Software Project Management (2 – 20191002)

Mohammed Seyam
seyam@mans.edu.eg
http://people.cs.vt.edu/seyam

Classroom Policy

- Lecture time: 10:20-12:00
  - Be on time!
  - Once door is closed, DO NOT knock!
    - and, do NOT enter!!
- Mobile phones MUST be on silent/vibration mode during lecture time
  - Recommended: turn your phone completely off!
- Fostering an atmosphere of mutual respect will always be a priority for me.
- I trust you, unless you force me not to!

Introduction to the Course (continued)

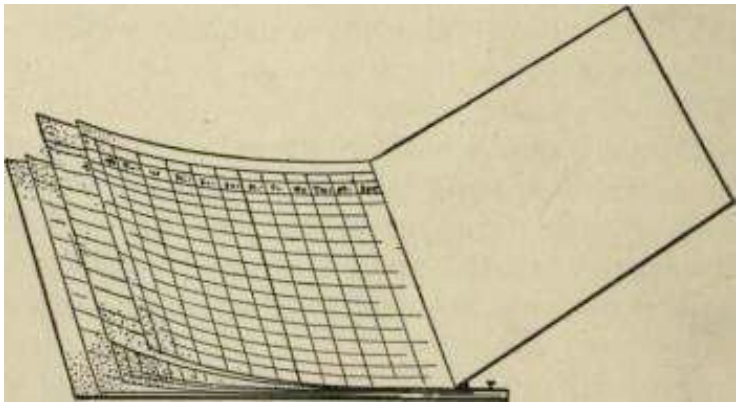
A Brief History of (Software) Project Management

Frederick Winslow Taylor

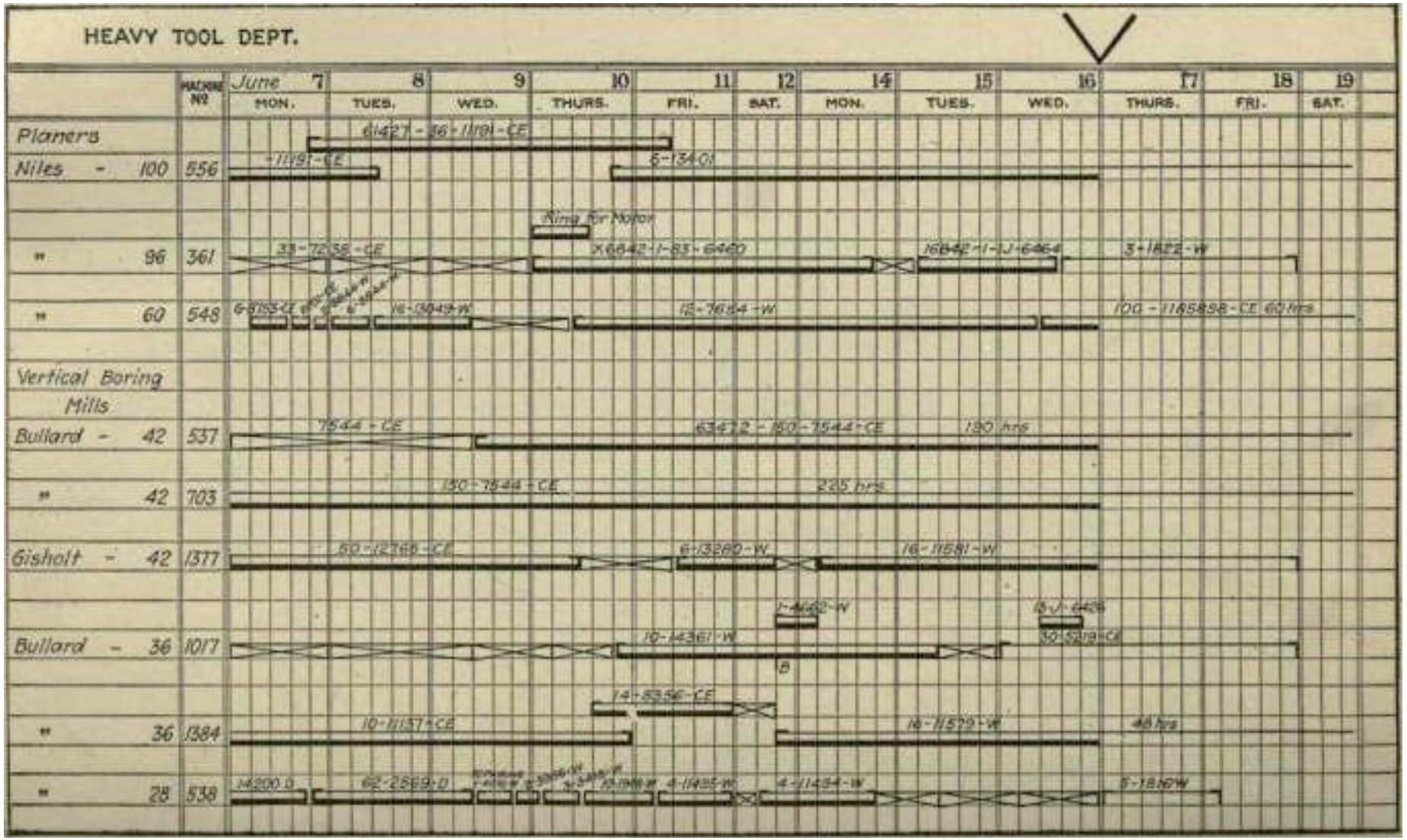
- Taylor's "Scientific Management" is the first theory of work and management
- Beginning of 1900
- A negative view of workers (they perform at the slowest rate which goes unpunished)
- Some more interesting characteristics:
  - Scientific definition of work
  - Scientific selection of personnel
  - Sharing of responsibilities between workers and management
  - Incentives and rest periods (to make workers more efficient)

Henry Gantt

- Gantt's "Gantt chart" notation is still used today to schedule projects
- Defined during the First World War
- First used to schedule and monitor work and progress in ship building: distinction between work and progress
- His book available for download from archive.org



Example of Gantt Chart



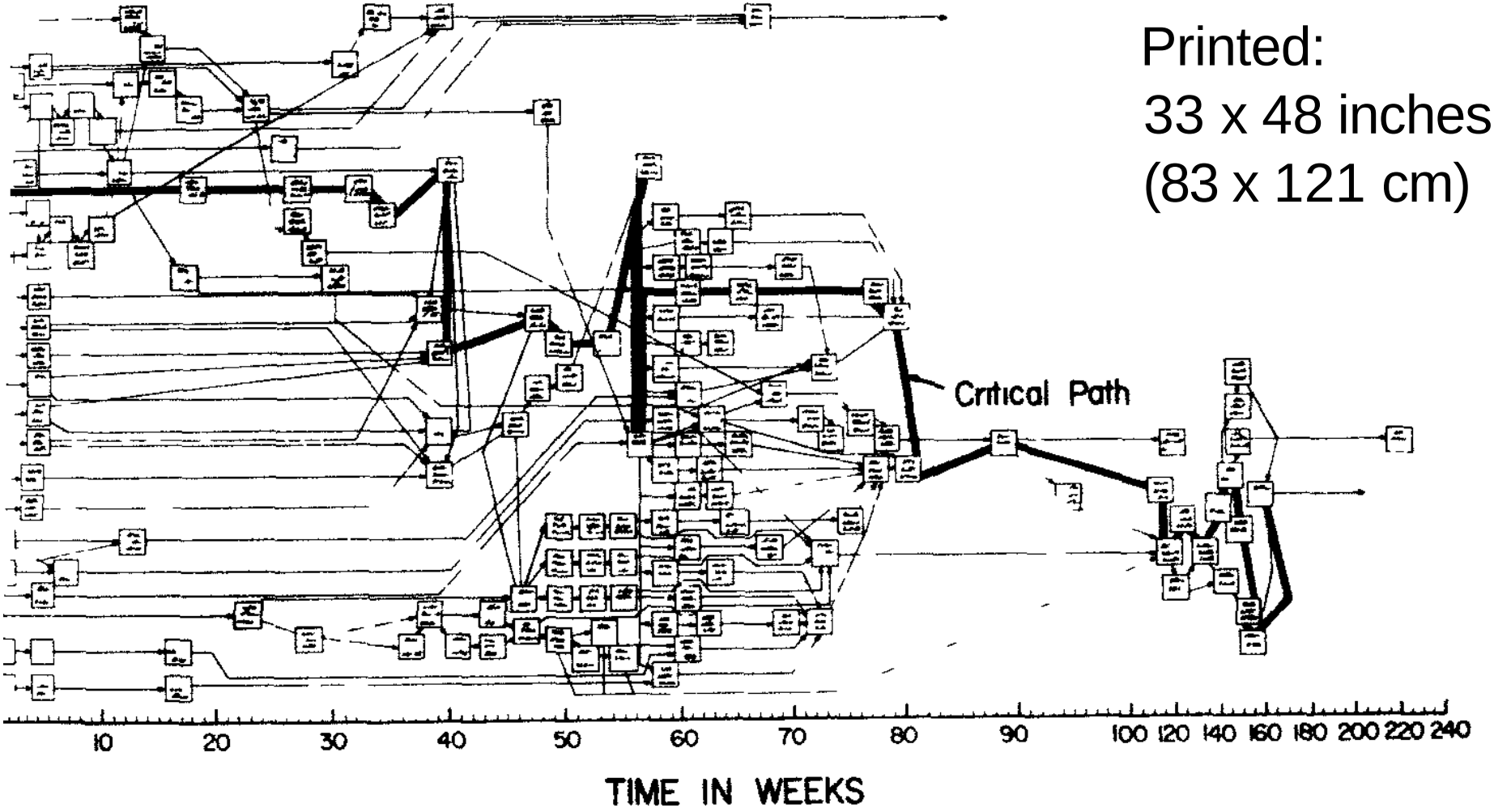
Source: The Gantt chart, a working tool of management
Clark, Wallace and Gantt, Henry

Fifties and Sixties

- 2nd World War:
  - Manhattan Project: process flow diagrams
- 1957 **CPM** (Critical Path Method)
  - Mathematically based algorithm for scheduling a set of project activities, used to plan maintenance activities in plants
  - Dupont + Remington Rand UNIVAC team
  - No fundamental changes to date
- 1958 **PERT** (Program Evaluation and Review Technique)
  - U.S. Navy Polaris missile program (Booz Allen & Hamilton (management consulting firm) working as ORSA team for Lockheed Missile System)

Motivation for CPM and PERT

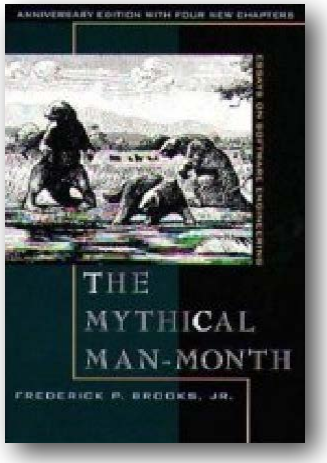
What activities could delay the project delivery of the following plan?



Printed:
33 x 48 inches
(83 x 121 cm)

Fifties and Sixties

- **1960's** Big Government contracts (Vietnam, nuclear power plants, NASA Apollo): standardization and automation
  - PERT/COST and WBS become compulsory in Government's sponsored projects
  - Earned Value Analysis (EVA) is defined
  - Configuration management
  - Project organizations (PMI, IPMA) promote profession and techniques
  - (1961) IBM uses PM commercially



- **1970** Software development gets into the equation
  - EVA developed for monitoring schedule and cost
  - Waterfall model for software development
  - The mythical man-month highlights many pitfalls of software development

The Computer Revolution

- **1980's**
  - Hardware and software proliferation make PM tools accessible to smaller firms
  - Hardware capacity grows exponentially (Moore's Law) and so does software
  - Estimation models (FP and COCOMO) are introduced to predict software complexity
- **1990's**
  - Total quality
  - Leaner, quicker, more responsive organizations
- **Today**
  - Web application and new application distribution models
  - Development with components and frameworks
  - Agility, quick interaction, constant feedback

Software Development Projects and Stakeholders

The name of the game, the players, and (some of) the rules

What is a project

The name of the game

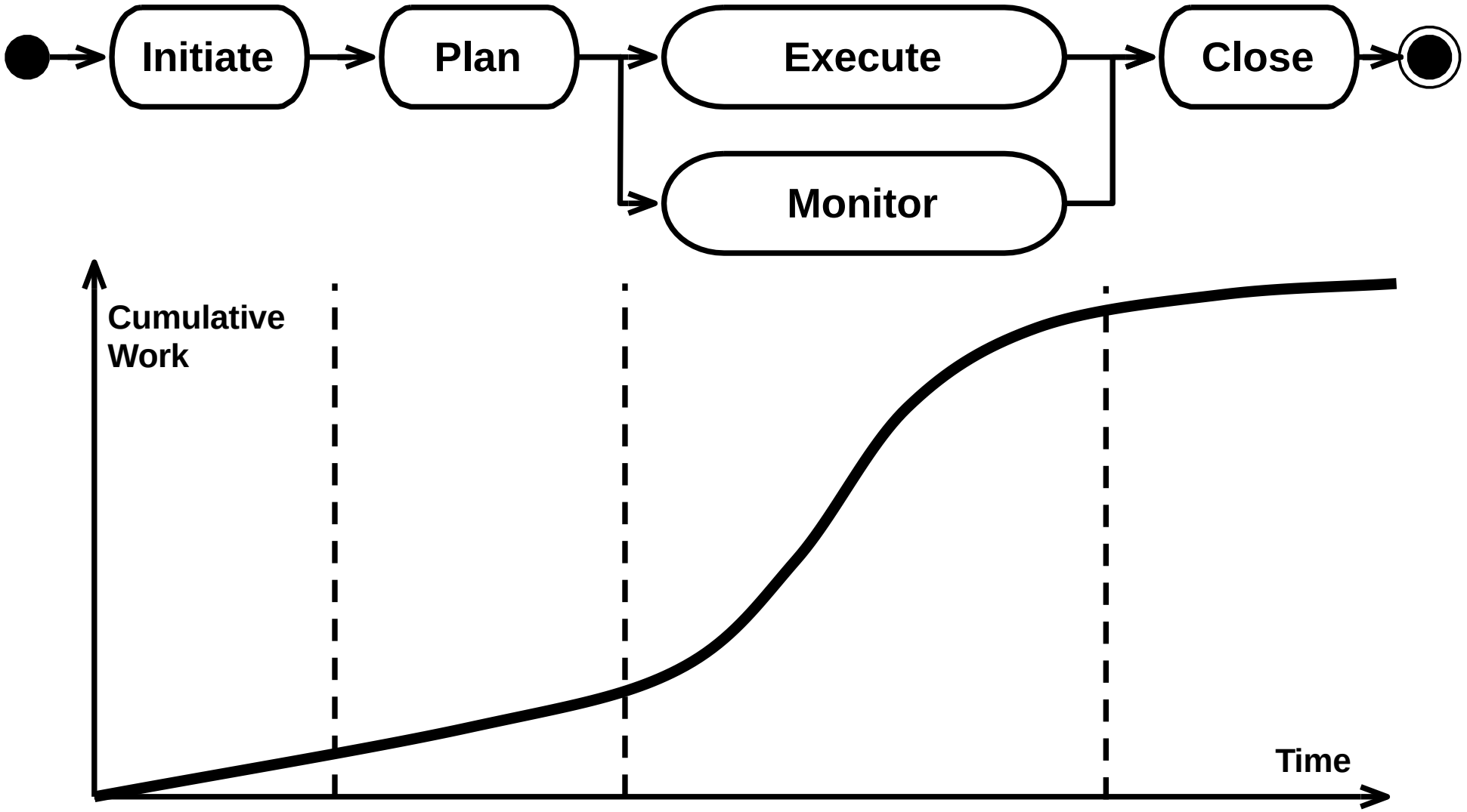
A project is a temporary endeavor undertaken to create a unique product, service, or result

(definition from the PMBOK)

Characteristics of a Project

- Temporary
  - Definitive begin and end (either because the goals are met or the project is closed - goals cannot or will not be met)
  - Projects' results are not necessarily temporary (see project and product lifecycle)
- Unique products, service, or result
  - A product which is quantifiable (e.g. a component, …)
  - A capability to perform a service, such a business function
  - A result, such as knowledge (collected in documents, presentation, …)
- Progressive elaboration
  - Development by steps and in increments (necessary to keep a project under scope)
- Resource constrained (like everything else in life)

Progressive Elaboration



Project Management Context

- **Subprojects**
  - Projects may be divided in subprojects (although the sub-projects may be referred to as “projects” and managed as such)
- **Project and Program Management**
  - Set of related projects managed in a coordinated way in order to achieve some sort of benefit
- **Portfolios and Portfolio Management**
  - Collection of unrelated projects or programs and other work grouped together to facilitate management and meet strategic objectives

Projects and Operational Work

- Work can be categorized either as project or operational
- Common characteristics
  - Performed by people
  - Limited resources
  - Planned, executed, and controlled
- Differences
  - Project: obtain goals and terminate
  - Operational work: sustain the business

Examples (and counterexamples)

- Writing a paper
- Developing a software system
- Maintaining a software system
- Managing personnel

Software Development Projects

Some Examples of Software Development Projects and Operational Work

Type of “Software” Development Projects

- In your life as a project manager you might be involved in different types of “software” development projects, among which:
  - Application Development
  - Process and Systems Re-Engineering
  - System Integration
  - Consulting Services
  - Installation and Training

Application Development

- Goal: developing an application (desktop, web, mobile, embedded)
- The most fun :-)
- Types of application development:
  - **One-offs:** systems specifically created for a client
  - **Off-the-shelf:** to fill the need of a large set of users
  - **Customized off-the-shelf:** standardized systems which require a significant amount of customization to be used in an organization. Example: **Enterprise Resource Planning** (ERP) systems

Process and Systems Re-Engineering

- Goal: change the way in which the operational work of an organization is carried out to achieve some strategic goal (e.g., improve quality, become more efficient)
- Typically large projects which involve an accurate analysis of the existing situation (“as is”) w.r.t. procedures, systems, infrastructure
- Often the support of the introduction of an ERP system and require system and data integration activities

System Integration Services

- Goal: automating the information flow among the systems of an organization
- Types of integration:
  - **Vertical:** integration of systems performing similar operations
  - **Horizontal:** integration of systems automating different steps of a procedure

Other types of Projects

- Consulting Services
  - Typically asked to gain a know-how outsize a company's core competence
- Installation and Training Services
  - Services related to the installation or training on specific software systems
  - Remark: also a revenue model in open source development

Projects and their Environment

The players (and you)

A **project stakeholder** is any individual or an organization that is actively involved in a project, or whose interest might be affected (positively or negatively) as a result of project execution or completion.

(PMBOK)

The Players

- Some characteristics:
  - They may have different influence and varying level of responsibility during the project
  - They may play different roles
  - They may have positive or negative influence on the project
  - They may be difficult to identify
  - Their lack of intervention may negatively influence the project (need for identification and involvement)
- Remark: the project manager and the project team **are** project stakeholders, although the term is often used to refer to the “other” stakeholders

Types of Stakeholders

- The project manager
- The project team
- The project sponsor
- The performing organizations
- The partners
- The client
- The “rest”: anyone who might be affected by the project outputs

Key Stakeholders

- Internal:
  - Project team members: the group performing the work
  - Project management team: the members of the team directly involved in project management
- In between:
  - Customer/User: person or organization that will use the results of a project. There may be multiple layers of users
  - Sponsor: person or group providing the financial resources
  - Performing Organization: the organization mostly involved in the project
- External:
  - Influencers: people or groups not directly related to the project who could influence the course of a project

The Project Manager (you)

- **Project Manager**
  - Person responsible of managing the project and stakeholders' expectations
- **Some skills**
  - Communication and negotiation skills
  - A little predisposition to risk
  - Goal orientation
  - Leadership
  - A bit of thinking outside the schemes
  - Solid know-how
  - Professional correctness
  - A lot of common sense
  - A bit of style

Code of Conducts and Ethical Aspects

The code of conduct of the PMI:

1. **Responsibility:**
   - the duty of taking ownership of decisions made or failed to make and their consequences
2. **Respect:**
   - the duty of treating with respect the resources assigned to us, such as people, money, reputation, environment, and so on
3. **Fairness:**
   - the duty of taking decisions impartially and objectively
4. **Honesty:**
   - the duty of acting in a truthful manner

Questions