COMMERCIAL BUILDING
CONSTRUCTION PROJECT MANAGEMENT
CE4010

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Project Overview:

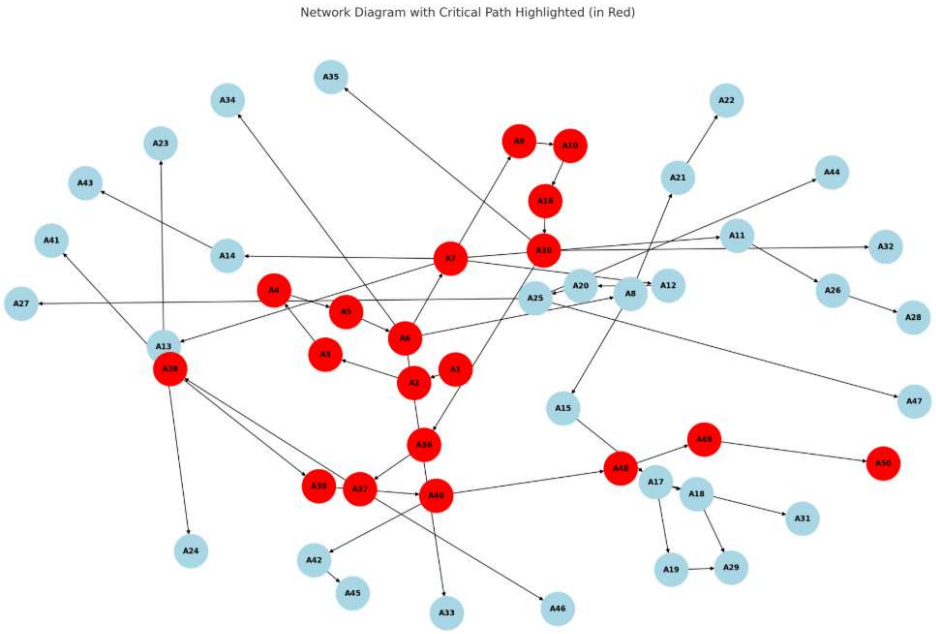
The project entails planning and construction of a multi-storey hostel building with all the necessary amenities. The objective is to provide a functional, well-finished residential complex enabling student/staff housing within the given time and resource constraints. There are 50+ activities scheduled with a minute-to-minute timetable by the use of Program Evaluation and Review Technique (PERT). PERT employs Optimistic (To), Most Likely (Tm), and Pessimistic (Tp) time estimates for calculating the Expected Time (Te) and Variance of each activity.

Major Assumptions:

- Resources (equipment, material, labour) are readily available without delays or shortages.
- Weather conditions are favourable throughout the construction period with no major slowdowns.
- Regulatory Approvals are taken to be obtained without any surprise bureaucratic holdups.
- Dependencies between activities are static and correct.
- Labor Productivity is uniform and according to normal norms

Activity Schedule: The table lists all 50 activities, their predecessors, PERT estimates, expected durations, and variances is attached at the end.

Network Diagram:



The network diagram shows the order of logic and interdependencies of all 50 activities of the hostel construction project. Each activity has been shown in the form of a node and the direction arrows represent precedence relation among tasks.
Critical path is the most time-consuming path in the network, which denotes the minimum duration required to complete the project. Delay in activities on the critical path will delay the entire project duration.
Critical Path Nodes
The critical path consists of the following activity sequence:
A1, A2, A3, A4, A5, A6, A7, A9, A10, A16, A30, A36, A37, A38, A39, A40, A48, A49, A50
Critical Path Sequence:
A1 → A2 → A3 → A4 → A5 → A6 → A7 → A9 → A10 → A16 → A30 → A36 → A37 → A38 → A39 → A40 → A48 → A49 → A50
Total Duration:
Around 129 days, based on adding up the forecasted durations (Te) for the critical path.

Resource Loading Table for Hostel Building Project, indicating the total work (in days) assigned to each resource type according to the anticipated duration (Te) of activities is attached at the end.

Summary:
The **Hostel Building Construction Project** was planned and scheduled using the **Program Evaluation and Review Technique (PERT)** to effectively manage time, resources, and dependencies across 50 well-defined activities. The project utilizes three-point estimates (Optimistic, Most Likely, Pessimistic) to compute the expected durations and variances, ensuring a probabilistic and risk-aware timeline.

Key highlights of the project include:

- **Total Project Duration:** Approximately **129 days**, based on the computed critical path.
- **Critical Path:** A1 → A2 → A3 → A4 → A5 → A6 → A7 → A9 → A10 → A16 → A30 → A36 → A37 → A38 → A39 → A40 → A48 → A49 → A50. These activities have **zero float**, and any delay in them will directly affect the completion date.
- **Float Analysis:** Non-critical activities have float values, enabling scheduling flexibility. For instance, A13 (HVAC Installation) and A33 (Staircase Installation) allow minor delays without project impact.
- **Resource Loading:** Resource allocation was calculated using expected activity durations. The most heavily involved resources are **Electricians (27.34 days)**, **Carpenters (23.17 days)**, and **Plumbers (23.17 days)**, highlighting their critical role in the construction timeline.
- **Network Diagram:** A directed activity-on-node network was developed to visualize logical dependencies and assist in tracking project flow. The **critical path was highlighted** to guide managerial attention.
- **Risk Assumptions:** The project assumes smooth regulatory approvals, constant resource availability, favorable weather, and adherence to planned productivity levels.

In conclusion, this project plan ensures a structured and risk-mitigated approach to hostel construction. The clear identification of the critical path, effective resource distribution, and use of PERT allow for proactive management and timely project delivery.