

## Project management

## 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 organisations developing and procuring the software.
- Project management is needed because software development is always subject to budget and schedule constraints that are set by the organisation developing the software.

## Management activities

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

## 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.
- Various different types of plan may be developed to support the main software project plan that is concerned with schedule and budget.

## Project planning process

```
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
```

## Project plan structure

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

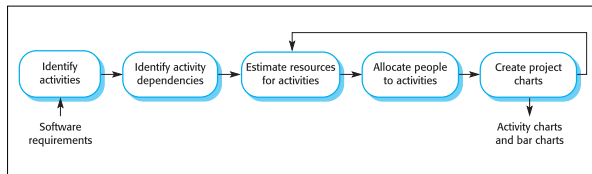
## Activity organization

- Activities in a project should be organised 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.

## 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.

## The project scheduling process



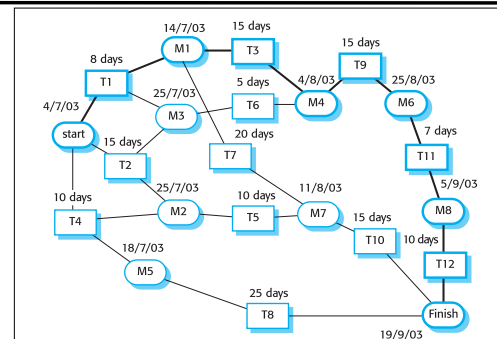
## Bar charts and activity networks

- 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 the critical path.
- Bar charts show schedule against calendar time.

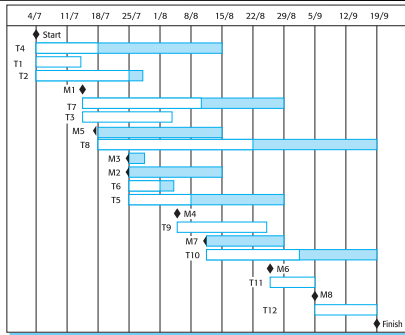
## Task durations and dependencies

Activity	Duration (days)	Dependencies
T1	8	
T2	15	
T3	15	T1 (M1)
T4	10	
T5	10	T2, T4 (M2)
T6	5	T1, T2 (M3)
T7	20	T1 (M1)
T8	25	T4 (M5)
T9	15	T3, T6 (M4)
T10	15	T5, T7 (M7)
T11	7	T9 (M6)
T12	10	T11 (M8)

## Activity network



## Activity timeline

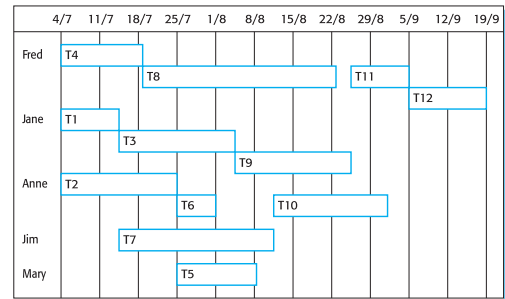


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## Staff allocation



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## 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 organisation may wish to develop employee skills on a software project.
- Managers have to work within these constraints especially when there are shortages of trained staff.

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## Selecting staff

- An important project management task is team selection.
- Information on selection comes from:
  - Information provided by the candidates.
  - Information gained by interviewing and talking with candidates.
  - Recommendations and comments from other people who know or who have worked with the candidates.

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## Motivating people

- An important role of a manager is to motivate the people working on a project.
- Motivation is a complex issue but it appears that there are different types of motivation based on:
  - Basic needs (e.g. food, sleep, etc.);
  - Personal needs (e.g. respect, self-esteem);
  - Social needs (e.g. to be accepted as part of a group).

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## Personality types

- Task-oriented.
  - The motivation for doing the work is the work itself;
- Self-oriented.
  - The work is a means to an end which is the achievement of individual goals - e.g. to get rich, to play tennis, to travel etc.;
- Interaction-oriented
  - The principal motivation is the presence and actions of co-workers. People go to work because they like to go to work.

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## Managing groups

- Most software engineering is a group activity
  - The development schedule for most non-trivial software projects is such that they cannot be completed by one person working alone.
- Group interaction is a key determinant of group performance.
- Flexibility in group composition is limited
  - Managers must do the best they can with available people.

## Factors influencing group working

- Group composition.
- Group cohesiveness.
- Group communications.
- Group organisation.

## Team spirit

Alice is an experienced project manager and understands the importance of creating a cohesive group. As the product development is new, she takes the opportunity of involving all group members in the product specification and design by getting them to discuss possible technology with elderly members of their families and to bring these to the weekly group lunch. The group lunch is an opportunity for all team members to meet informally, talk around issues of concern and, generally, get to know each other.

The lunch is organised as an information session where Alice tells the group members what she knows about organisational news, policies, strategies, etc. Each team member then briefly summarises what they have been doing and the group then discusses some general topic such as new product ideas from elderly relatives.

Every few months, Alice organises an away day for the group where the team spend two days on technology updating. Each team member prepares an update on some relevant technology and presents it to the group. This is an off-site meeting in a good hotel and plenty time is scheduled for discussion and social interaction.

## The people capability model

