

Software Engineering Project Management

Chapter 3: Effective Teams, Project Scheduling

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This chapter provides an overview of the core internals that make up a computer system.

Course Materials

Online Course Material

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Additional Materials

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Team Work

Effective Teams and Effective Meetings



Common goals

- No team can function well over a long period of time if there are no common goals. It is the glue that keeps people on the team pulling in the same direction.
- If people have different goals, their efforts will not be aligned, and organizational stress will result.
- If people on your team are fighting or showing other signs of stress, the first thing to check is if the goal is really shared by everyone.
- Often people give official goals lip service but have a hidden different agenda. Eventually this discontinuity will come out in bad behaviors.
- If you lead a team, one of the most powerful ways to unite people is to have everyone working towards a common goal.
- When a team has a common goal that is meaningful, it creates that significance.
- The key is the goal must be inspiring for the leader so when it is communicated, that inspiration and enthusiasm is carried.
- When a goal is communicated in such a way, the feelings of the leader are transferred to the team and the effect will be people acting with a sense of purpose.

Why are goals seen as so powerful when it comes to team working?

- Firstly a goal gives everyone a clear and specific outcome to aim for. The team knows what is trying to deliver and has a clear direction of travel.
- Secondly, delivering the goal, especially if it is going to make a big difference to a number of stakeholders becomes a huge desire for those in the team. This desire drives the team on, even when things are tough.
- Thirdly a common goal breaks down the barriers of which function or special area people work in and shifts the attention to delivering the result.

Ways to check if a team has common goals

- One way to check where each individual is on Maslow's Hierarchy of needs. Maslow posited that people have a hierarchy of needs as follows:
 1. Need for survival
 2. Safety needs
 3. Social and love needs

4. Needs for self worth
 5. Self actualization and growth needs.
- Maslow stated that if lower needs are not fully met, human beings cannot work on higher level needs.
 - This phenomenon often shows up in teams as individual differences. For example, if one person on the team is not feeling safe - level 2 (perhaps is afraid of being fired) then that person is not going to respond well to teambuilding efforts that focus on social or level 3 needs. This person's goals will not be in alignment with other people who may feel perfectly safe and are working on higher level needs.
 - So, the first thing to check on a team is whether everyone is in a position where they are capable of sharing common goals with others. If not, then corrective action needs to take place before trying to forge a common goal.

What Makes Good Objectives?

- Applying the SMART Principle to the team's objectives is a good test of whether they can be improved:
 - **Specific** : The team needs to understand exactly what is expected of them. Any lack of clarity can result in the team aiming off target (and missing the goal the visions)
 - **Measurable** : How will we know that we are on track? Particularly if the objective will take some time to be realised? Can we measure part way to know that we are heading in the right direction?
 - **Achievable** : Does the team members buy into the objectives? Do they believe that can deliver what is expected of them with the skills, training and time available?
 - **Realistic** : Are the objectives realistic? Will the goals you have set the team realistically deliver the vision desired.
 - **Timely** : You might have met all the criteria above, but do the team have sufficient time to do a competent job?

Ideas for creating a common goal include...

- Assign each and every member some responsibility and document it.
- Discuss why the team exists.
- Allow each team member to express commitment.
- Create mottoes, symbols, awards, or posters that show the team as one unit.
- Use the common purpose to prioritize team actions

What should team leaders do?

- Team leaders need to start a team project with open discussion about the common goals and listen to the alternatives.
- The goals should be fully discussed and all positions and agendas should be placed upon the table.
- Using a side note to the open discussion better results, expectations and methodology for results are usually created using open discussion and listening to each members points of view.

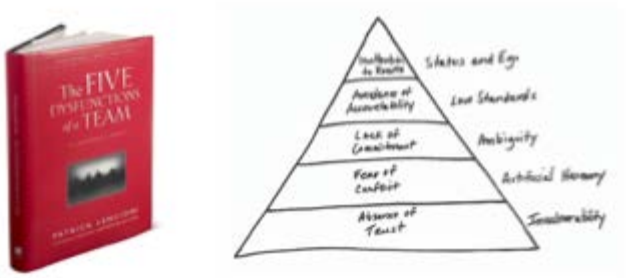
Making sure that everyone on the team is working towards a common goal. Saying it often and repeat it often.

- Avoid assuming that the team know the goal of the project or task at hand. Don't leave it to chance.
- Start every meeting with a summary of what you are trying to achieve and how teams work will help get there. Even if you think it's redundant, you cant communicate the goals and outcomes often.

Five Dysfunctions of a Team

- Points getting from experience and summary of author of Five Dysfunctions of a Team: Patrick Lencioni
- Usually, organizations fail to achieve teamwork because they unknowingly fall prey to five natural but dangerous pitfalls, which are called the five dysfunctions of a team.
- These dysfunctions can be mistakenly interpreted as five distinct issues that can be addressed in isolation of the others. But in reality they form an interrelated model, making susceptibility to even one of them

potentially lethal for the success of a team.

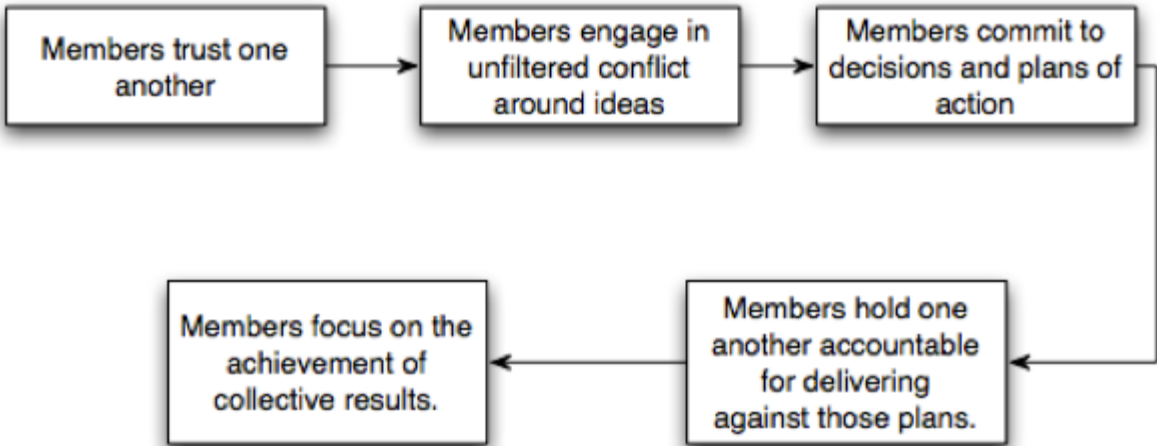


Model of Five Dysfunctions of a Team



- Like a chain with just one link broken, teamwork deteriorates if even a single
- dysfunction is allowed to flourish.

A Positive Line: Effective Teams should have



Trust: the heart of an effective team

- Trust lies at the heart of a functioning, cohesive team. Without it, teamwork is all but impossible.
- In the context of building a team, trust is the confidence among team members that their peers intentions are good, and that there is no reason to be protective or careful around the group. In essence, teammates must get comfortable being vulnerable with one another.
- Achieving vulnerability-based trust is difficult because in the course of career advancement and education, most successful people learn to be competitive with their peers, and protective of their reputations.

Members of teams with an absence of Trust...

- Conceal their weaknesses and mistakes from one another
- Hesitate to ask for help or provide constructive feedback
- Hesitate to offer help outside their own areas of responsibility
- Jump to conclusions about the intentions and aptitudes of others without attempting to clarify them
- Fail to recognize and tap into one another's skills and experiences Waste time and energy managing their behaviors for effect
- Hold grudges
- Dread meetings and find reasons to avoid spending time together



Members of trusting teams...

- Admit weaknesses and mistakes
- Ask for help
- Accept questions and input about their areas of responsibility
- Give one another the benefit of the doubt before arriving at a negative conclusion
- Take risks in offering feedback and assistance
- Appreciate and tap into one another's skills and experiences Focus time and energy on important issues, not politics
- Offer and accept apologies without hesitation
- Look forward to meetings and other opportunities to work as a group

Methods for building trust

- Personal Histories Exercise:
 - In less than an hour, having team members answer a short list of questions about themselves. Questions need not be overly sensitive in nature and might include the following: number of siblings, hometown, unique challenges of childhood, favorite hobbies, first job, and worst job.
- Team Effectiveness Exercise:
 - It requires team members to identify the single most important contribution that each of their peers makes to the team, as well as the one area that they must either improve upon or eliminate for the good of the team. All members then report their responses, focusing on one person at a time, usually beginning with the team leader.
- Personality and Behavioral Preference Profiles
 - Some of the most effective and lasting tools for building trust on a team are profiles of team members behavioral preferences and personality styles. These help break down barriers by allowing people to

better understand and empathize with one another.

- 360-Degree Feedback

Common problem solving

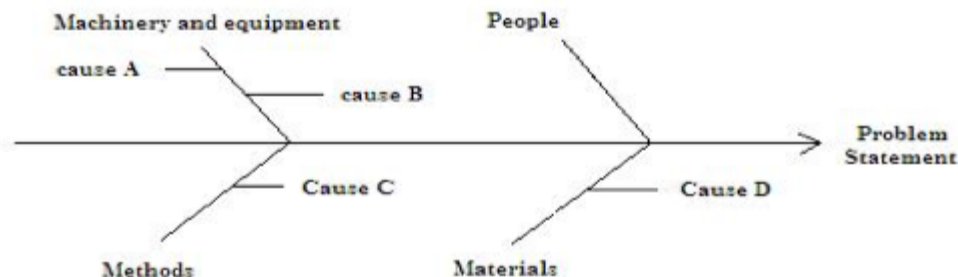
1. Define the Problem:

- A problem definition
- states the current situation and the desired situation
- should not imply any solutions or causes
- The current situation is defined by facts
- use clear and concise language supported by gathered
- facts when defining the problem
- The desired situation is defined as an objective
- use clear, concise, concrete language and be both realistic
- and worthwhile.

****A primary source of group ineffectiveness is rushing to solutions before properly defining the problem.**

2. Identify and Define the Root Causes:

- To solve problems so they remain solved, the group must identify
- and define the reasons for the problem rather than symptoms(i.e., sth indicating the presence of the problem)
- Techniques; brainstorming and fishbone
- Fishbone diagram = The cause and effect diagram
- The best use of fishbone is when you know that a specific area needs to be analysed but you are not sure which portion of it is creating the problem.
- i.e. once all the root causes identified and organized on the
- fishbone, the group should discuss the potential causes to
- verify their relevancy and impact to the problem.



A Fishbone diagram

3. Generate Alternative Solutions:

- Brainstorm alternative solutions
- The focus of this step is to generate, NOT EVALUATE.

4. Evaluate the Alternatives:

- Establish the criteria for judging solutions
- Criteria should be objective and preferably measurable rather than emotional
- Methods; Matrix for Evaluating Alternative Solutions, Vote by using dots

- These methods are NOT FORMULAS to calculate correct answer

| | Criteria | | | | | | | | | |
|------------|------------------------|----|----|------------------------|----|----|------------------------|----|----|-----------------|
| | Criterion 1 x (weight) | | | Criterion 2 x (weight) | | | Criterion 3 x (weight) | | | |
| Solutions | Ann | Al | Jo | Ann | Al | Jo | Ann | Al | Jo | Solution Scores |
| Solution 1 | | | | | | | | | | |
| Solution 2 | | | | | | | | | | |
| Solution 3 | | | | | | | | | | |

A Matrix for Evaluating Alternative Solutions

- 5. Agree on the Best Solution:
 - Agree on the evaluation if not discuss again or identify new solutions
- 6. Develop an Action Plan:
 - Action planning is designed to involve people, build their commitment, and increase the likelihood that the solution will be implemented effectively on time.
 - To help structure the action plan, groups can choose from a variety of action plan types.

| Goal (What) | | | | | |
|----------------------|------------|-----------------|-----|--------|------------------|
| Critical Steps (How) | When | | Who | Status | Expected Outcome |
| | Start Date | Completion Date | | | |
| | | | | | |
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Action planning chart

- 7. Implement and Evaluate the Solution:
 - Solution steps should be implemented according to the action plan. However, sometimes unintended consequences occur that require changing the implementation plan. The group can adapt to unintended consequences by suggesting that project updates be added to each meeting's agenda so that the group has a regular way to check its progress.

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Project Scheduling (GANTT CHART)

Project schedule

- It is simply the project plan in an altered format
- It is a convenient form for monitoring and controlling project activities
- There are various formats to represent a schedule-
 1. Summary table format
 2. Gantt Charts
 3. PERT/CPM networks (some professionals think that this is obsolete, that is a very incorrect notion in itself)



Summary table

- Most basic form of representing a project schedule
- It can be as simple as follows...

| MILESTONE SCHEDULE - (INSERT SUBJECT) | | | |
|--|--------------------------|--|---------|
| ACTION ITEM | PROPOSED COMPLETION DATE | # OF DAYS BETWEEN THIS AND PREVIOUS ACTION | REMARKS |
| E-mail Vendors about Pending RFP | | | |
| Issue the RFP via E-mail | | | |
| Receive Written Proposals | | | |
| Evaluate Written Proposals | | | |
| Establish Competitive Range | | | |
| Notify Offerors in Competitive Range | | | |
| Period allowed for preparation of Oral Presentations by Offerors | | | |
| Conduct Oral Proposals | | | |
| Conduct Final Evaluations | | | |
| Prepare Final Documentation | | | |
| Award of Contract | | | |
| Conduct Post Award Meeting | | | |
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Acknowledgement: [US Government Census](#)

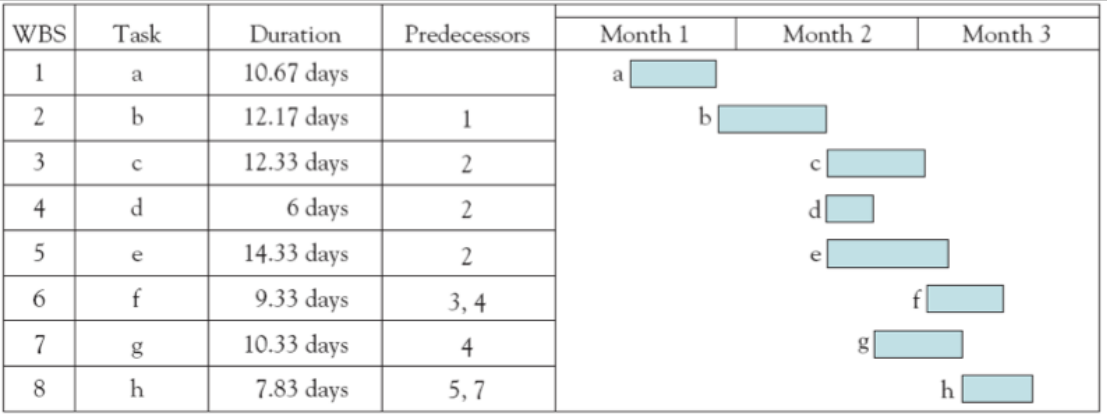
The Gantt Chart

- Henry Gantt developed the Gantt chart around 1917
- It displays project activities as bars measured against a
- horizontal time scale
- Most popular way of exhibiting sets of related activities in the form of schedules

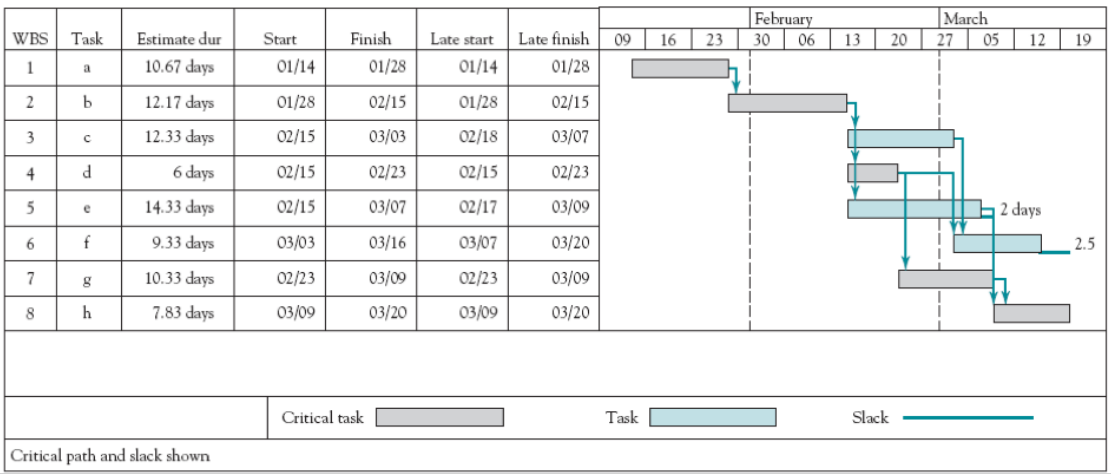
The Chart

- Gantt charts are easy to draw
- Problems arise when several tasks begin at the same time and have the same duration
 - Can make it hard to find critical path
 - Only a problem on hand-drawn charts
- Software shows critical path using some visual method
- However, technical dependencies are harder to see on a Gantt chart

A Gantt Chart of a Sample Project



A Gantt Chart Showing Critical Path, Path Connections, Other Data



Microsoft Project

- Microsoft Project is a powerful program that helps you plan and manage a wide range of projects. You can use Project to:
 - Create project plans at the level of detail thats right for your project. Work with summary data initially or shift to a more detailed approach when it's convenient. Control what tasks Project can schedule automatically or that youll schedule manually.
 - Manage tasks, costs, work, and resources at whatever level of detail is appropriate for your projects needs.
 - See your project plan data in a variety of views. Apply grouping, highlighting, sorting, and filtering to see your data the way that you want.
 - Track and manage your project plan throughout project execution.
 - Collaborate and share data with others in your organization using a variety of productivity applications.
 - Use resource pools, consolidated projects, and cross-project links to extend your project management focus across multiple projects.

Obtaining Microsoft Project

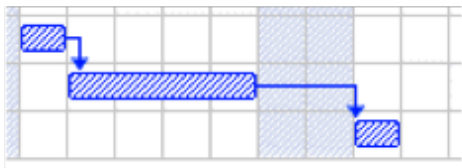
- The latest version is 2013
- Some of the notes here will assume the use of Project 2010
- You are free to install and choose either of these
- You can order and download the software from RMIT Dreamspark premium website
- Search for DreamSpark RMIT

Setting up a project

- Define the project settings, such as its start date, end date and scheduling mode. The most common scheduling mode is forwards from the project start date. In this mode the default is for tasks to start as soon as possible, which means that the whole project finishes at the earliest possible date.
- Define the project calendar. This sets the number of working days in the week, the number of working hours in the day, and so on.
- Enter or edit task names and durations.
- Set up a global resources list and assign resources to tasks. Although you can often define the resources as you need them, it is usually quicker to start by setting up a global resources list from which you can then select resources to assign to the various project tasks. See Including resources in a Gantt chart.
- Create links to specify the dependencies between the project tasks.
- Set constraints on the tasks as necessary.
- Make adjustments, if any.

Linking in a Gantt chart

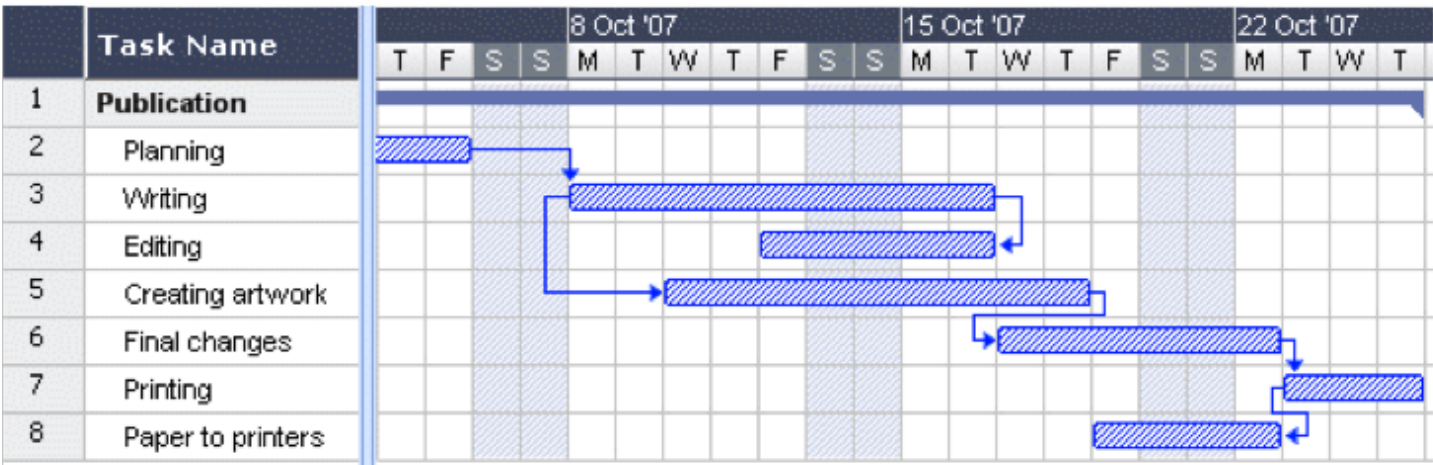
- This is typically represented on the Gantt chart by lines with arrowheads joining each task to its successor.
- The arrowhead indicates the direction of the link: it goes from the predecessor to the successor.



- There are four possible relationships (dependencies) between tasks:
- Finish to Start (FS) - the default: The task cannot start before its predecessor ends, although it may start later. This is the most common type of relationship.
- Start to Start (SS): The task cannot start until the predecessor starts, although it may start later. This can be useful if you have a task whose start date depends on the start date of another task.
- Finish to Finish (FF): The task cannot end before the predecessor ends, although it may end later.
- Start to Finish (SF): The task cannot end before the predecessor starts, although it may end later. This task relationship is rarely used.

Example

Let us examine links in the following chart...



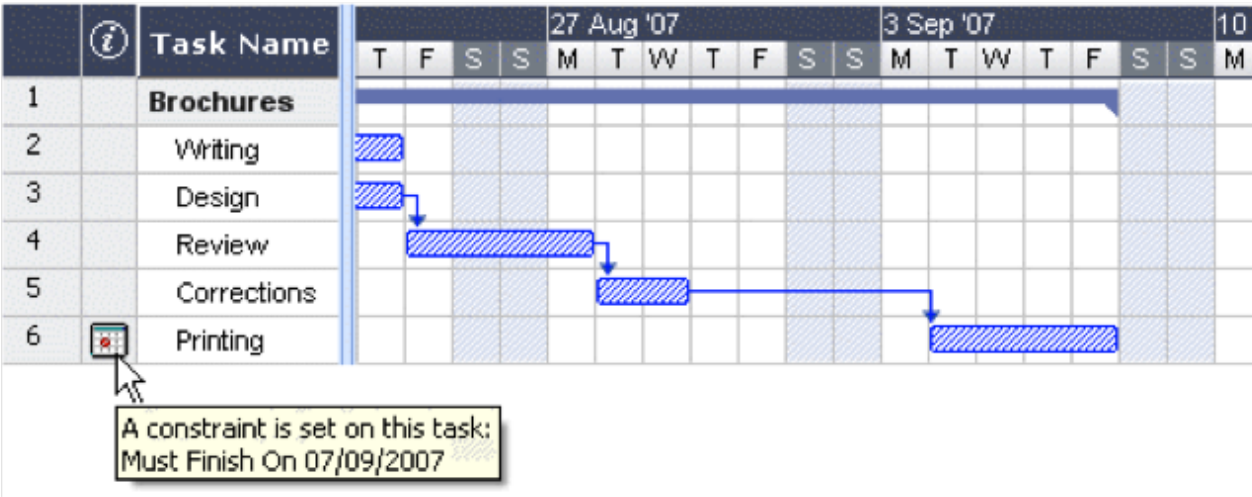
- When linking tasks you can add a lead or lag time to extend a link backwards or forwards so that the successor

task starts earlier or later than it otherwise would.

- For a default 'Finish to Start' link, this either introduces an overlap (lead time), so that the successor task starts before its predecessor ends, or it introduces a delay (lag time) that makes the successor task start some time after its predecessor ends.

Adding constraints

- The following constraints all restrict the Gantt application's flexibility when scheduling tasks-
 - Start No Earlier Than (SNET):** This means that the task, whether linked or not, may not start before the given date. However, the Gantt application still has the flexibility to start the task later than the given date.
 - Start No Later Than (SNLT):** This means that the task, whether linked or not, may not start later than the given date. However, the Gantt application still has the flexibility to start the task earlier than the given date.
 - Finish No Earlier Than (FNET):** This means that the task, whether linked or not, may not end before the given date. However, the Gantt application still has the flexibility to end the task later than the given date.
 - Finish No Later Than (FNLT):** This means that the task, whether linked or not, may not end later than the given date. However, the Gantt application still has the flexibility to end the task earlier than the given date.
 - Must Start On (MSO):** This rigid constraint means that the task, whether linked or not, must start on the given date. Even if the preceding task is completed earlier, the Gantt application cannot pull in the constrained task to take advantage of the time gained.
 - Must Finish On (MFO):** This rigid constraint means that the task, whether linked or not, must end on the given date. As above, even if the preceding task is completed earlier, the Gantt application cannot pull in the constrained task to take advantage of the time gained.

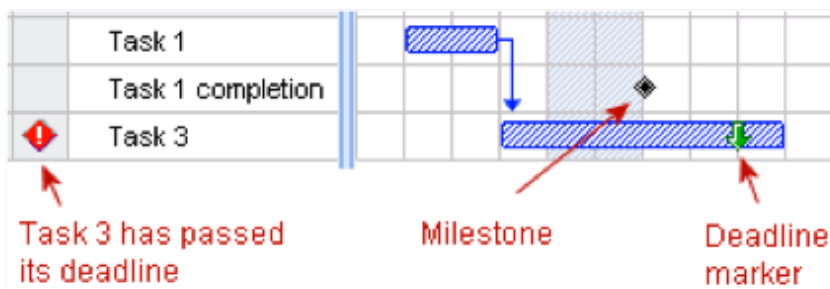
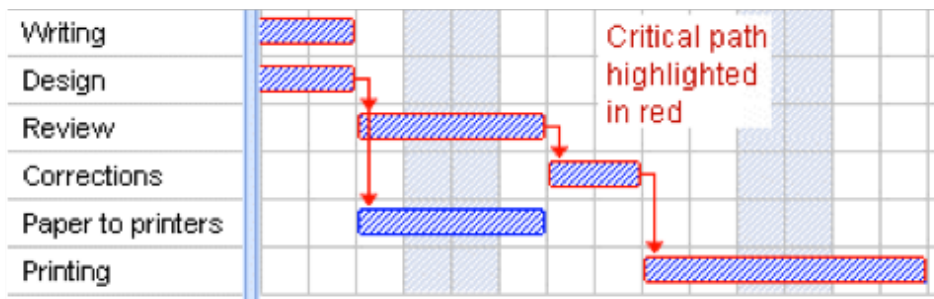


Including resources

- The Gantt display will indicate the resources that have been assigned to each task. You may also be able to

enter additional information, for example:

- Where the resource is a person or a team, the amount of time that the person or team will spend on the task.
This is usually designated as a percentage, 100% signifying one person full time. So you would enter 250% for a team of three people where one of the people will be working only 50% of the time.
- Where the resource is a material, the amount needed for the task. For a material such as sand it might be 50 tons.
- The cost of the resource. In the case of a person this could be a dollars per hour figure. For a material such as sand it might be dollars per ton, for electricity dollars per kWh.
- The rate of consumption of a material resource. Some resources have a fixed cost but for others the cost depends on the duration of the task. For example, heating might be estimated in kWh per day.



Advantages of Gantt charts

- It creates a picture of complexity. We think in pictures. Therefore, if we can see complex ideas as a picture, this will help our understanding.
- It organises your thoughts. A big problem is conquered by dividing it into component parts. A Gantt chart will force you to do this.
- It demonstrates that you know what you're doing. When you produce a nicely presented Gantt chart with high level tasks properly organised and resources allocated to those tasks, it speaks volumes about whether you are on top of the needs of the project and whether the project will be successful.
- It (should) help you to set realistic time frames. The bars on the chart indicate in which period a particular task or set of tasks will be completed. This can help you to get things in perspective properly.
- It can be highly visible. It can be useful to place the chart, or a large version of it, where everyone can see it. This helps to remind people of the objectives and when certain things are going to happen. It is useful if everyone in your enterprise can have a basic level of understanding of what is happening with the project even if they may not be directly involved with it.

Disadvantages of Gantt charts

They can become extraordinarily complex. Except for the most simple projects, there will be large numbers of tasks undertaken and resources employed to complete the project. There are some very good software programs that can cope with all this complexity (e.g. Microsoft Project).

However, when the project gets to this level, it must be managed by a small number of people (perhaps one) who

manages all of the details. Sometimes this does not work so well in a business that is not used to this type of management.

Big businesses will frequently employ one or more project managers who are very skilled in this. For a range of reasons, this may not work so well in a smaller enterprise.

Another disadvantage is that the size of the bar does not indicate the amount of work. Each bar on the chart indicates the time period over which a particular set of tasks will be completed.

However, by looking at the bar for a particular set of tasks, you cannot tell what level of resources are required to achieve those tasks. So, a short bar might take 500 man hours while a longer bar may only take 20 man hours. The longer bar may indicate to the uninformed that it is a bigger task, when in fact it is not.

Other disadvantages

- They need to be constantly updated. As you get into a project, things will change. If you're going to use a Gantt chart you must have the ability to change the chart easily and frequently. If you don't do this, it will be ignored.
- Difficult to see on one sheet of paper. The software products that produce these charts need to be viewed on a computer screen, usually in segments, to be able to see the whole project. It then becomes difficult to show the details of the plan to an audience. Further, you can print out the chart, but this will normally entail quite a large cut and paste exercise. If you are going to do this frequently, it can be very time-consuming.

Lesson Number 3

- Project schedule is indispensable!!
- <http://www.youtube.com/watch?v=IOK9xvjtto>

Acknowledgement: Youtube videos copyright is held by the Youtube website and the owner, it has been cited for educational-purposes.

References

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- <http://www.gantt.com/creating-gantt-charts.htm>
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Reading from textbook

- Chapter 5: Scheduling the project "Pages 151, 181-188
- Chapter 6: Allocating resources to the project "Pages 207-213, 221-223

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