

Brief tutorial on Gantt charts

W. Durfee and T. Chase, 1999

Project Planning Basics

A "Project" is a set of activities which ends with specific accomplishments and which has (1) non-routine tasks, (2) distinct start/finish dates, and (3) resource constraints (time/money/people/equipment).

"Tasks" are activities which must be completed to achieve project goals. Break the project into tasks and subtasks. Tasks have start and end points, are short relative to the project and are significant (not "go to library", but rather, "search literature"). Use a verb-noun form for naming tasks, e.g. "create drawings" or "build prototype". Use action verbs such as "create", "define" and "gather" rather than "will be made". Each task has a duration. It is very difficult to estimate durations accurately. Doubling your best guess usually works well.

"Milestones" are important checkpoints or interim goals for a project. They can be used to catch scheduling problems early. Name them by noun-verb form, e.g. "report due", "parts ordered", "prototype complete". Your plan will evolve so be flexible and update on a regular basis. It also helps to identify risk areas for a project, for example, things you don't know how to do but will have to learn. These are risky because you may not have a good sense for how long the task will take. Or, you may not know how long it will take to receive components you purchased for a project.

Work Breakdown Statement

A work breakdown statement (WBS) is a categorized list of tasks with an estimate of resources required to complete the task. An example WBS appears below.

| WBS # | Task Description | Est Person-Hrs | Who | Resources | Materials & Supplies |
|-------|-----------------------|----------------|--------|---------------------|----------------------|
| 5 | Profile motor power | | | | |
| 5.1 | Design test stand | 20 | SE, JM | Pro/E | |
| 5.2 | Build test stand | 15 | SE, JM | Frame & brake parts | \$35 |
| 5.3 | Test 3 motors | 3 | SE, JM | Stroboscope | |
| 5.4 | Plot torque vs. speed | 2 | JM | Excel | \$75 |

Gantt Chart Basics

Gantt charts are a project planning tool that can be used to represent the timing of tasks required to complete a project. Because Gantt charts are simple to understand and easy to construct, they are used by most project managers for all but the most complex projects.

In a Gantt chart, each task takes up one row. Dates run along the top in increments of days, weeks or months, depending on the total length of the project. The expected time for each task is represented by a horizontal bar whose left end marks the expected beginning of the task and whose right end marks the expected completion date. Tasks may run sequentially, in parallel or

overlapping.

As the project progresses, the chart is updated by filling in the bars to a length proportional to the fraction of work that has been accomplished on the task. This way, one can get a quick reading of project progress by drawing a vertical line through the chart at the current date. Completed tasks lie to the left of the line and are completely filled in. Current tasks cross the line and are behind schedule if their filled-in section is to the left of the line and ahead of schedule if the filled-in section stops to the right of the line. Future tasks lie completely to the right of the line.

In constructing a Gantt chart, keep the tasks to a manageable number (no more than 15 or 20) so that the chart fits on a single page. More complex projects may require subordinate charts which detail the timing of all the sub-tasks which make up one of the main tasks. For team projects, it often helps to have an additional column containing numbers or initials which identify who on the team is responsible for the task.

Often the project has important events which you would like to appear on the project time line, but which are not tasks. For example, you may wish to highlight when a prototype is complete or the date of a design review. You enter these on a Gantt chart as "milestone" events and mark them with a special symbol, often an upside-down triangle.

Using a Spreadsheet to Make Gantt Charts

A Gantt chart can be made using a spreadsheet such as Microsoft Excel. Gantt charts made with Excel are easy to update and maintain. Here's how to do it.

On a piece of scrap paper, make a list of tasks and assign each task tentative start and stop dates (or durations) and the people responsible for the task. Also, list important milestones and their dates. If you have more than 15 or 20 tasks, split your project into main tasks and sub-tasks, then make an overall Gantt chart for the main tasks and separate Gantt charts for the sub-tasks which make up each main task.

Decide what resolution to use in the time line. For projects of three months or less, use days, for longer projects use weeks or months, and for very short project use hours. For these instructions, we will assume you have chosen a resolution of days.

Fire up Excel. Under Page Setup, select landscape orientation, and then select the options to center the chart horizontally and vertically on the page. Also under Page Setup, activate the "fit to one page" button. (Note that if the text comes out too small, you may have to print your chart on two pages and paste together. Even better, adjust the resolution of your date scale or drop less important tasks to make your chart fit comfortably on one page.) Still under Page Setup, set header and footer to be blank. (It's better to write the title right on the spreadsheet rather than use the header for the title. Finally, under Page Setup, turn off the option to print grid lines.

Set up the cells. You can use the example as a guide. Use the border command to draw boxes around the appropriate cells. Enter your scheduling data. To make the open bars which indicate length of task, select the appropriate cells, then the fill command (one of the buttons near the top).

As the project progresses, fill in the open bars with gray to denote the fraction of a task that is complete.

GANTT CHART

| Learning Objectives | Actions Planned | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 | Wk 8 | Wk 9 | Wk 10 | Wk 11 | Wk 12 | Wk 13 | |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------|---------------------|------------------------|---------|---------|----------------------------|---------------------|---------|---------------------------|-----------------------------|-----------------|-------------|----------|--|
| Demonstrate the importance of multi-professional collaboration | Write/present paper | <div></div> | Week 2 presentation | | | | | | | | | | | | |
| Recognize/distinguish various cultures prevalent at site | Write/present paper | | <div></div> | | | | | Week 6 presentation | | | | | | | |
| Develop more acute time management skills | Complete Gantt chart. Report progress in journal. | | <div></div> | Week 2 Gantt chart due | | | | | | | | | | | |
| | | | | <div></div> | | | | | | Week 8 journal report due | | | | | |
| Develop lesson plans for nutrition portfolio | Complete multi-professional group portfolio/presentation | | <div></div> | | | | | | | | Week 9 preparation complete | | | | |
| | | | | | | | | | | <div></div> | Week 10 presentation | | | | |
| Differentiate between all administrative duties within a WIC office | Observe processing of WIC client. Report in journal. | | | | | | <div></div> | | | Shadowing | | | | | |
| | | | | | | | Week 11 journal report due | | | | <div></div> | | | | |
| Articulate to the staff how active listening and empathy are tools in counseling | Observe counselor-client interaction at KKV and conduct nutrition counseling successfully. Report progress in journal. | | | | | | <div></div> | | | | | Observe/counsel | | | |
| | | | | | | | Week 11 journal report due | | | | <div></div> | | | | |
| Communicate to class about field experience | Write/present paper | | | | | | | | | Week 13 present paper | | | <div></div> | | |