

# Informatik-Projektentwicklung

**Prof. Dr. Peter Müller**

Software Component Technology

Wintersemester 03/04

**ETH**

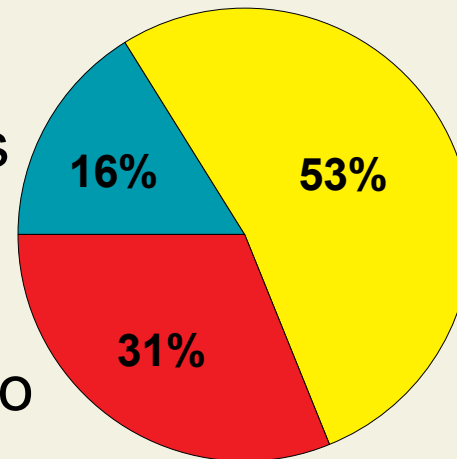
Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

# A Sad Story

## ■ Standish Group Research Study “CHAOS” 1995

Fully successful (on-time, on-budget, with all features as initially specified)

cancelled prior to completion

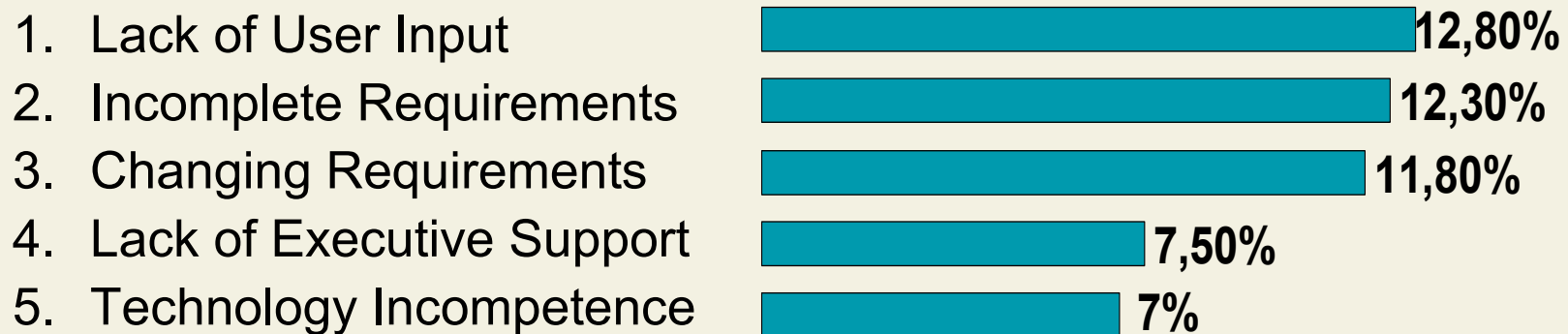


late, over-budget, or offered fewer features than originally specified

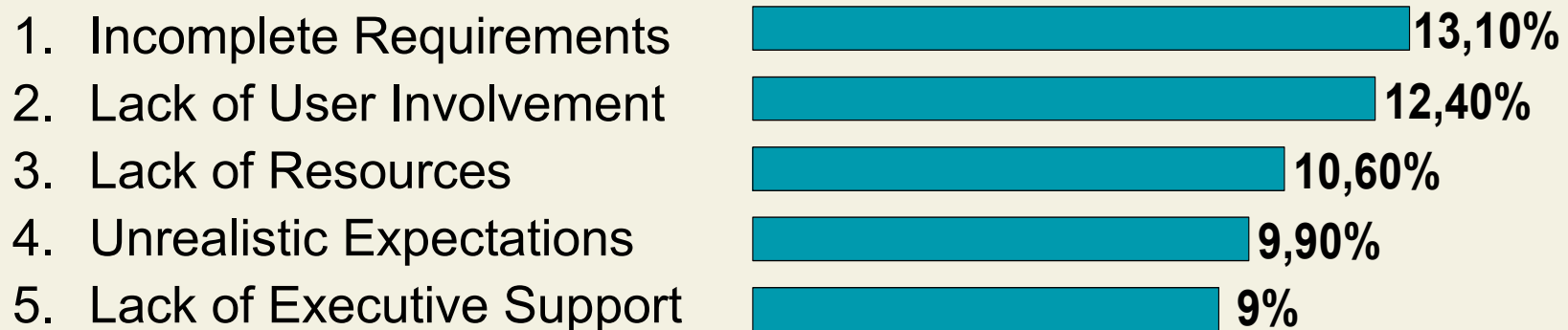
- The average unsuccessful project (yellow and red)
  - Lasts 222% longer than it was planned to last
  - Goes over budget by 189% (4% by more than 400%)
  - Offers 61% of originally specified features (yellow)

# Why IT-Projects Fail

- Top 5 reasons measured by frequency of responses by IT executive management
- Failure profiles of yellow projects



- Failure profiles of red projects



# How to Avoid Troubled Projects

- Apply proper engineering
  - ⇒ Characteristics of IT-projects
  - ⇒ Phases of IT-projects with their purpose, methods, and deliverables
- Apply proper project management
  - ⇒ Main processes of project management with their inputs, techniques, tools, and outputs
  - ⇒ Main areas of project management (scope, time, cost, quality, risk, etc.)
- Recognize the importance of non-technical aspects
  - ⇒ Some basic rules of successful project management

# PMI – Project Management Institute

- Non-profit project management professional association
- Develops and maintains a professional certification program to advance the PM profession
- *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide) is a globally recognized standard for managing projects
- The general PM part of this course is based on PMI standards, terminology, and systematics
- [www.pmi.org](http://www.pmi.org)



# Literature: IT-Projects

- Zehnder, Carl August: Informatik-Projektentwicklung, vdf Hochschulverlag, 2003
- Frühauf, Karol: Software-Projektmanagement und -Qualitätssicherung, vdf Hochschulverlag, 2002
- Jenny, Bruno: Projektmanagement in der Wirtschaftsinformatik, vdf Hochschulverlag, 2000
- Steinweg, Carl: Projektkompass Softwareentwicklung, Vieweg, 2002
- Gaulke, Markus: Risikomanagement in IT-Projekten, Oldenbourg Verlag 2002

# Literature: General Project Management

- A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Project Management Institute, 2000
- Mulcahy, Rita: PMP Exam Prep (4th Edition), RMC Publishing, 2002
- Fleming, Quentin, Koppelman, Joel: Earned Value Project Management, Project Management Institute, 2000
- PMI – Project Management Institute, [www.pmi.org](http://www.pmi.org)

# Literature: Software Engineering

- Pagel, Bernd-Uwe, Six, Hans-Werner: Software Engineering (Band 1), Addison-Wesley, 1994



# Related Courses

- Projektführung und -abwicklung in der Praxis (Weydert, WS)
- Fallstudien aus der Praxis (Gutknecht, Brandis, SS)

# Course Infrastructure

- Web page:  
[se.inf.ethz.ch/teaching/ws2003/37-801/index.html](http://se.inf.ethz.ch/teaching/ws2003/37-801/index.html)
- Slides will be available on the web page  
Wednesday before the lecture at the latest
- Mailing list:  
[se.inf.ethz.ch/cgi-bin/mailman/listinfo/ipe](http://se.inf.ethz.ch/cgi-bin/mailman/listinfo/ipe)

# Agenda for Today

## 1. Introduction

### 1.1 Basics

### 1.2 Integration Management

### 1.3 Practice Projects

# 1. Introduction

## 1.1 Basics

## 1.2 Integration Management

## 1.3 Practice Projects

# What is a Project?

- Definition:

*A project is a temporary endeavor undertaken to create a unique product or service*

Every project has a definite beginning and a definite end

The product or service is different in some distinguishing way from all similar products and services

- In contrast: *Operations* are ongoing and repetitive

# Examples for Projects and Operations

- Projects

- Developing a new software application
- Implementing a new business procedure
- Adding functionality to an IT system
- Doing a Diplomarbeit

- Operations

- Bugfixing of an existing software application
- Selling train tickets
- Running a car factory

# What is an IT-Project?

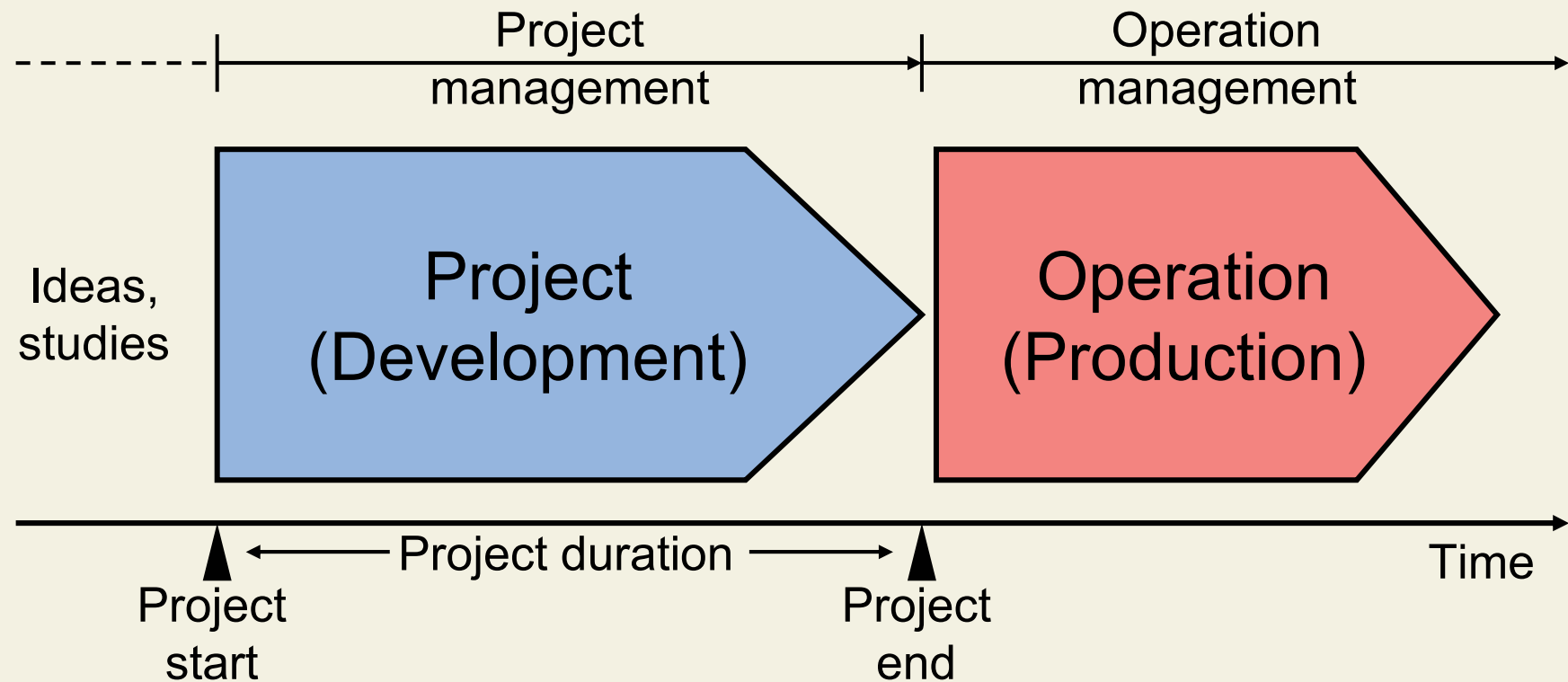
- Definition:

*An IT-project is a project to create a product or service, of which the usage of information technology is the decisive characteristic*

- Examples

- The development of a software application is an IT-project (IT-based product)
- The development of a car is not an IT-project, although information technology is involved substantially

# From Projects to Operations



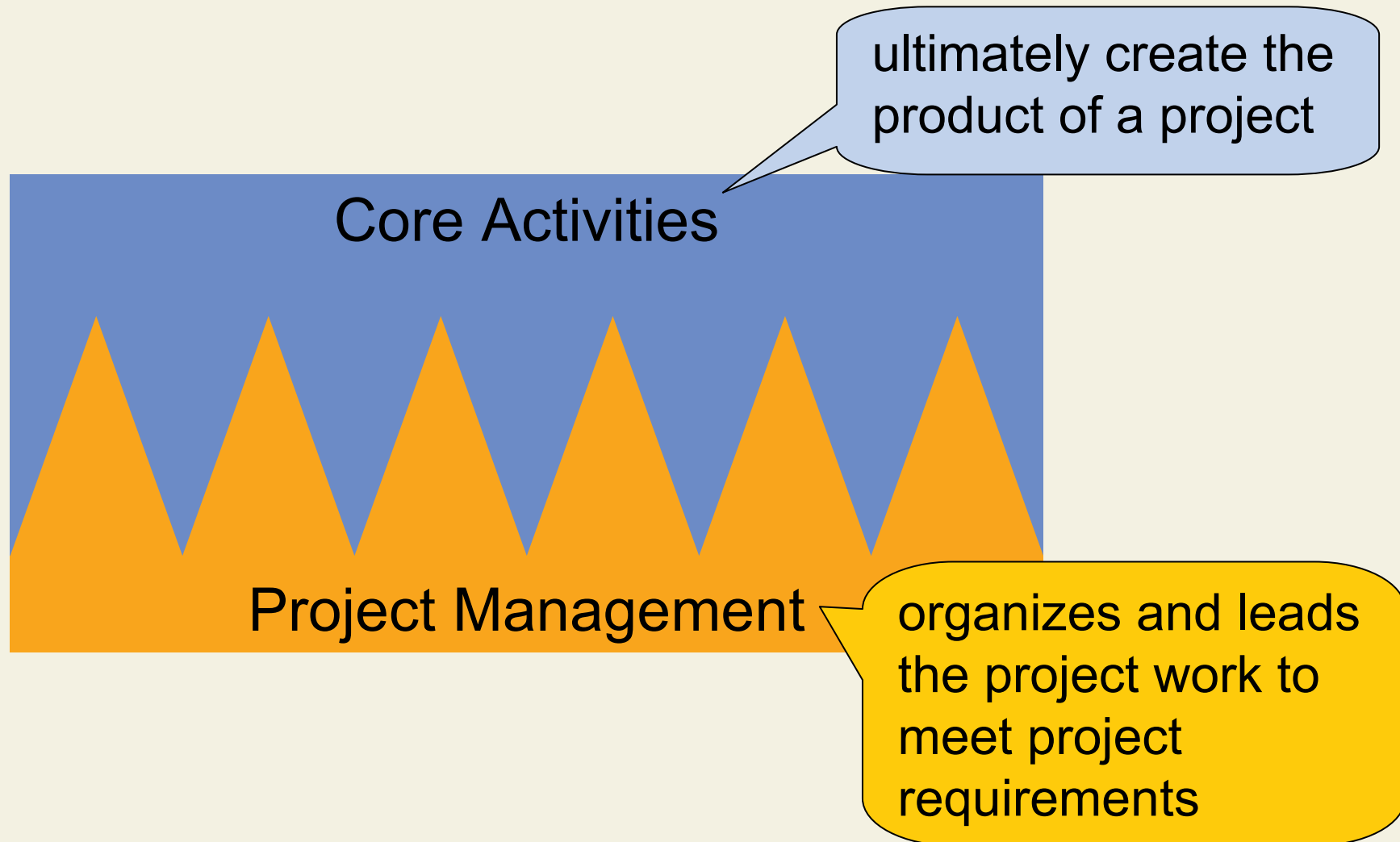
- Applications are neither projects nor operations, but products



# Characteristics of Projects

- **Temporary** endeavor
- **Unique** product or service
- Performed by **people**
- **Constrained** by limited resources
  - Budget, time, staff
- **Planned, executed, and controlled**
- Have their own **organization**

# Core Activities and Project Management



# Project Management

- Definition of Project Management (PM):  
*Project Management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.*

# Typical Core Activities in IT-Projects

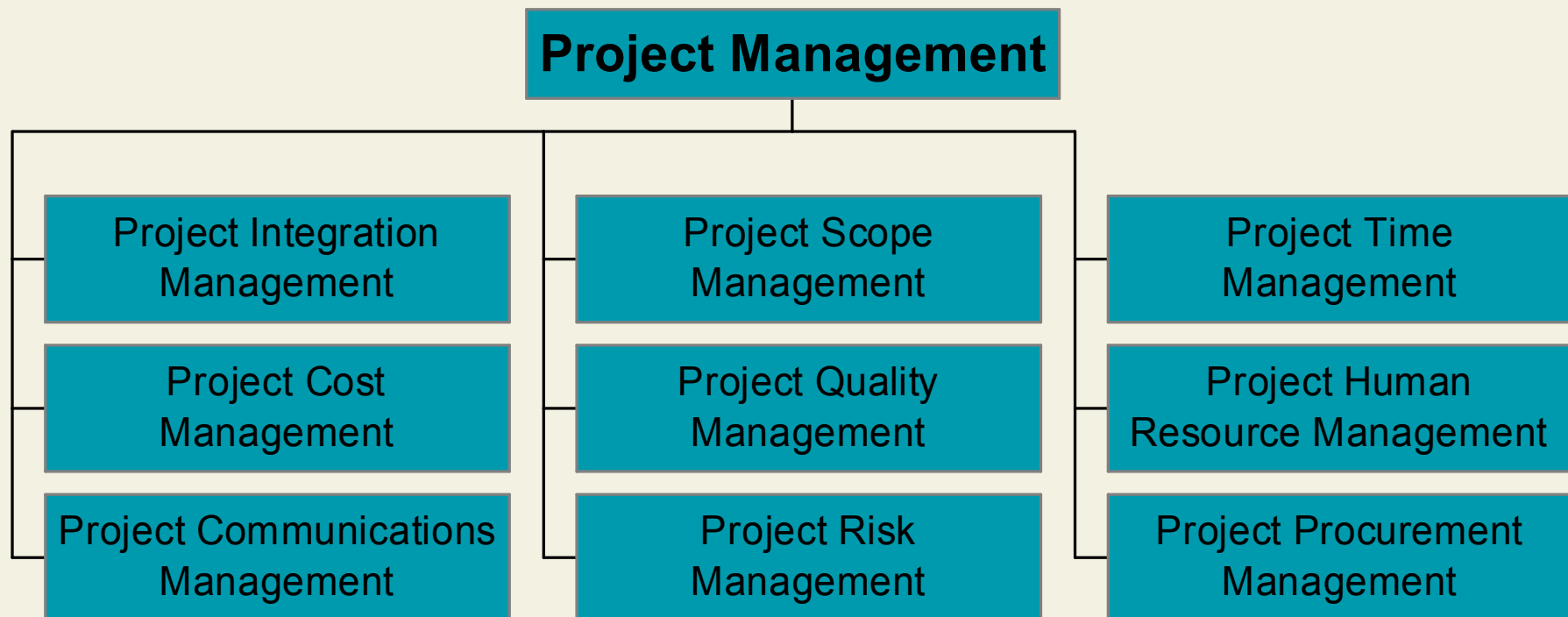
- Design of a graphical user interface
- Installation of a local area network
- Integration test of all system components
- Training of users on a new application
- Implementation of a set of Java classes
- Documentation of design decisions and code

# Typical Project Management Activities

- Communication with team, clients, management
- Efforts estimations
- Planning activities and assigning resources
- Comparing actual performance to plan
- Risk analysis
- Negotiation with subcontractors
- Staff acquisition

# PM Knowledge Areas

PM activities fall into nine Knowledge Areas



# Course Outline

2. Project Life Cycle and Project Management Life Cycle
3. Project Initiation and Analysis Phase
4. Project Planning
5. Schedule Analysis (\*)
6. Design Phase and Procurement Management
7. Project Execution and Control
8. Organizational Aspects and HR Management (\*)
9. Cost Management
10. Risk Management, Quality Management, and Test
11. Legal Issues (guest lecture by Prof. C. A. Zehnder)
12. Presentation of Project Results (\*)
13. Project Documentation and Project Closeout, Exam (\*)

# Special Event

Half-day seminar on

## Communication and Leadership for Project Managers

Wolfgang Köhler, Deutsche Bank AG

- **Friday, January 23, 2004 in the afternoon**
- Exact time and place to be announced



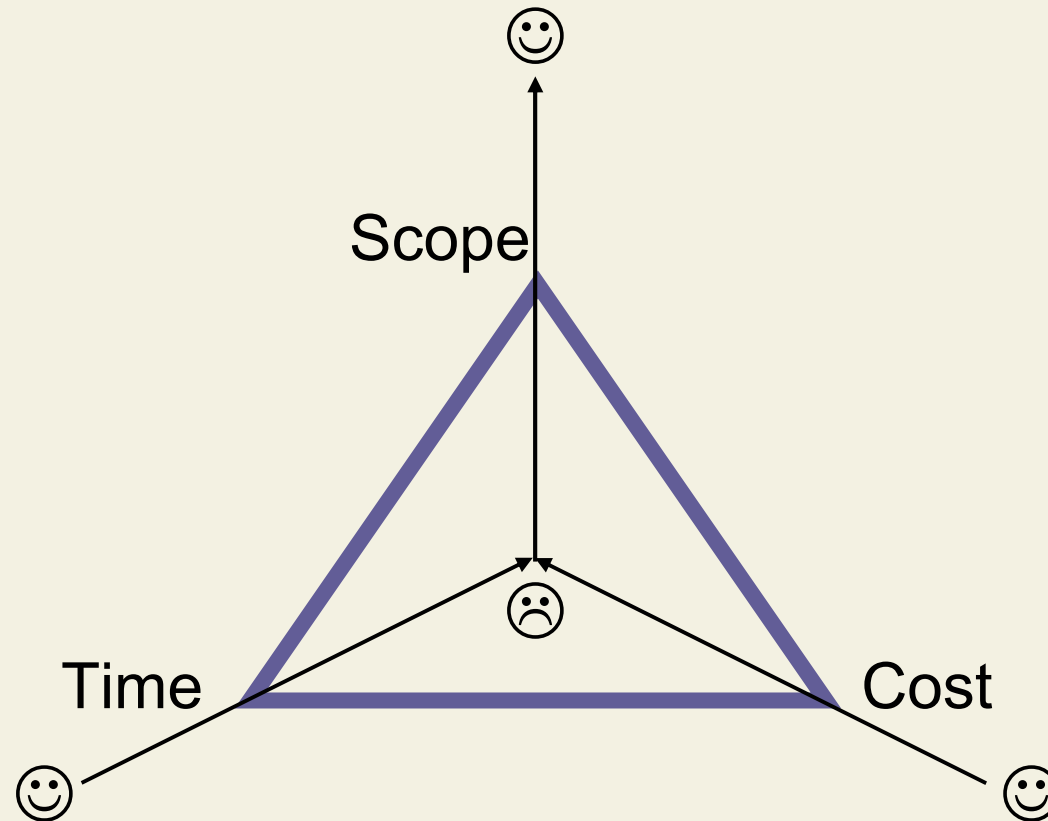
# 1. Introduction

## 1.1 Basics

## 1.2 Integration Management

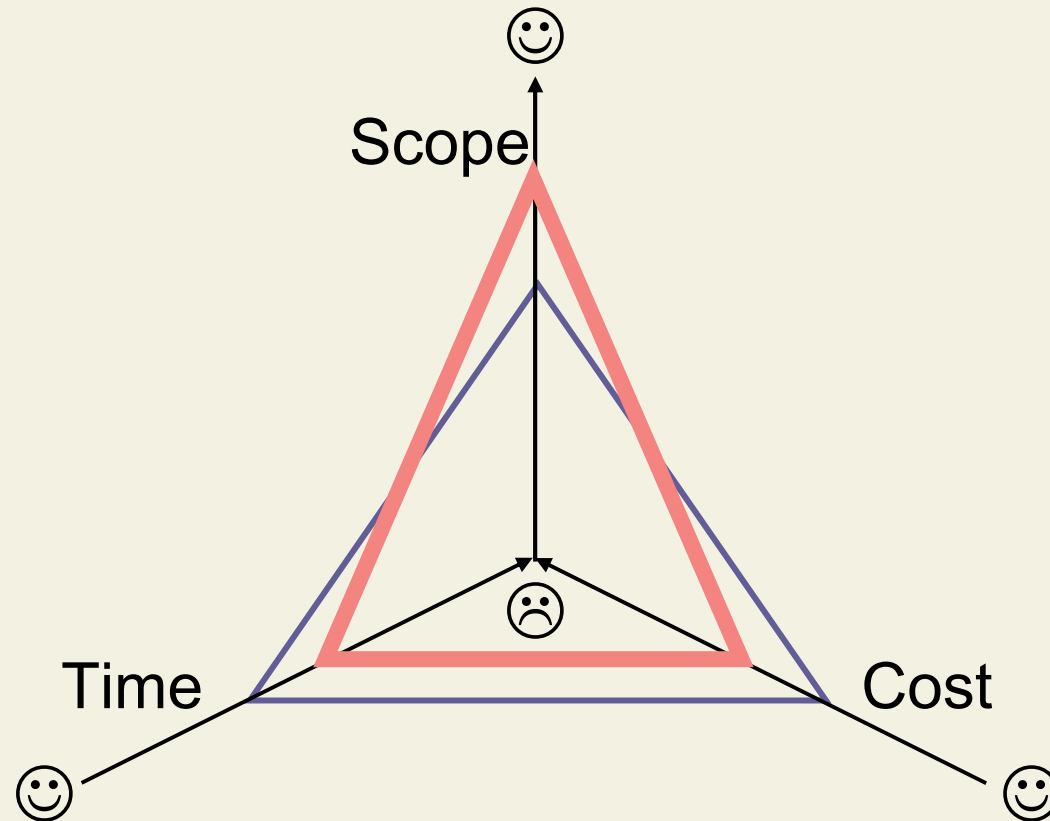
## 1.3 Practice Projects

# The Triple Constraint



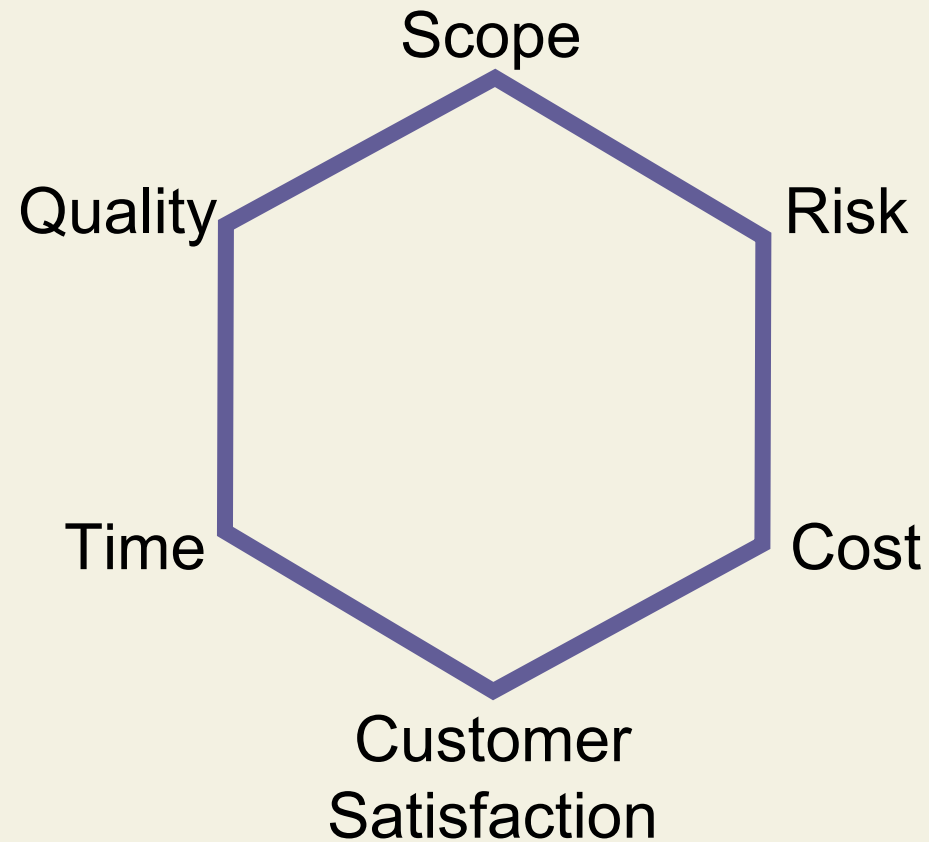
- Project objectives are **equally important**
- Actions in one project area usually affect other areas

# The Triple Constraint



- **Tradeoffs** among objectives must be **managed**
- **Priorities** are set by customers and management

# More Competing Objectives



# Project Success

- Definition:

*A project is successful if the specified results are delivered in the required quality and within the predetermined time and resource limits.*

- Computer scientists tend to focus on scope and quality only

- The development of a technically perfect application is not a success if the cost exceeds the price clients are willing to pay
- Excellent project results often are worthless if they come too late (temporary market windows, external deadlines)

# Project Integration Management

- Ensure that various elements of the project are **properly coordinated**
  - Estimate cost of staffing alternatives
  - Determine effects of a scope change on schedule
- Make **tradeoffs** among competing objectives and alternatives
- Primarily task of project manager since he / she is responsible for seeing the overall “**big picture**”

# Integration Management Processes

- Project plan development
  - Integrates various planning outputs (time, cost, risk, etc.)
  - Produces a formal, consistent document to manage project execution
- Project plan execution
  - Produces actual work results
- Integrated change control
  - Determines that a change has occurred
  - Manages the changes as they occur
  - Results in corrective actions and project plan updates

# 1. Introduction

1.1 Basics

1.2 Integration Management

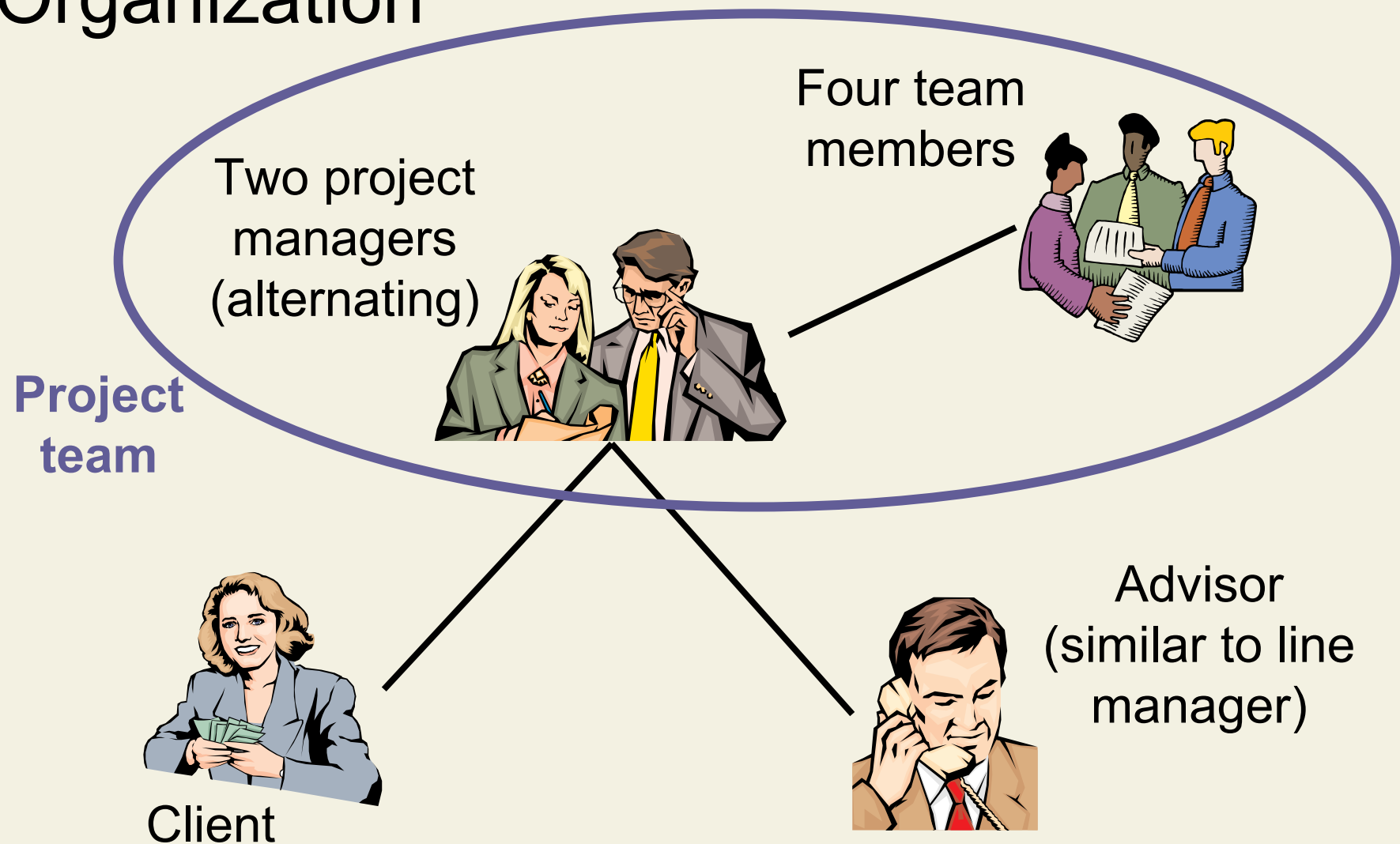
**1.3 Practice Projects**



# Overview

- Idea: Perform realistic projects in small teams
- Three different topics / clients
- Each project consists of three major phases
  - Project definition
  - Design
  - Result
- Deliverable for each phase
  - Result, status reports, presentation
- Constraints
  - Schedule is fixed
  - Effort is fixed at  $16 \times 6 = 96$  person hours

# Organization



# Roles and Responsibilities

- Project managers
  - Assigning tasks to project members
  - Controlling progress w.r.t. project plan
  - Escalating problems to assistant or client if necessary
  - Delivery of results in time
  - Quality of deliverables
  - Writing meeting minutes and status reports
  - Preparing and giving presentation
- Team members
  - Performing assigned tasks
  - Providing project manager with status information

# Project 1: Website for Caritas München

- Requirements
  - Re-design and re-implement web site of a branch of Caritas München.
  - Support for dynamic content
  - Follow style guides and infrastructure constraints of the client
  - Define exact requirements together with client
- Client:  
Caritas Zentrum München-West und Würmtal
- Advisor: Peter Müller

# Project 2: Publications Viewer

- Requirements

- A web-based tool for viewing the BibTeX file and publications repository of the Software Component Technology Group
- Viewing all available BibTeX entries in an abbreviated list or table format as well as details for a selected entry
- Searching, filtering, and sorting BibTeX entries
- Viewing the corresponding PDF/PS article

- Client: Werner Dietl (SCT Group)

- Advisor: Adam Darvas

# Project 3: Publications Editor

- Requirements

- A web-based tool for manipulating the BibTeX file and publications repository of the Software Component Technology Group
- Editing the BibTeX file by inserting, deleting, or modifying entries
- Editing the publications repository by uploading, removing, or replacing files.

- Client: Adam Darvas (SCT Group)

- Advisor: Werner Dietl

# Timeframe

- 06.11. Enroll for participation
- 10.11. Project order is issued
- 20.11. Deadline for project definition
- 24.11. Presentation of project definition
- 11.12. Deadline for design
- 15.12. Presentation of design
- 22.01. Deadline for project results
- 26.01. Presentation of project results
- 02.02. Presentation of best projects in plenum

# Participation

- To participate send email to [ipe@inf.ethz.ch](mailto:ipe@inf.ethz.ch)
  - Names and email addresses of project members
  - Preferred topic (bring topics into an order from most to least wanted)
  - Names of project managers and deputies for each phase
- **Deadline: November 06, 2003**



# Grading

- 2 credit points for successful completion of the course
- Credit points are rewarded based on
  - The practice projects (70%)
  - A written exam (30%)
- Requirements for projects
  - Delivering all required documents in time and in quality
  - Presenting the project status and results in front of (parts of) the course
  - Deliverables and presentations will be reviewed by advisors