PROJECT SCHEDULING

Project scheduling is the process of deciding how the work in a project will be organized as separate tasks, and when and how these tasks will be executed.

It is extremely inefficient to have a project that will take five years to complete and will need one thousand people at its peak and have all one thousand people on the payroll from the first day forward when only twenty people might be needed for the first year.

In project scheduling you should estimate the following for each task:

• Calendar time (Tasks should normally last at least a week and no longer than 2 months, if it takes longer than this, the task should be subdivided).

• Effort.

• Who will work on the tasks.

• Estimate the needed resources.

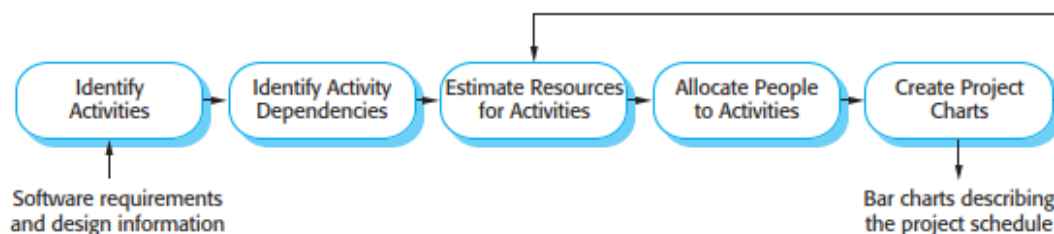Some of these tasks are carried out in parallel, with different people working on different components of the system.

Figure 6.1: the project scheduling process

⬛ <u>Schedule Representation:</u>

Graphical representations of project schedules have been developed that are often easier to read and understand. There are two types of representation that are commonly used:

1- <u>Activities Networks</u>

Which are network diagrams, that show the dependencies between the different activities making up a project.
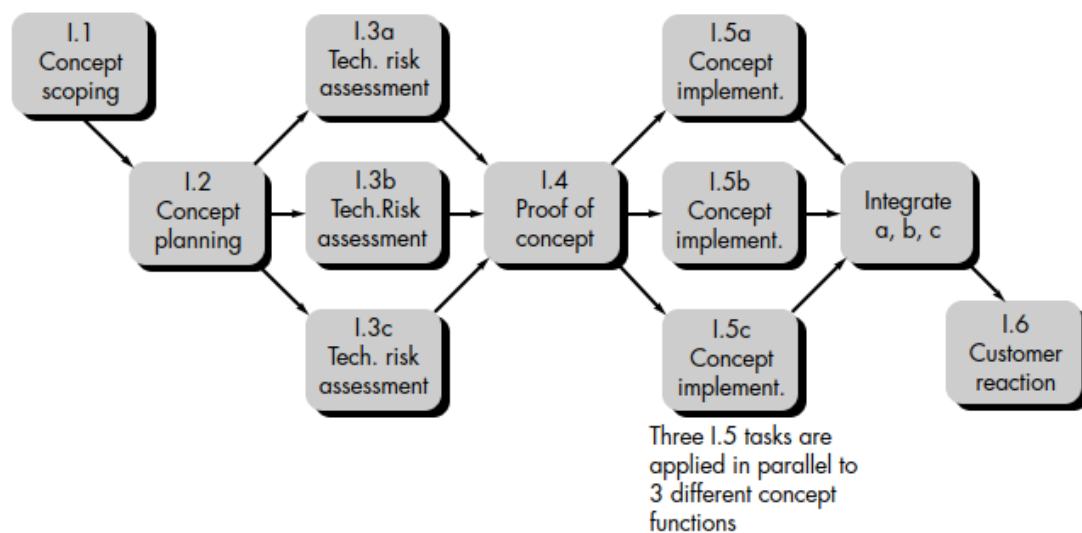
Figure 6.2: activity networks example

2- **Bar Chart**

Which is calendar-based, and shows who is responsible for each activity, the expected elapsed time, and when the activity is scheduled to begin and end. Bar charts are sometimes called "Gantt charts" or "Timeline charts".

Project activities are the basic planning element. Each activity has:

1- Duration in calendar days or months.

2- An effort estimate, which reflects the number of person-days or person-months to complete the work.

3- A deadline by which the activity should be completed.

4- A defined endpoint. This represents the result of completing the activity. This could be a document, the holding of a review meeting, the successful execution of all tests, etc.

When planning a project, you should also define milestones; that is, each stage in the project where a progress assessment can be made.

Milestones may be associated with a single task or with groups of related activities. For example, in table 1, milestone M1 is associated with task Tl and milestone M3 is associated with a pair of tasks, T2 and T4.

A special kind of milestone is the production of a project deliverable. A deliverable is a work product that is delivered to the customer. It is the outcome of a significant project phase such as specification or design.

Table 1: Tasks information

Task	Effort (person-days)	Duration (days)	Dependencies
T1	15	10	
T2	8	15	
T3	20	15	T1 (M1)
T4	5	10	
T5	5	10	T2, T4 (M3)
T6	10	5	T1, T2 (M4)
T7	25	20	T1 (M1)
T8	75	25	T4 (M2)
T9	10	15	T3, T6 (M5)
T10	20	15	T7, T8 (M6)
T11	10	10	T9 (M7)
T12	20	10	T10, T11 (M8)

The above table is Shown estimated effort, duration, and task interdependencies. From this table, you can see that task T3 is dependent on task T1. Task T1 must be completed before T3 starts. For example, T1 might be the preparation of a component design, and T3, the implementation of that design. Before implementation starts, the design should be complete.

The next figure takes the information from table 1 and presents the project schedule in a graphical format. It is a bar chart showing a project calendar and the start and finish dates of tasks. Reading from left to right, the bar chart clearly shows when tasks start and end. The milestones (M1, M2, etc.) are also shown on the bar chart. Notice that tasks that are independent are carried out in parallel (e.g., tasks T1, T2, and T4 all start at the beginning of the project).
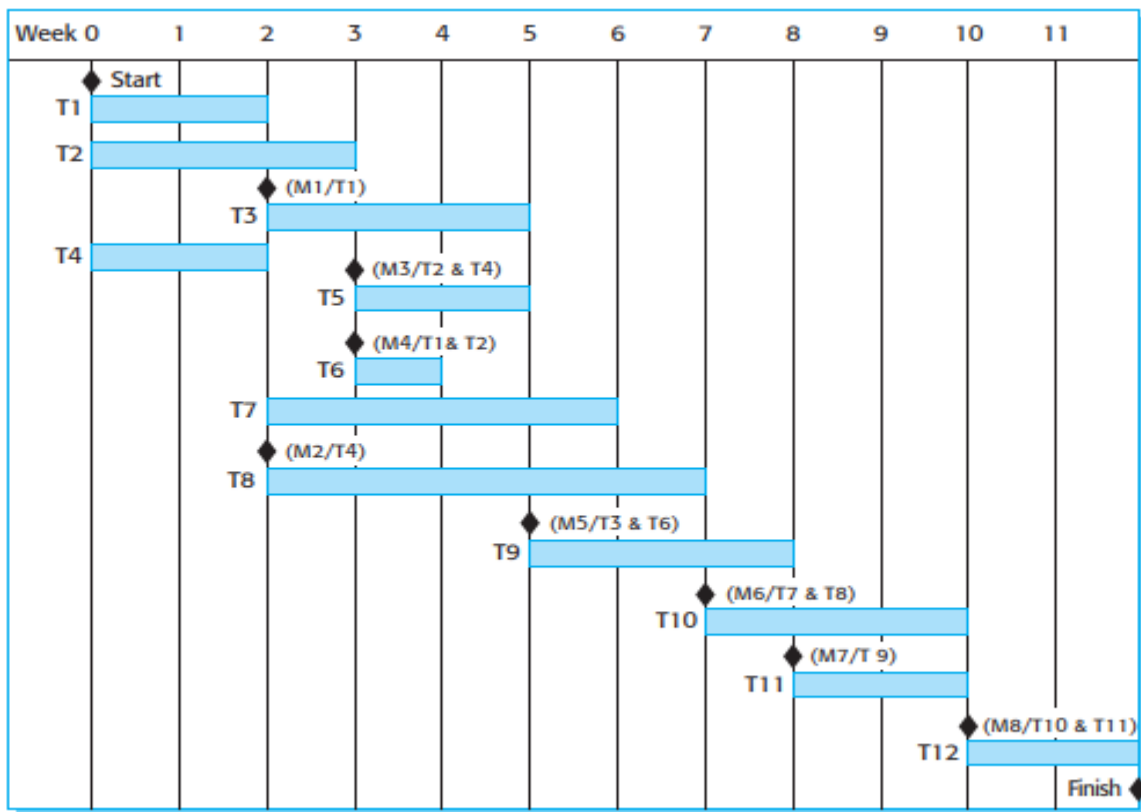
Figure 6.3: Bar charts

Example

A project, its activities are shown below, was started on (1/1/2022). Use the Gantt chart technique to find its estimated delivery date.

Activity	A	B	C	D	E	F	G	H	I	K
Duration (weeks)	3	4	4	2	3	3	4	4	5	6
Following Activity	B,D,E	C	I	F	G	H	I	----	K	----

Solution:

The project's Total Duration is 22 weeks.