Planning / Scheduling 23.2 23.3
Risk Management 22.1
Cost / Price 23.5 23.1
People Management 22.2 22.3

Engineering or Management?
- management requires experience
  - not your first job
- career path?
  - programmer – software engineer – project manager
  - compare: professor  prefect
  - or: Dilbert  Dilbert’s boss
  - take two courses (available in any company):
    - elementary bookkeeping
    - “leadership”

Dilbert’s boss
From: the Dilbert Principle

Project proposal
- external customer
  - bidding process
  - networking
- internal customer
  - you sell your idea
  - someone ask for a solution

The planning problem
- you must present
  - content
  - cost
  - time plan
- with no/limited knowledge of
  - detailed requirements
  - resources (people)
  - budget

RISKS
**Figure 23.5** Tasks, durations, and dependencies

<table>
<thead>
<tr>
<th>Task</th>
<th>Effort (person-days)</th>
<th>Duration (days)</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>15</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>8</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>20</td>
<td>15</td>
<td>T1 (M1)</td>
</tr>
<tr>
<td>T4</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>T5</td>
<td>5</td>
<td>10</td>
<td>T2, T4 (M3)</td>
</tr>
<tr>
<td>T6</td>
<td>10</td>
<td>9</td>
<td>T1, T2 (M4)</td>
</tr>
<tr>
<td>T7</td>
<td>25</td>
<td>20</td>
<td>T1 (M1)</td>
</tr>
<tr>
<td>T8</td>
<td>75</td>
<td>25</td>
<td>T4 (M2)</td>
</tr>
<tr>
<td>T9</td>
<td>10</td>
<td>15</td>
<td>T3, T6 (M5)</td>
</tr>
<tr>
<td>T10</td>
<td>20</td>
<td>15</td>
<td>T7, T8 (M6)</td>
</tr>
<tr>
<td>T11</td>
<td>10</td>
<td>10</td>
<td>T9 (M7)</td>
</tr>
<tr>
<td>T12</td>
<td>20</td>
<td>10</td>
<td>T10, T11 (M8)</td>
</tr>
</tbody>
</table>

**Figure 23.6** Activity bar chart

**Activity Network**

- T1 (10)
- M1
- T3 (15)
- T2 (15)
- M3
- T7 (20)
- T5 (10)
- M2
- T8 (25)
- T12 (10)

T = task  
M = milestone  
Find longest path (critical path)

**Figure 23.7** Staff allocation chart

**Following the plan**

For large projects, Team Leaders use sophisticated project management software to keep track of who’s doing what. The software collects the times and names of the project team and organizes them into instantly outdated charts that are too boring to look at closely. This is called “planning.”

**Milestones diagram**
Continuous planning process

Process Risk Management

- Product risks
  - loss of life etc.
- Process risks
  - delays
  - lose to competition

- Hazard identification
- Risk identification
- Risk assessment
- Risk analysis
- Hazard analysis
- Risk planning
- Risk monitoring

Risk classification

- Project
  - delays
  - extra cost
- Product
  - requirements change
  - unable to deliver
- Business
  - can’t sell it

Risk planning

- Reduce probability
  - working conditions
  - contracts
  - good estimation techniques
- Reduce effect – “Plan B”
  - redundancy in teams
  - buffers/margins

Risk analysis & planning

Mythical Man-Month

- effort ≠ progress
- not all tasks can be made more parallel
Mythical Man-Month

- adding people to a late project makes it later
  - reorganisation
  - training / education (new staff)
  - doing the training (old staff)
  - added communication

Beyond project planning

- Staff
- Long term goals, policies
  - Quality Assurance
  - Technology development
  - Staff development
- Maintenance

Software Cost & Price

- What determines the outcome?
  - requirements
  - available people
  - budget
  - risks
  - eventual ownership

Software Cost – Plan based

- Salary costs dominate
  \[ \text{Salary costs} = \text{People} \times \text{months} \times \text{salary} \times \text{overhead} \]
  - planned to satisfy requirements
  - available: "Parkinson’s Law"
    Work expands so as to fill the time available for its completion
    This could mean:
    We will implement as much as time allows

Overhead

- building – energy
- recruitment
- proposal preparation and marketing
- support staff
- computers, network, communication
- recreational facilities
- Social Security and employee benefits

Experience

- Compare to previous projects
- Ask several experts
Algorithmic cost modeling

\[ \text{Cost} = \text{Org} \times \text{PP} \times \text{Size}^{\text{Complexity}} \]

- \( \text{Org} \): organizational constant
- \( \text{PP} \): project and process
  - people, support, schedule, reuse, platform
- \( \text{Size} \)
  - line of source code?? (KLOC)
  - function points
  - screens, complexity (user interfaces)

Complexity

\[ \text{Complexity} = \text{Org} \times \text{PP} \times \text{Size}^{\text{Complexity}} \]

- "done it before?"
- team cohesion
- flexible process?
- mature process?
- risks analyzed?

- A factor between 1 and 1.5

My views on Alg. Cost Mod.

- Risk: unmotivated precision
  - "it will take 2306 person-months"
- Requires organisational experience
- Recommendation: use intervals
  - [1928 ... 2712] person-months
- Use the factors as a checklist
  - for an experience based calculation

Software Cost & Price

- Budget-limited project:
  \[ \text{Cost} = \text{Price} - \text{Profit} \]
  This means:
  - We will implement as much as the budget allows
- Profit
  + if we have risks (requirement changes)
  - if we need a contract (jobs, market share)
  - if we can reuse the work

Peopleware 22.2 22.3

A leadership course could contain:
- How to treat people
- Why people work for you (or not)
- How to hire people
- How to compose a team
- How to organize a team – roles

Teams

- Project manager – Technical leader?
- Decision-making
  - one vision vs. democratic compromise
- Information sharing
  - avoid single point of failure
- Outside communication
  - making software – meetings
- Distributed teams
Offices vs. Landscape

- Need for concentration vs.
- Need for communication (formal/informal)