

TOPICS

Overview

Metrics

Estimation

Planning

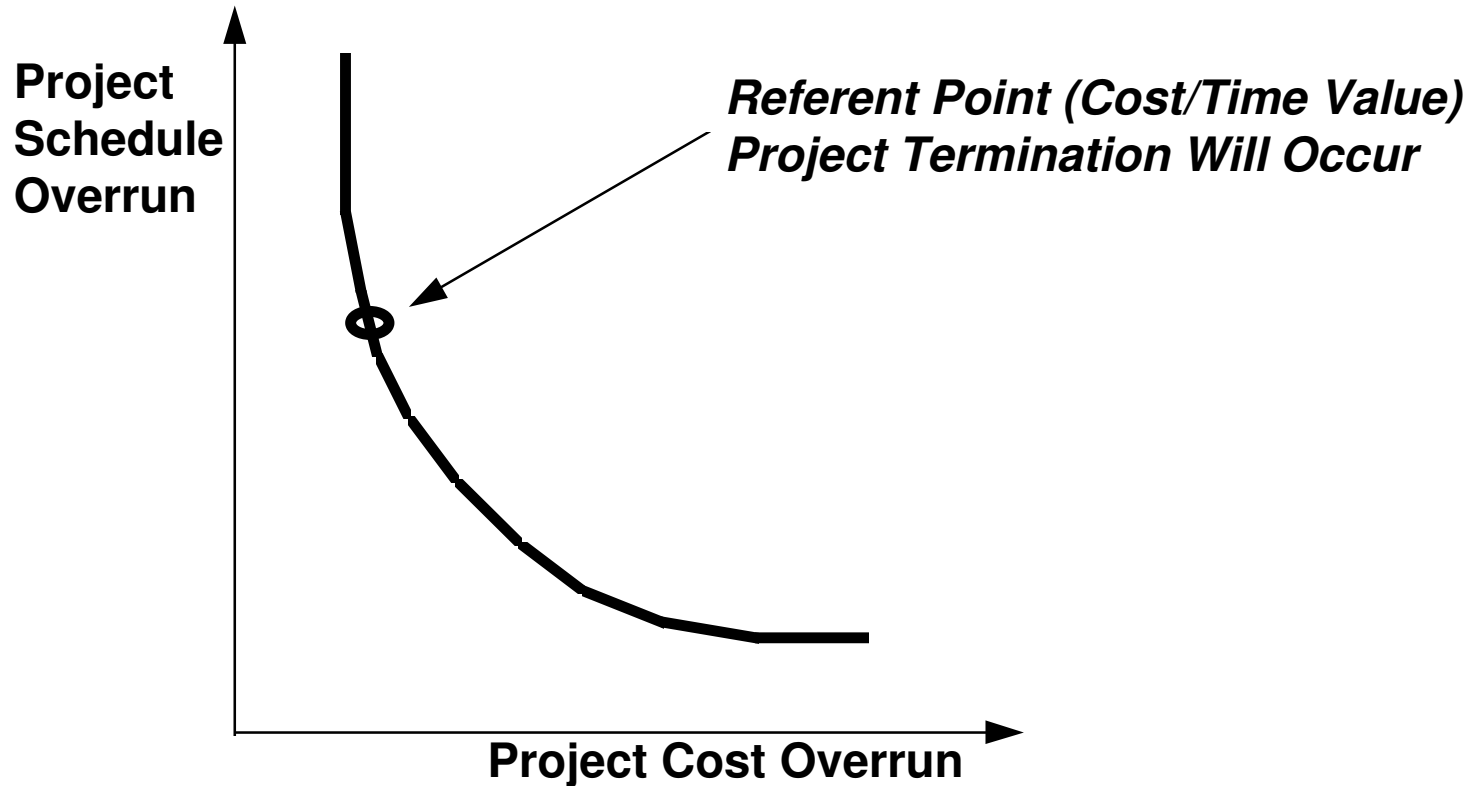
SOFTWARE PROJECT PLANNING

- **What Software Project Planning Involves**
- **Risk Analysis**
- **Risk Management**
- **Risk Monitoring - Project Tracking**
- **Software Project Scheduling**
- **Typical Task Network**
- **Approaches to Project Tracking**
- **Software Acquisition**
- **Software Acquisition Decision Tree**
- **Software Re-Engineering**
- **Organizational Planning**
- **Enhancements to a Good Organization**
- **The Software Project Plan (SPP)**

What Software Project Planning Involves

- 1. Estimation*
- 2. Risk Analysis**
- 3. Scheduling**
- 4. Acquisition Decision Making**
- 5. Re-Engineering**
- 6. Organizational Planning**

Risk Analysis



Risk Management

- **Create risk management and monitoring plan**
- **For each risk triplet, define the risk management steps**
- **Risk management incurs additional project cost**
- **For larger projects, there may be 30-40 risks identified**

Example

Assume:

Risk = High staff turnover

Likelihood of occurrence = 70%

Impact = Increase project time by 15%, project cost by 12%

Risk Management steps may be:

- 1. Identify high turnover causes**
- 2. Reduce causes before project starts**
- 3. Develop techniques to assure work continuity in light of turnover**

Risk Monitoring - Project Tracking

- 1. Determine if predicted risk occurs**
- 2. Properly apply risk aversion steps**
- 3. Collect info for future risk analysis**

Software Project Scheduling

- **People-work relationships**
- **Task definition and parallelism**
- **Effort distribution**
- **Scheduling methods**
- **An example**

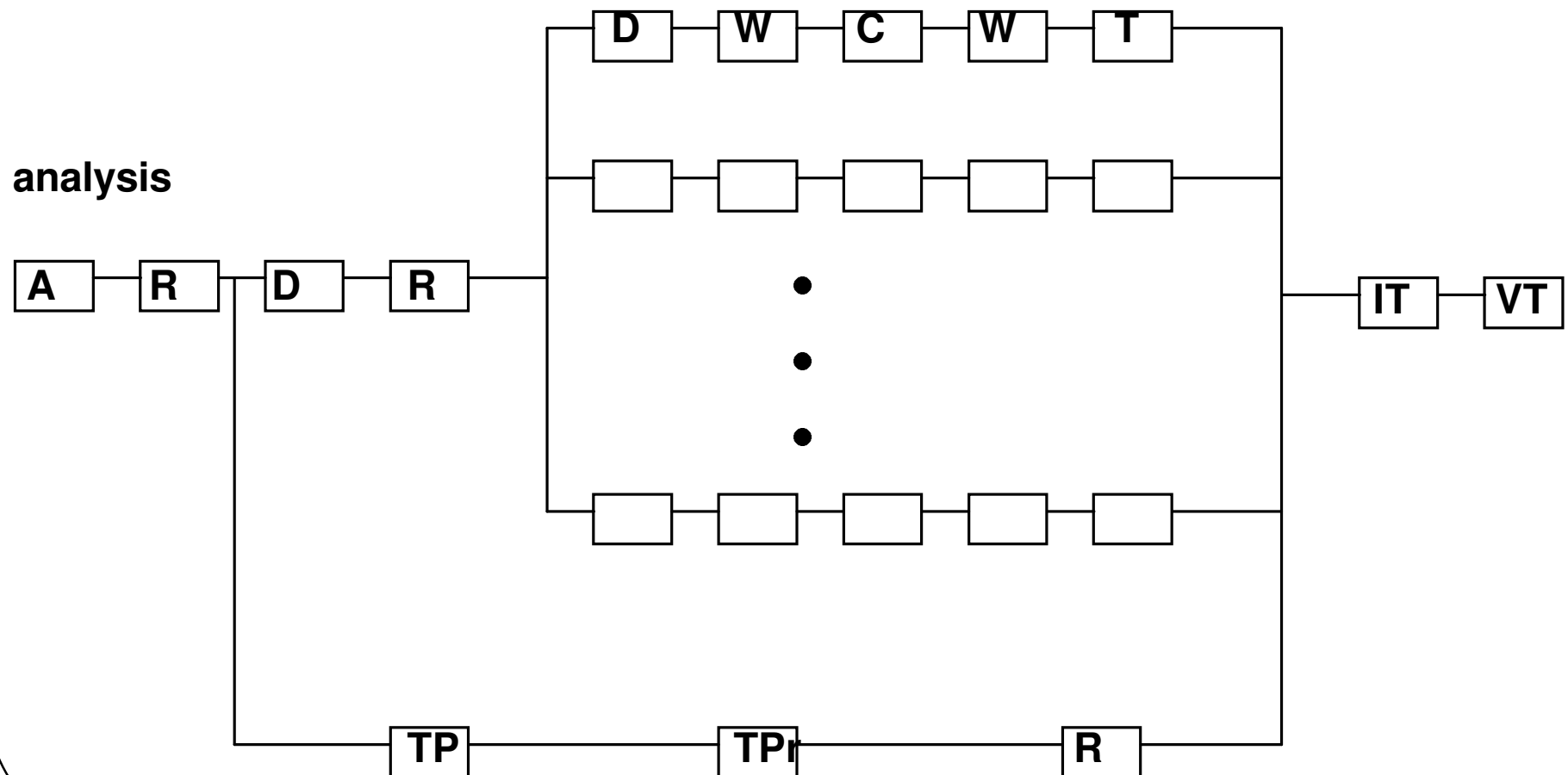
Software Project Scheduling

People-Work Relationships

- Adding people to a project when behind schedule is counterproductive (*adding people to a late project makes it later*)
- Using fewer people over a longer period of time is more beneficial than lots of people for a shorter period of time
- Use of small, tightly-knit teams is productive
- Inspire creativity and self-motivation within the structure of the project

Software Project Scheduling

Task Definition and Parallelism



Software Project Scheduling

Task Definition and Parallelism

Initial Sequential Events

Milestone 1 Occurs After --

- **System analysis and specification**
- **System requirements review**

Milestone 2 Occurs After --

- **System architecture and data design**
- **System preliminary design review**

Software Project Scheduling

Task Definition and Parallelism

Parallel Events for Each Subfunction

Milestone P1 Occurs After --

- **Procedural design**
- **Design walkthrough**

Milestone P2 Occurs After --

- **Coding**
- **Code walkthrough**

Milestone P3 Occurs After --

- **Unit testing**

Software Project Scheduling

Task Definition and Parallelism

System Testing Activities Can Be Performed In Parallel

Testing Milestone (After Unit Testing) --

- **System test planning**
- **System test procedure**
- **System test review**

Software Project Scheduling

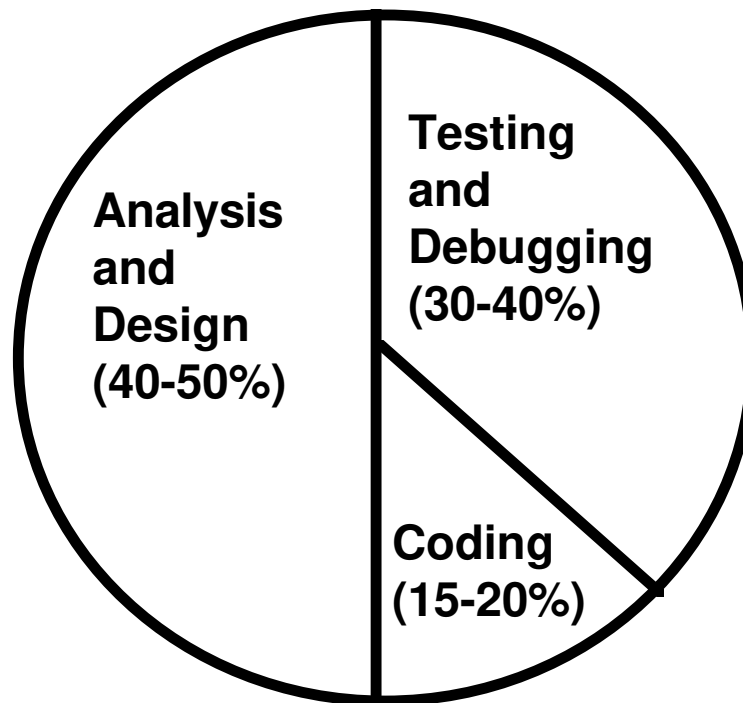
Task Definition and Parallelism

**Integration Test Milestone - completed after
system is assembled**

Validation Test Milestone - completed last

Software Project Scheduling

Effort Distribution



Software Project Scheduling

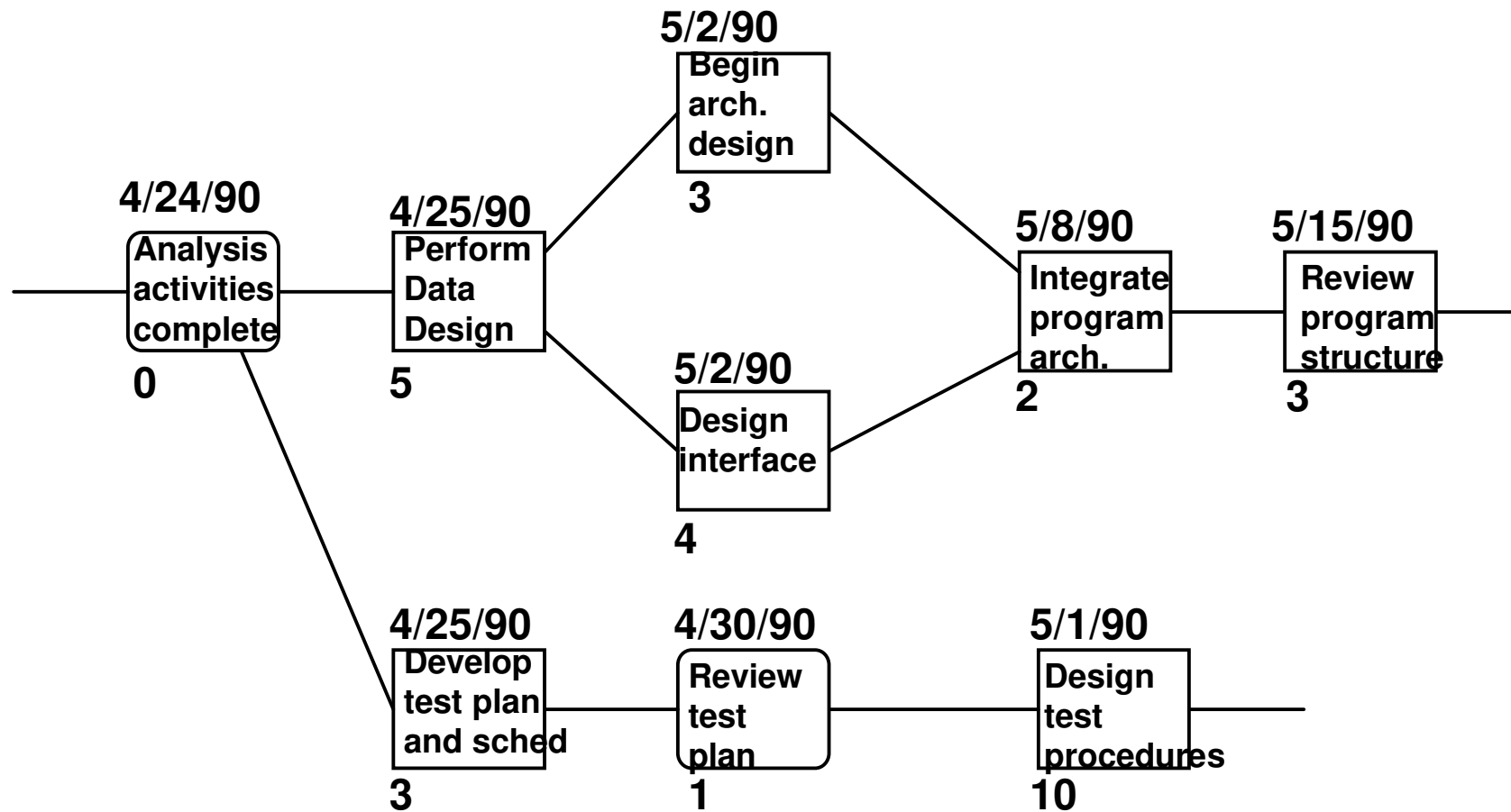
Scheduling Methods

- **PERT - *Program Evaluation and Review Technique***
- **CPM - *Critical Path Method***

PERT and CPM are:

- **Usually presented pictorially**
- **Quantitative tools for the planner to determine:**
 - **Critical path**
 - **Most likely time estimates**
 - **Boundary times (earliest task start time, latest task start time, earliest task finish time, latest task finish time, total float time)**

Typical Task Network



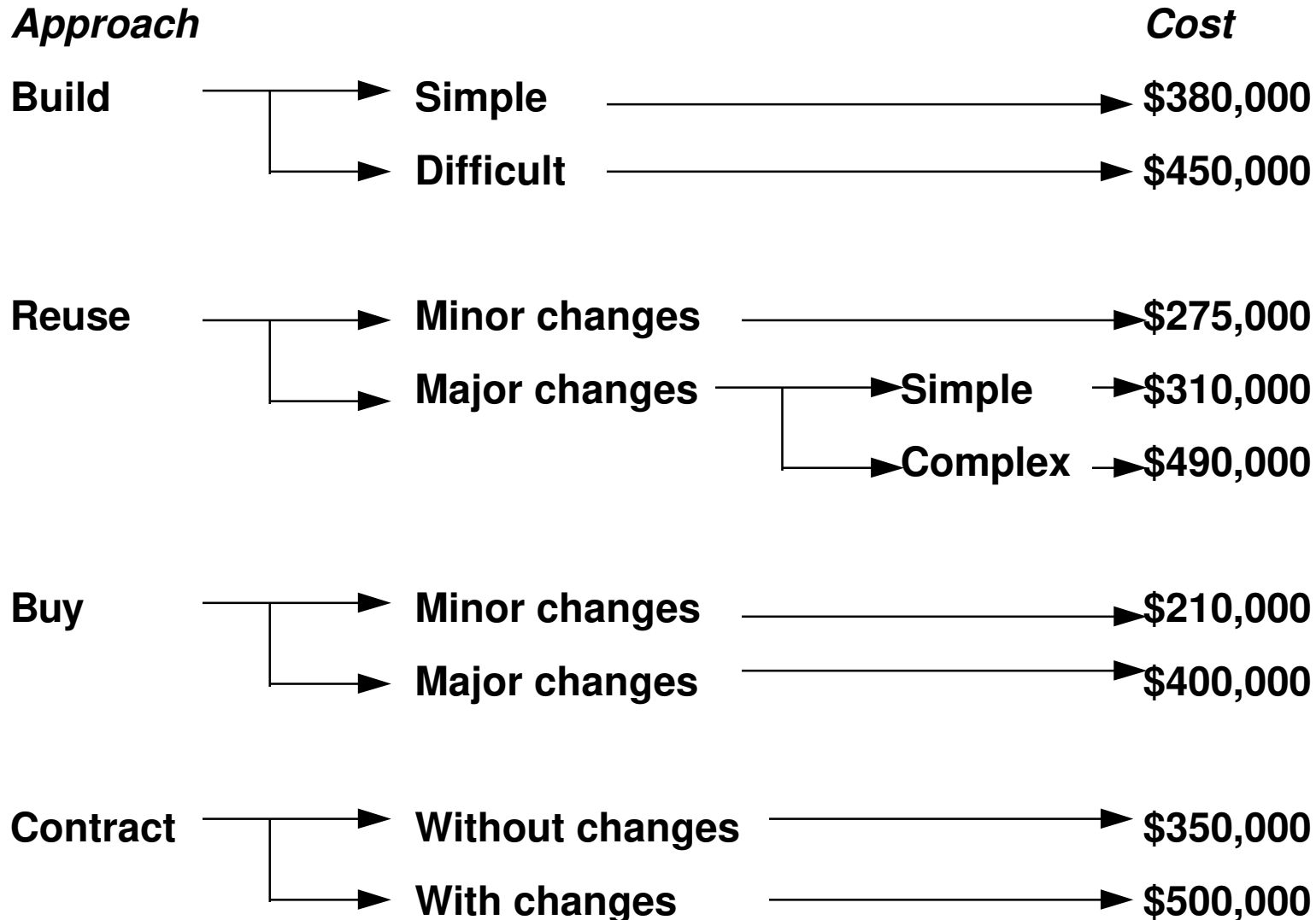
Approaches to Project Tracking

- **Conducting periodic project status meetings in which each team member reports progress and problems**
- **Evaluating the results of all reviews conducted throughout the engineering process**
- **Determining whether formal project milestones have been accomplished by the scheduled date**
- **Comparing the actual start date to the planned start date for each task**
- **Meeting informally with software engineers to obtain their subjective assessments of the progress to date and problems on the horizon**

Software Acquisition

- **Make or buy?**
 - **Who will use?**
 - **Buy and modify?**
 - **Contact outside contractor to build?**
- **Decision based on:**
 - **Reduced cost**
 - **Earlier delivery date**
 - **Not enough or properly skilled people to develop**
 - **Better support outside**

Software Acquisition Decision Tree



Software Re-Engineering

- **For often-used programs, build a controlled database of components for all to use.**
- **Include documents, source code, user's guide, maintenance guide, test procedures and data, and a history of use with the components.**
- **Software re-engineering may be enhanced by object-oriented design and implementation.**

Organizational Planning

- There are lots of human organizational structures for software development
- Possibilities - consider N people working for K years on M different functional tasks

<i>Approach</i>	<i>Level of Interaction</i>	<i>Coordination</i>
1 Assign N people to M tasks ($M > N$)	Individual	Project Mgr
2 Assign N people to M tasks ($M < N$)	Teams	Project Mgr, Team Leader
3 Assign N people to T teams, each team resp. for 1 or more tasks	Formal Teams	Project Mgr, Team Leader

Enhancements to a Good Organization

- **The Chief Programmer Team**
- **The Software Librarian**
- **Egoless programming with a team environment**

The Software Project Plan (SPP)

A brief document which describes --

- **The scope of the project**
- **The resources to be used**
- **Risks and risk avoidance techniques**
- **Cost and schedule**
- **Overall approach to software development**

Management, technical staff, and customer are the primary reads of the SPP.

The SPP provides a starting point for the rest of the project.