-24
92	A1720	DESHUTTERING	2	01-Jul-24*	02-Jul-24
93	A1710	CURING	14	03-Jul-24*	22-Jul-24
94	459.3.2.3 STAIRCASE		14	23-Jul-24	09-Aug-24
95	A1770	SHUTTERING	2	23-Jul-24*	24-Jul-24
96	A1760	REINFORCEMENT	2	25-Jul-24*	26-Jul-24
97	A1750	CONCRETING	2	29-Jul-24*	30-Jul-24
98	A1790	DESHUTTERING	1	31-Jul-24*	31-Jul-24
99	A1780	CURING	7	01-Aug-24*	09-Aug-24
100	459.3.3 THIRD FLOOR		63	12-Aug-24	06-Nov-24
101	459.3.3.2 COLUMN		18	12-Aug-24	04-Sep-24

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5.2 Second Iteration results

APARTMENT — Activities/Activity Usage Spreadsheet — 17-Jul-23 14:00

#	Activity ID	Activity Name	Original Duration	Start	Finish	Resources
102	A3940	REINFORCEMENT	1	12-Oct-23*	12-Oct-23	BARBENDERS
103	A3950	SHUTTERING	1	12-Oct-23*	12-Oct-23	LABOURS
104	A3910	CONCRETING	2	13-Oct-23*	16-Oct-23	LABOURS, MIXERS, VIBRATORS
105	A3920	CURING	7	17-Oct-23*	25-Oct-23	LABOURS
106	A3930	DESHUTTERING	1	17-Oct-23*	17-Oct-23	LABOURS
107		459.3.2.3 STAIRCASE	9	12-Oct-23	24-Oct-23	
108	A4020	REINFORCEMENT	1	12-Oct-23*	12-Oct-23	BARBENDERS
109	A4030	SHUTTERING	1	12-Oct-23*	12-Oct-23	LABOURS
110	A4010	CONCRETING	1	13-Oct-23*	13-Oct-23	LABOURS, MIXERS, VIBRATORS
111	A4040	CURING	7	16-Oct-23*	24-Oct-23	LABOURS
112	A4050	DESHUTTERING	1	16-Oct-23*	16-Oct-23	LABOURS
113		459.3.2.2 SLABS AND BEAMS	10	18-Oct-23	31-Oct-23	
114	A3990	REINFORCEMENT	1	18-Oct-23*	18-Oct-23	BARBENDERS
115	A4000	SHUTTERING	1	18-Oct-23*	18-Oct-23	LABOURS
116	A3960	CONCRETING	2	19-Oct-23*	20-Oct-23	LABOURS, MIXERS, VIBRATORS
117	A3970	CURING	7	23-Oct-23*	31-Oct-23	LABOURS
118	A3980	DESHUTTERING	1	23-Oct-23*	23-Oct-23	LABOURS
119		459.3.3 FOURTH FLOOR	20	01-Nov-23	28-Nov-23	
120		459.3.3.1 COLUMN	10	01-Nov-23	14-Nov-23	
121	A4090	REINFORCEMENT	1	01-Nov-23*	01-Nov-23	BARBENDERS
122	A4100	SHUTTERING	1	01-Nov-23*	01-Nov-23	LABOURS
123	A4060	CONCRETING	2	02-Nov-23*	03-Nov-23	LABOURS, MIXERS, VIBRATORS
124	A4070	CURING	7	06-Nov-23*	14-Nov-23	LABOURS
125	A4080	DESHUTTERING	1	06-Nov-23*	06-Nov-23	LABOURS
126		459.3.3.3 STAIRCASE	9	01-Nov-23	13-Nov-23	
127	A4170	REINFORCEMENT	1	01-Nov-23*	01-Nov-23	BARBENDERS
128	A4180	SHUTTERING	1	01-Nov-23*	01-Nov-23	LABOURS
129	A4160	CONCRETING	1	02-Nov-23*	02-Nov-23	LABOURS, MIXERS, VIBRATORS
130	A4190	CURING	7	03-Nov-23*	13-Nov-23	LABOURS
131	A4200	DESHUTTERING	1	03-Nov-23*	03-Nov-23	LABOURS
132		459.3.3.2 SLABS AND BEAMS	10	15-Nov-23	28-Nov-23	
133	A4140	REINFORCEMENT	1	15-Nov-23*	15-Nov-23	BARBENDERS
134	A4150	SHUTTERING	1	15-Nov-23*	15-Nov-23	LABOURS
135	A4110	CONCRETING	2	16-Nov-23*	17-Nov-23	LABOURS, MIXERS, VIBRATORS
136	A4120	CURING	7	20-Nov-23*	28-Nov-23	LABOURS
137	A4130	DESHUTTERING	1	20-Nov-23*	20-Nov-23	LABOURS
138		459.3.6 FIFTH FLOOR	20	29-Nov-23	26-Dec-23	
139		459.3.6.1 COLUMN	10	29-Nov-23	12-Dec-23	
140	A4240	REINFORCEMENT	1	29-Nov-23*	29-Nov-23	BARBENDERS
141	A4250	SHUTTERING	1	29-Nov-23*	29-Nov-23	LABOURS
142	A4210	CONCRETING	2	30-Nov-23*	01-Dec-23	LABOURS, MIXERS, VIBRATORS
143	A4220	CURING	7	04-Dec-23*	12-Dec-23	LABOURS
144	A4230	DESHUTTERING	1	04-Dec-23*	04-Dec-23	LABOURS
145		459.3.6.3 STAIRCASE	9	29-Nov-23	11-Dec-23	
146	A4320	REINFORCEMENT	1	29-Nov-23*	29-Nov-23	BARBENDERS
147	A4330	SHUTTERING	1	29-Nov-23*	29-Nov-23	LABOURS
148	A4310	CONCRETING	1	30-Nov-23*	30-Nov-23	LABOURS, MIXERS, VIBRATORS
149	A4340	CURING	7	01-Dec-23*	11-Dec-23	LABOURS
150	A4350	DESHUTTERING	1	01-Dec-23*	01-Dec-23	LABOURS
151		459.3.6.2 SLABS AND BEAMS	10	13-Dec-23	26-Dec-23	
152	A4290	REINFORCEMENT	1	13-Dec-23*	13-Dec-23	BARBENDERS

APARTMENT — Activities/Activity Usage Spreadsheet — 17-Jul-23 14:00

#	Activity ID	Activity Name	Original Duration	Start	Finish	Resources
51	A1460	REINFORCEMENT	1	20-Jul-23*	20-Jul-23	BARBENDERS
52	A1470	SHUTTERING	1	20-Jul-23*	20-Jul-23	LABOURS
53	A1430	CONCRETING	1	21-Jul-23*	21-Jul-23	LABOURS
54	A1480	CURING	7	24-Jul-23*	01-Aug-23	LABOURS
55	A1490	DESHUTTERING	1	24-Jul-23*	24-Jul-23	LABOURS
56		459.3.5.2 SLABS AND BEAMS	29	03-Aug-23	12-Sep-23	
57	A1410	REINFORCEMENT	1	03-Aug-23*	03-Aug-23	BARBENDERS
58	A1420	SHUTTERING	1	03-Aug-23*	03-Aug-23	LABOURS
59	A1380	CONCRETING	2	04-Aug-23*	07-Aug-23	LABOURS, MIXERS, VIBRATORS
60	A1390	CURING	7	16-Aug-23*	23-Aug-23	LABOURS
61	A1400	DESHUTTERING	1	12-Sep-23*	12-Sep-23	LABOURS
62		459.3.17 FIRST FLOOR	20	17-Aug-23	13-Sep-23	
63		459.3.17.1 COLUMN	10	17-Aug-23	30-Aug-23	
64	A3640	REINFORCEMENT	1	17-Aug-23*	17-Aug-23	BARBENDERS
65	A3650	SHUTTERING	1	17-Aug-23*	17-Aug-23	LABOURS
66	A3610	CONCRETING	2	18-Aug-23*	21-Aug-23	LABOURS, MIXERS, VIBRATORS
67	A3620	CURING	7	22-Aug-23*	30-Aug-23	LABOURS
68	A3630	DESHUTTERING	1	22-Aug-23*	22-Aug-23	LABOURS
69		459.3.17.3 STAIRCASE	9	17-Aug-23	29-Aug-23	
70	A3720	REINFORCEMENT	1	17-Aug-23*	17-Aug-23	BARBENDERS
71	A3730	SHUTTERING	1	17-Aug-23*	17-Aug-23	LABOURS
72	A3710	CONCRETING	1	18-Aug-23*	18-Aug-23	LABOURS
73	A3740	CURING	7	21-Aug-23*	29-Aug-23	LABOURS
74	A3750	DESHUTTERING	1	21-Aug-23*	21-Aug-23	LABOURS
75		459.3.17.2 SLABS AND BEAMS	10	31-Aug-23	13-Sep-23	
76	A3690	REINFORCEMENT	1	31-Aug-23*	31-Aug-23	BARBENDERS
77	A3700	SHUTTERING	1	31-Aug-23*	31-Aug-23	LABOURS
78	A3660	CONCRETING	2	01-Sep-23*	04-Sep-23	LABOURS, MIXERS, VIBRATORS
79	A3670	CURING	7	05-Sep-23*	13-Sep-23	LABOURS
80	A3680	DESHUTTERING	1	05-Sep-23*	05-Sep-23	LABOURS
81		459.3.1 SECOND FLOOR	20	14-Sep-23	11-Oct-23	
82		459.3.1.1 COLUMN	10	14-Sep-23	27-Sep-23	
83	A3790	REINFORCEMENT	1	14-Sep-23*	14-Sep-23	BARBENDERS
84	A3800	SHUTTERING	1	14-Sep-23*	14-Sep-23	LABOURS
85	A3760	CONCRETING	2	15-Sep-23*	18-Sep-23	LABOURS, MIXERS, VIBRATORS
86	A3770	CURING	7	19-Sep-23*	27-Sep-23	LABOURS
87	A3780	DESHUTTERING	1	19-Sep-23*	19-Sep-23	LABOURS
88		459.3.1.3 STAIRCASE	9	14-Sep-23	26-Sep-23	
89	A3870	REINFORCEMENT	1	14-Sep-23*	14-Sep-23	BARBENDERS
90	A3880	SHUTTERING	1	14-Sep-23*	14-Sep-23	LABOURS
91	A3860	CONCRETING	1	15-Sep-23*	15-Sep-23	LABOURS, MIXERS, VIBRATORS
92	A3890	CURING	7	18-Sep-23*	26-Sep-23	LABOURS
93	A3900	DESHUTTERING	1	18-Sep-23*	18-Sep-23	LABOURS
94		459.3.1.2 SLABS AND BEAMS	10	28-Sep-23	11-Oct-23	
95	A3840	REINFORCEMENT	1	28-Sep-23*	28-Sep-23	BARBENDERS
96	A3850	SHUTTERING	1	28-Sep-23*	28-Sep-23	LABOURS
97	A3810	CONCRETING	2	29-Sep-23*	02-Oct-23	LABOURS, MIXERS, VIBRATORS
98	A3820	CURING	7	03-Oct-23*	11-Oct-23	LABOURS
99	A3830	DESHUTTERING	1	03-Oct-23*	03-Oct-23	LABOURS
100		459.3.2 THIRD FLOOR	14	12-Oct-23	31-Oct-23	
101		459.3.2.1 COLUMN	10	12-Oct-23	25-Oct-23	

#	Activity ID	Activity Name	Original Duration	Start	Finish	Resources
153	A4300	SHUTTERING	1	13-Dec-23	13-Dec-23	LABOURS
154	A4290	CONCRETING	2	14-Dec-23*	15-Dec-23	LABOURS, MIXERS, VIBRATORS
155	A4270	CURING	7	18-Dec-23*	26-Dec-23	LABOURS
156	A4280	DESHUTTERING	1	19-Dec-23*	19-Dec-23	LABOURS
157	459.3.7	SIXTH FLOOR	20	27-Dec-23	23-Jan-24	
158	459.3.7.1	COLUMN	10	27-Dec-23	09-Jan-24	
159	A4390	REINFORCEMENT	1	27-Dec-23*	27-Dec-23	BARBENDERS
160	A4400	SHUTTERING	1	27-Dec-23	27-Dec-23	LABOURS
161	A4360	CONCRETING	2	28-Dec-23*	29-Dec-23	LABOURS, MIXERS, VIBRATORS
162	A4370	CURING	7	01-Jan-24*	09-Jan-24	LABOURS
163	A4380	DESHUTTERING	1	01-Jan-24*	01-Jan-24	LABOURS
164	459.3.7.3	STAIRCASE	9	27-Dec-23	08-Jan-24	
165	A4470	REINFORCEMENT	1	27-Dec-23*	27-Dec-23	BARBENDERS
166	A4480	SHUTTERING	1	27-Dec-23*	27-Dec-23	LABOURS
167	A4460	CONCRETING	1	28-Dec-23	28-Dec-23	LABOURS, MIXERS, VIBRATORS
168	A4490	CURING	7	29-Dec-23*	08-Jan-24	LABOURS
169	A4500	DESHUTTERING	1	29-Dec-23*	29-Dec-23	LABOURS
170	459.3.7.2	SLABS AND BEAMS	10	10-Jan-24	23-Jan-24	
171	A4440	REINFORCEMENT	1	10-Jan-24*	10-Jan-24	BARBENDERS
172	A4450	SHUTTERING	1	10-Jan-24*	10-Jan-24	LABOURS
173	A4410	CONCRETING	2	11-Jan-24*	12-Jan-24	LABOURS, MIXERS, VIBRATORS
174	A4420	CURING	7	15-Jan-24*	23-Jan-24	LABOURS
175	A4430	DESHUTTERING	1	15-Jan-24*	15-Jan-24	LABOURS
176	459.3.9	MASONRY INCLUDING LINT	21	24-Jan-24	21-Feb-24	
177	A2400	GROUND FLOOR	3	24-Jan-24*	26-Jan-24	MASONS
178	A2410	FIRST FLOOR	3	29-Jan-24	31-Jan-24	MASONS
179	A2420	SECOND FLOOR	3	31-Jan-24*	02-Feb-24	MASONS
180	A2430	THIRD FLOOR	3	05-Feb-24*	07-Feb-24	MASONS
181	A2440	FOURTH FLOOR	3	08-Feb-24*	12-Feb-24	MASONS
182	A2450	FIFTH FLOOR	3	13-Feb-24*	15-Feb-24	MASONS
183	A2460	SIXTH FLOOR	3	16-Feb-24*	20-Feb-24	MASONS
184	A2470	PARAPET WALL	1	21-Feb-24*	21-Feb-24	MASONS
185	459.3.11	FINISHING	31	29-Jan-24	11-Mar-24	
186	459.3.11.1	PLASTERING	28	29-Jan-24	08-Mar-24	
187	459.3.11.1.10	INTERNAL	20	29-Jan-24	23-Feb-24	
188	A3	GROUND FLOOR	3	29-Jan-24	31-Jan-24	MASONS
189	A3	FIRST FLOOR	3	31-Jan-24*	02-Feb-24	MASONS
190	A3	SECOND FLOOR	3	05-Feb-24*	07-Feb-24	MASONS
191	A3	THIRD FLOOR	3	08-Feb-24*	12-Feb-24	MASONS
192	A3	FOURTH FLOOR	3	13-Feb-24*	15-Feb-24	MASONS
193	A3	FIFTH FLOOR	3	16-Feb-24*	20-Feb-24	MASONS
194	A3	SIXTH FLOOR	3	21-Feb-24*	23-Feb-24	MASONS
195	459.3.11.1.1	EXTERNAL	8	26-Feb-24	08-Mar-24	
196	A3	TOTAL EXTERNAL PLASTE	0	26-Feb-24*	06-Mar-24	MASONS
197	459.3.11.2	PAINTING	20	13-Feb-24	11-Mar-24	
198	459.3.11.2.10	INTERNAL	15	13-Feb-24	04-Mar-24	
199	A3	GROUND FLOOR	2	13-Feb-24*	14-Feb-24	LABOURS
200	A3	FIRST FLOOR	2	15-Feb-24*	16-Feb-24	LABOURS
201	A3	SECOND FLOOR	2	19-Feb-24*	20-Feb-24	LABOURS
202	A3	THIRD FLOOR	2	21-Feb-24*	22-Feb-24	LABOURS
203	A3	FOURTH FLOOR	2	26-Feb-24*	27-Feb-24	LABOURS

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VI. CONCLUSION

From first iteration it is found that the project requires 3 years' time to complete after second iteration it is found that the project requires only 1 year to complete which is possible by preparing the labour schedule, material schedule and gantt chart. The completion time of the project is reduced from 1 to 3 years the project in such a way that some of the activities can be started at the same time for example curing of the columns and bar bending schedule for the staircase or slabs can be prepared at the same time and increasing the number of labours required per day similarly increasing the numbers of machineries and equipment's etc.

We can conclude that by using primavera software the project can be managed properly and we can complete the project either the expected time and estimated cost. The management is necessary to reduce the wastage and losses over materials and machienary and to use the available resources effectively and efficiently. Primavera software is most useful for managing a commercial, industrial or any type of high-rise building. Estimation of quantities of material like concrete, steel, bricks, paints, tiling, and sanitary fixtures can be determined according to the given plan. Estimation of the required manpower and machinery can be carried out for further ease in scheduling. Keeping the resource as time as a constraint, manpower, machinery, and money can be optimized so as to achieve a quality product that is also economical. Through Primavera, Resource Allocation and Resource leveling techniques can be applied for calculating the total budget of the project.
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VII. ACKNOWLEDGMENT

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