

Chapter 3

Chapter 3 Project Management

Learning Objective

...to give an appreciation for and to introduce *project management* and to place it into context and give some of the fundamentals to project management including organizing, planning and scheduling software projects.

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Project management

Organizing, planning and scheduling software projects

Objectives

- To introduce software project management and to describe its distinctive characteristics
- To discuss project planning and the planning process
- To show how graphical schedule representations are used by project management

Topics covered

Management activities
Project planning
Activity organization
Project scheduling

Software project management

Concerned with activities involved in ensuring that software is delivered on time ...
And on schedule and in accordance with the requirements of the organizations developing and procuring the software

Why is management important?

Software engineering is an economic activity and therefore is subject to economic, non-technical constraints
Well-managed projects sometimes fail. Badly managed projects inevitably fail
The objective of the course is to introduce management activities rather than teach you to be managers. You can only learn to manage by managing

Software management distinctions

- The product is intangible
- The product is uniquely flexible
- Software engineering is not recognized as an engineering discipline with the same status as mechanical, electrical engineering, etc.
- The software development process is not standardized
- Most software projects are 'one-off' projects

Management activities

- Proposal writing
- Project costing
- Project planning and scheduling
- Project monitoring and reviews
- Personnel selection and evaluation
- Report writing and presentations

Management commonalities

- These activities are not peculiar to software management
- Many techniques of engineering project management are equally applicable to software project management
- Technically complex engineering systems tend to suffer from the same problems as software systems

Project staffing

May not be possible to appoint the ideal people to work on a project

- Project budget may not allow for the use of highly-paid staff
- Staff with the appropriate experience may not be available
- An organization may wish to develop employee skills on a software project

Project planning

Probably the most time-consuming project management activity

Continuous activity from initial concept through to system delivery. Plans must be regularly revised as new information becomes available

Types of project plan

| Plan | Description |
|-------------------------------|---|
| Quality plan | Describes the quality procedures and standards that will be used in a project. |
| Validation plan | Describes the approach, resources and schedule used for system validation. |
| Configuration management plan | Describes the configuration management procedures and structures to be used. |
| Maintenance plan | Predicts the maintenance requirements of the system, maintenance costs and effort required. |
| Staff development plan. | Describes how the skills and experience of the project team members will be developed. |

Project planning process

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Establish the project constraints
Make initial assessments of the project parameters
Define project milestones and deliverables
while project has not been completed or cancelled loop
  Draw up project schedule
  Initiate activities according to schedule
  Wait ( for a while )
  Review project progress
  Revise estimates of project parameters
  Update the project schedule
  Re-negotiate project constraints and deliverables
  if ( problems arise ) then
    Initiate technical review and possible revision
  end if
end loop
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Project plan structure

- Introduction
- Project organization
- Risk analysis
- Hardware and software resource requirements
- Work breakdown
- Project schedule
- Monitoring and reporting mechanisms

Activity organization

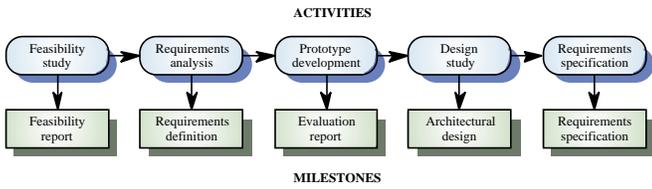
Activities in a project should be organized to produce tangible outputs for management to judge progress

Milestones are the end-point of a process activity

Deliverables are project results delivered to customers

The waterfall process allows for the straightforward definition of progress milestones

Milestones and deliverables



Project scheduling

Split project into tasks and estimate time and resources required to complete each task

Organize tasks concurrently to make optimal use of workforce

Minimize task dependencies to avoid delays caused by one task waiting for another to complete

Dependent on project managers intuition and experience

Scheduling problems

Estimating the difficulty of problems and hence the cost of developing a solution is hard

Productivity is not proportional to the number of people working on a task

Adding people to a late project makes it later because of communication overheads

The unexpected always happens. Always allow contingency in planning

Bar charts and activity networks

Graphical notations used to illustrate the project schedule

Show project breakdown into tasks. Tasks should not be too small. They should take about a week or two

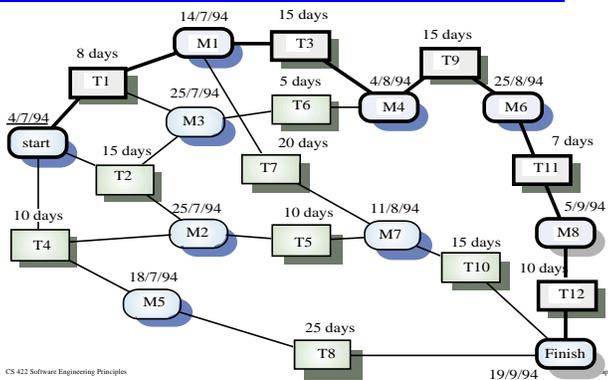
Activity charts show task dependencies and the critical path

Bar charts show schedule against calendar time

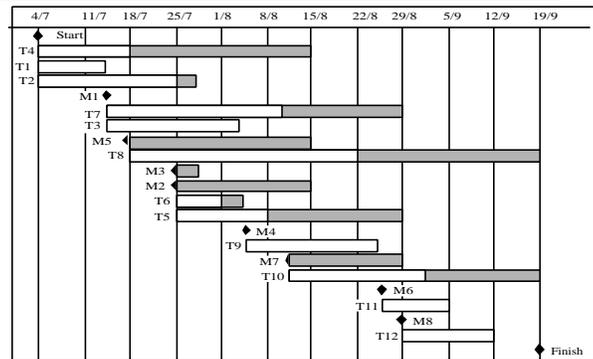
Task durations and dependencies

| Task | Duration (days) | Dependencies |
|------|-----------------|--------------|
| T1 | 8 | |
| T2 | 15 | |
| T3 | 15 | T1 |
| T4 | 10 | |
| T5 | 10 | T2, T4 |
| T6 | 5 | T1, T2 |
| T7 | 20 | T1 |
| T8 | 25 | T4 |
| T9 | 15 | T3, T6 |
| T10 | 15 | T5, T7 |
| T11 | 7 | T9 |
| T12 | 10 | T11 |

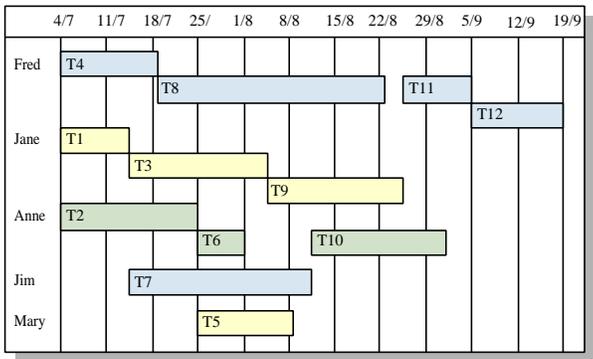
Activity network



Activity timeline



Staff allocation



Key points

Good project management is essential for project success

The intangible nature of software causes problems for management

Managers have diverse roles but their most significant activities are planning, estimating and scheduling

Planning and estimating are iterative processes which continue throughout the course of a project

Key points

A project milestone is a predictable state where some formal report of progress is presented to management.

Activity charts and bar charts are graphical representations of a project schedule
