Gantt Charts
Planning and scheduling complex projects

When a project is under way, Gantt Charts help you to monitor whether the project is on schedule. If it is not, it allows you to pinpoint the remedial action necessary to put it back on schedule.

Sequential and parallel activities:
An essential concept behind project planning is that some activities are dependent on other activities being completed first. As a shallow example, it is not a good idea to start building a bridge before you have designed it!

These dependent activities need to be completed in a sequence, with each stage being more-or-less completed before the next activity can begin. We can call dependent activities 'sequential' or 'linear'.

Other activities are not dependent on completion of any other tasks. These may be done at any time before or after a particular stage is reached. These are nondependent or 'parallel' tasks.

To draw up a Gantt diagram (Gant diagram), follow these steps:

1. List all activities in the plan
For each task, show the earliest start date, estimated length of time it will take, and whether it is parallel or sequential. If tasks are sequential, show which stages they depend on.

You will end up with a task list like the one in figure 1. This example shows the task list for a custom-written computer project. We will use this same example for both this section and the section on Critical Path Analysis and PERT. This will allow you to compare the results of the two approaches.

Figure 1. Gantt Chart Example: Planning a custom-written computer project
NB: The start week shows when resources become available. Whether a task is parallel or sequential depends largely on context.

Task	possible start	Length	Type	Dependent on...
1. High level analysis	week 1	5 days	sequential	
2. Selection of hardware platform	week 1	1 day	sequential	1
3. Installation and commissioning of hardware	week 3	2 weeks	parallel	2
4. Detailed analysis of core modules	week 1	2 weeks	sequential	1
5. Detailed analysis of supporting utilities	week 1	2 weeks	sequential	4
6. Programming of core modules	week 4	3 weeks	sequential	4
7. Programming of supporting modules	week 4	3 weeks	sequential	5

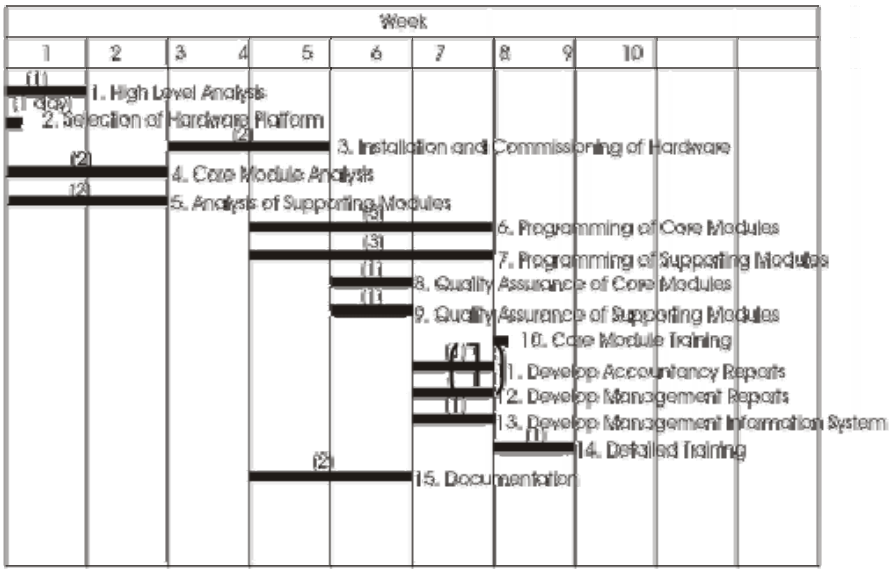
8. Quality assurance of core modules	week 5	1 week	sequential	6
9. Quality assurance of supporting modules	week 5	1 week	sequential	7
10.Core module training	week 7	1 day	parallel	6
11.Development of accounting reporting	week 6	1 week	parallel	5
12.Development of management reporting	week 6	1 week	parallel	5
13.Development of management analysis	week 6	2 weeks	sequential	5
14.Detailed training	week 7	1 week	sequential	1-13
15.Documentation	week 4	2 weeks	parallel	13

2. Head up graph paper with the days or weeks through to task completion

3. Plot the tasks onto the graph paper
Next draw up a rough draft of the Gantt Chart. Plot each task on the graph paper, showing it starting on the earliest possible date. Draw it as a bar, with the length of the bar being the length of the task. Above the task bars, mark the time taken to complete them. Do not worry about task scheduling yet. All you are doing is setting up the first draft of the analysis.

This will produce an untidy diagram like the one below:

Figure 2: Draft Gantt Chart: Example Computer Project



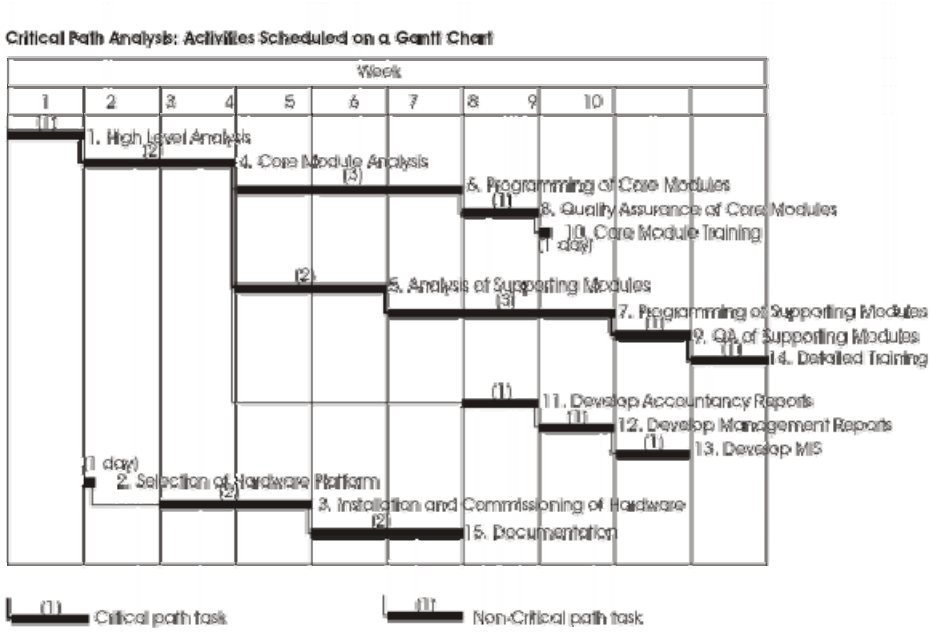
4. Schedule Activities
Now take the draft Gantt Chart, and use it to schedule actions. Schedule them in such a way that sequential actions are carried out in the required sequence. Ensure that dependent activities do not start until the activities they depend on have been completed.

Where possible, schedule parallel tasks so that they do not interfere with sequential actions on the critical path. While scheduling, ensure that you make best use of the resources you have available, and do not over-commit resource. Also allow some slack time in the schedule for holdups, overruns, quality rejections, failures in delivery, etc.

5. Presenting the Analysis

The final stage in this process is to prepare a final version of the Gantt Chart. This should combine the draft analysis (see above) with your scheduling and analysis of resources. This chart will show when you anticipate that jobs should start and finish.

A redrawn and scheduled version of the example project is shown below:



By drawing this example Gantt Chart, you can see that:

- If all goes well, the project can be completed in 10 weeks
- If you want to complete the task as rapidly as possible, you need:
    - 1 analyst for the first 5 weeks
    - 1 programmer for 6 weeks starting week 4
    - 1 programmer for 3 weeks starting week 6
    - Quality assurance resource for weeks 7 and 9
    - Hardware to be installed by the end of week 7
- Analysis, development and installation of supporting modules are essential activities that must be completed on time.

Hardware installation is a low priority task as long as it is completed by the end of week 7

Not only do these ease the drawing of Gantt Charts, they also make modification of plans easier and provide facilities for monitoring progress against plans, as well as generating resource histograms. Microsoft Project is reviewed at the top of the left hand sidebar.

Key points:

Gantt charts are useful tools for planning and scheduling projects. They allow you to assess how long a project should take, determine the resources needed, and lay out the order in which tasks need to be carried out. They are useful in managing the dependencies between tasks.

When a project is under way, Gantt charts are useful for monitoring its progress. You can immediately see what should have been achieved at a point in time, and can therefore take remedial action to bring the project back on course. This can be essential for the successful and profitable implementation of the project.