A Sad Story

- Standish Group Research Study “CHAOS” 1995
  - Fully successful (on-time, on-budget, with all features as initially 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
  1. Lack of User Input
  2. Incomplete Requirements
  3. Changing Requirements
  4. Lack of Executive Support
  5. Technology Incompetence

- Failure profiles of yellow projects
  1. Lack of User Input
  2. Incomplete Requirements
  3. Changing Requirements
  4. Lack of Executive Support
  5. Technology Incompetence

- Failure profiles of red projects
  1. Incomplete Requirements
  2. Lack of User Involvement
  3. Lack of Resources
  4. Unrealistic Expectations
  5. Lack of Executive Support
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

Agenda

Basics
- Integration Management
- Project Lifecycle
- Project Management Lifecycle

What is a Project?

- Definition:
  
  A project is a temporary endeavor undertaken to create a unique product or service

  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 organizes and leads the project work to meet project requirements.

ultimately create the product of a project

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
- Effort 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
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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

- Scope
- Quality
- Risk
- Time
- Cost
- Customer Satisfaction

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

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Projects are Complex

- At project start, only broad information about characteristics of product are available
- Average size of IT projects is 500-2000 person days
- Different tasks have to be performed such as designing a GUI, testing a module, installing hardware, training users, or negotiating with customers
  - How can we handle this complexity?
Decomposition According to Product

Subprojects
- Decomposition usually follows structure of product
- Subprojects are easier to manage
- Subprojects enable one to use specialized staff
- Remaining and new problems
  - Only broad information about product characteristics
  - Managing the interfaces between subprojects
  - Integrating the results of the subprojects
  - Increased need for communication
- Subprojects are still complex

Progressive Elaboration

Characteristics of a unique product or service must be progressively elaborated
- Continuing steadily by increments
- Worked out with care and detail
- During the project, characteristics are defined in more detail as the project team develops a better and more complete understanding of the product
Project Phases

- Definition:
  Precisely documented interfaces between phases: deliverables

Projects are divided into project phases

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Deliverables

- Definition:
  Definition: Any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project

- Examples
  - An object-oriented design, described by a UML diagram
  - A project schedule as MS Project file
  - A user guide for a new application
  - Software, delivered as compiled binary

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Project Phases

- Definition:
  A collection of logically related project activities, usually culminating in the completion of a major deliverable
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Waterfall Model of Project Life Cycle

- Analysis Phase
- Design Phase
- Implementation Phase
- Test Phase
- Deployment Phase

Properties of the Project Life Cycle

- Stakeholders' influence on product characteristics and final cost is highest at project start and decreases progressively
- Cost of changes and error correction increases during the project life cycle
From Projects to Operations

- Project phases are surrounded by related activities that are not part of the project

Product Life Cycle

Agenda

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Project Management Life Cycle
Core and Project Management Processes

- **Core Processes**
- **Project Management Processes**
  - Grouped into phases
  - Grouped into process groups

Project Management Life Cycle

- **Initiating Processes**
- **Planning Processes**
- **Controlling Processes**
- **Executing Processes**
- **Closing Processes**

Example: Time Management

- **Schedule Development**
- **Schedule Updates**
- **Status Reports**
- **Task List for Each Team Member**
- **Project Plan Execution**
- **Corrective Actions**
Process Groups

- Project groups are not discrete one-time events
- They overlap and occur at varying levels of intensity within each phase of the project

Interaction between Phases

- Input and output of the processes depend on the phase in which they are carried out
- But processes are not limited to one phase (overlaps)

Core and Project Management Processes

- Core Processes
- Project Management Processes