TOPICS

Overview

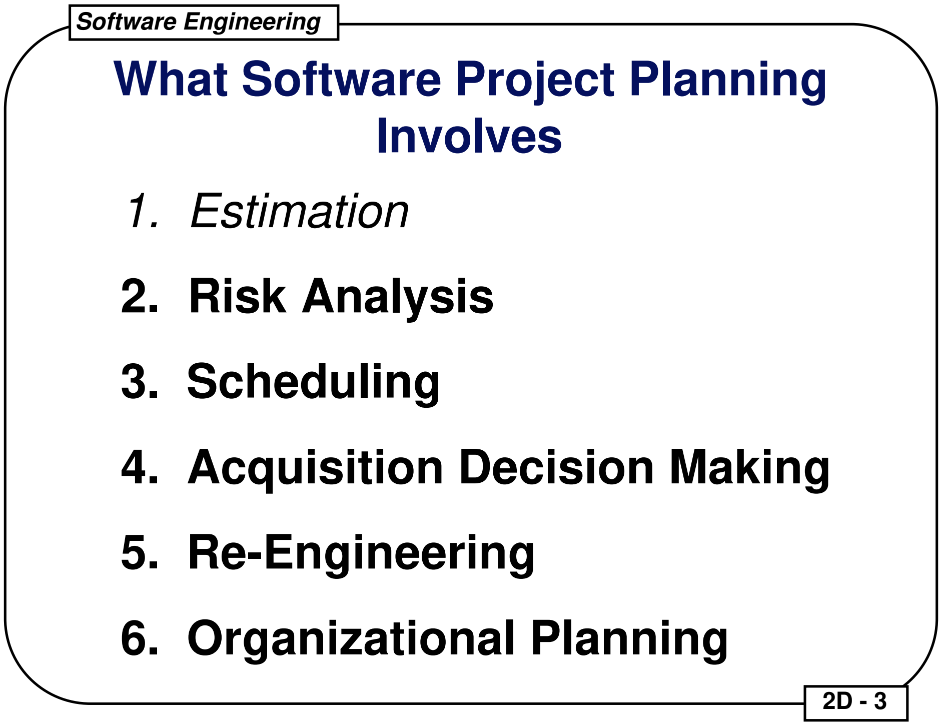
Metrics

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)



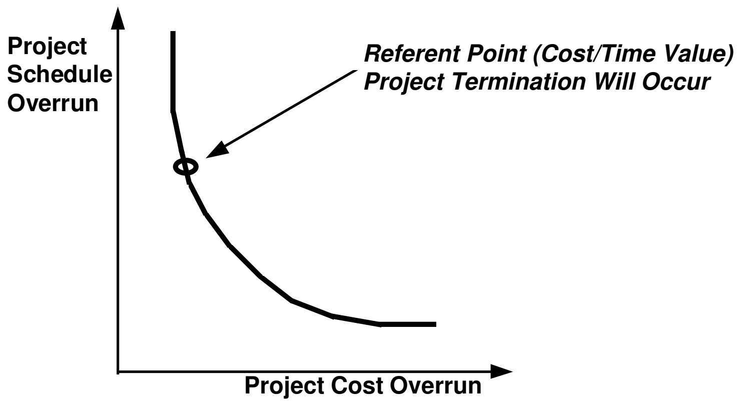
What Software Project Planning Involves

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

Before starting a development project, we must:

1. Assess the risks involved
2. Develop a strategy for attacking the problem
3. Establish a mechanism for assessing the program
4. Organize people who will be building the project

Risk Analysis



Referent Point (Cost/Time Value) Project Termination Will Occur

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

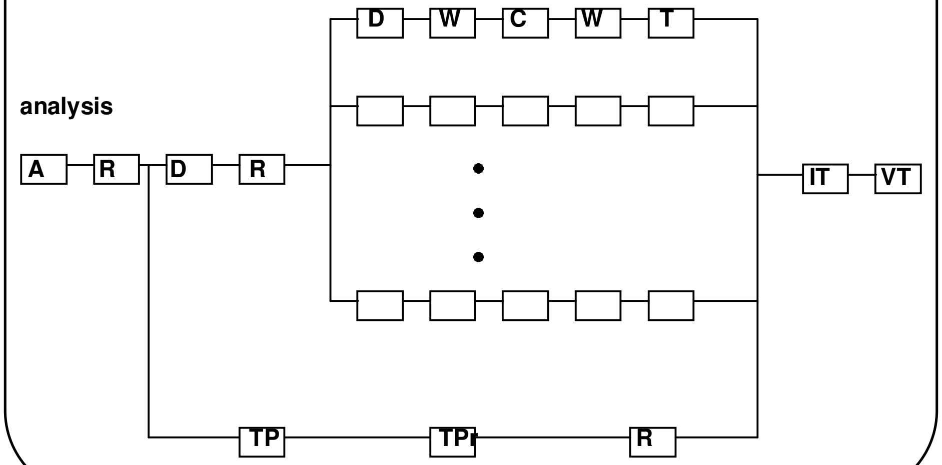
Software Project Scheduling

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



Legend:

- A: Analysis and specification
- R: Review
- D: Design
- W: Walkthrough
- C: Coding
- T: Test
- TP: Test planning
- TPr: Test procedure
- IT: Integration test
- VT: Validation test

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

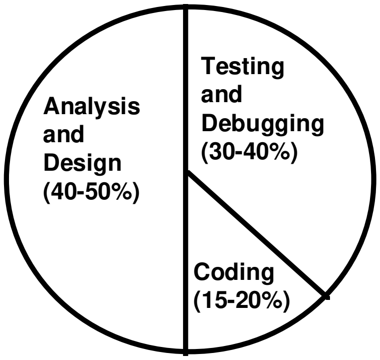
Task Definition and Parallelism

Integration Test Milestone - completed after system is assembled

Validation Test Milestone - completed last

Software Project Scheduling

Effort Distribution



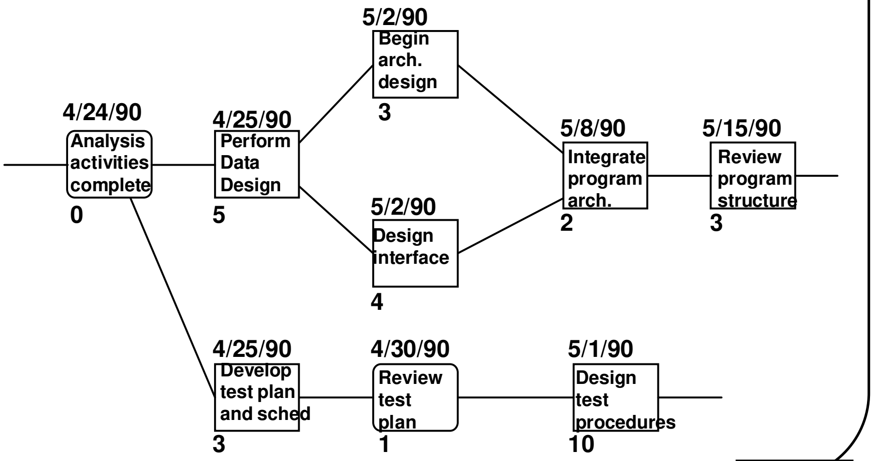
Software Project Scheduling
Scheduling Methods

- **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



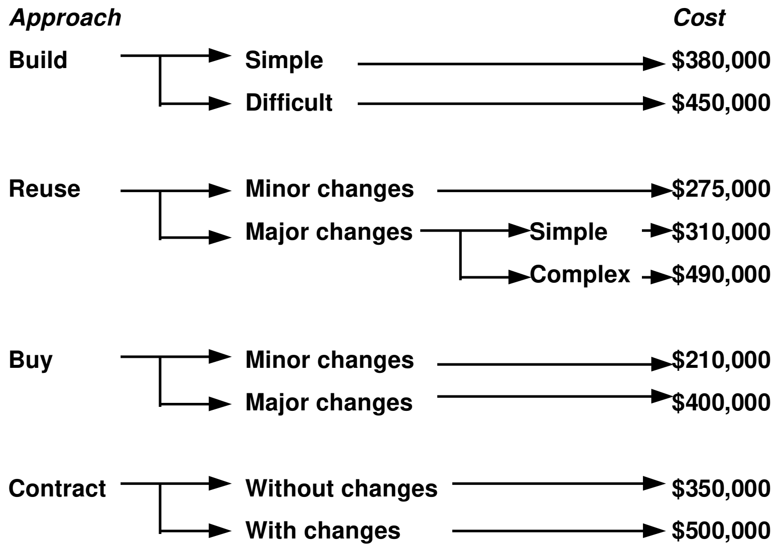
Approaches to Project Tracking

- 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 Acqusition Decision Tree



Approach

Cost

Build

Simple $380,000

Difficult $450,000

Reuse

Minor changes $275,000

Major changes

Simple $310,000

Complex $490,000

Buy

Minor changes $210,000

Major changes $400,000

Contract

Without changes $350,000

With changes $500,000

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

Approach	*Level of Interaction*	*Coordination*
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.