

Principles & Architecture



EPITA Bachelor of Science

**Principles and Architecture of
Information Systems**

Chapter #8

Systems Development

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Structure

- **Chapter 1 : Introduction and Organizations**
- **Chapter 2 : Hardware**
- **Chapter 3 : Software**
- **Chapter 4 : Database Systems**
- **Chapter 5 : Network**
- **Chapter 6 : Internet and E-Commerce**
- **Chapter 7 : Major Information Systems**
- **Chapter 8 : Systems Development**
- **Chapter 9 : Security, Privacy and Ethical issues**



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Introduction

- **Effective systems development requires a team effort from stakeholders, users, managers, systems development specialists, and various support personnel, and it starts with careful planning**
- **Systems development starts with investigation and analysis of existing systems**



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Participants in Systems Development

- **Project Manager**
- **Development team**
- **Stakeholders**
- **Users**
- **Systems analysts**
- **Programmer**



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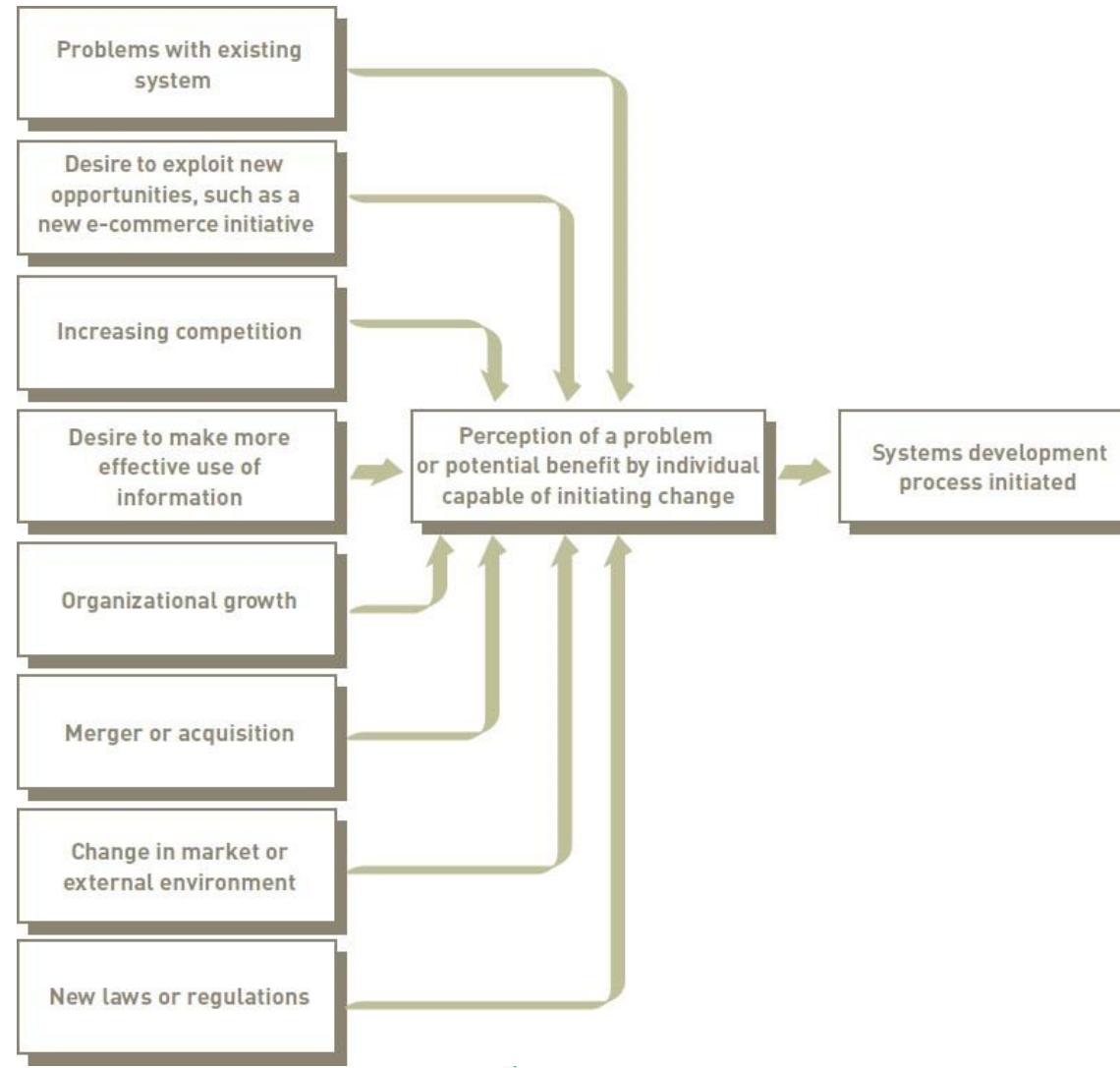
Acquiring Software: Make or Buy?

- **Make-or-buy decision:**
 - Whether to obtain software from external or internal sources
- **Externally acquired software and Software as a Service (SaaS)**
 - Commercial off-the-shelf (COTS) combines software from various vendors into a finished system
 - Software as a Service (SaaS) allows businesses to subscribe to Web-delivered application software by paying a monthly service charge



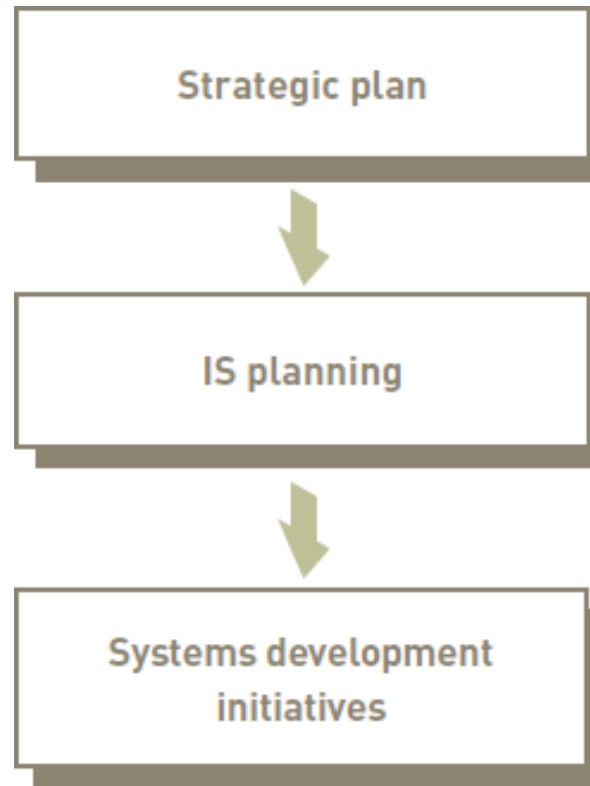
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Typical reasons to initiate a project



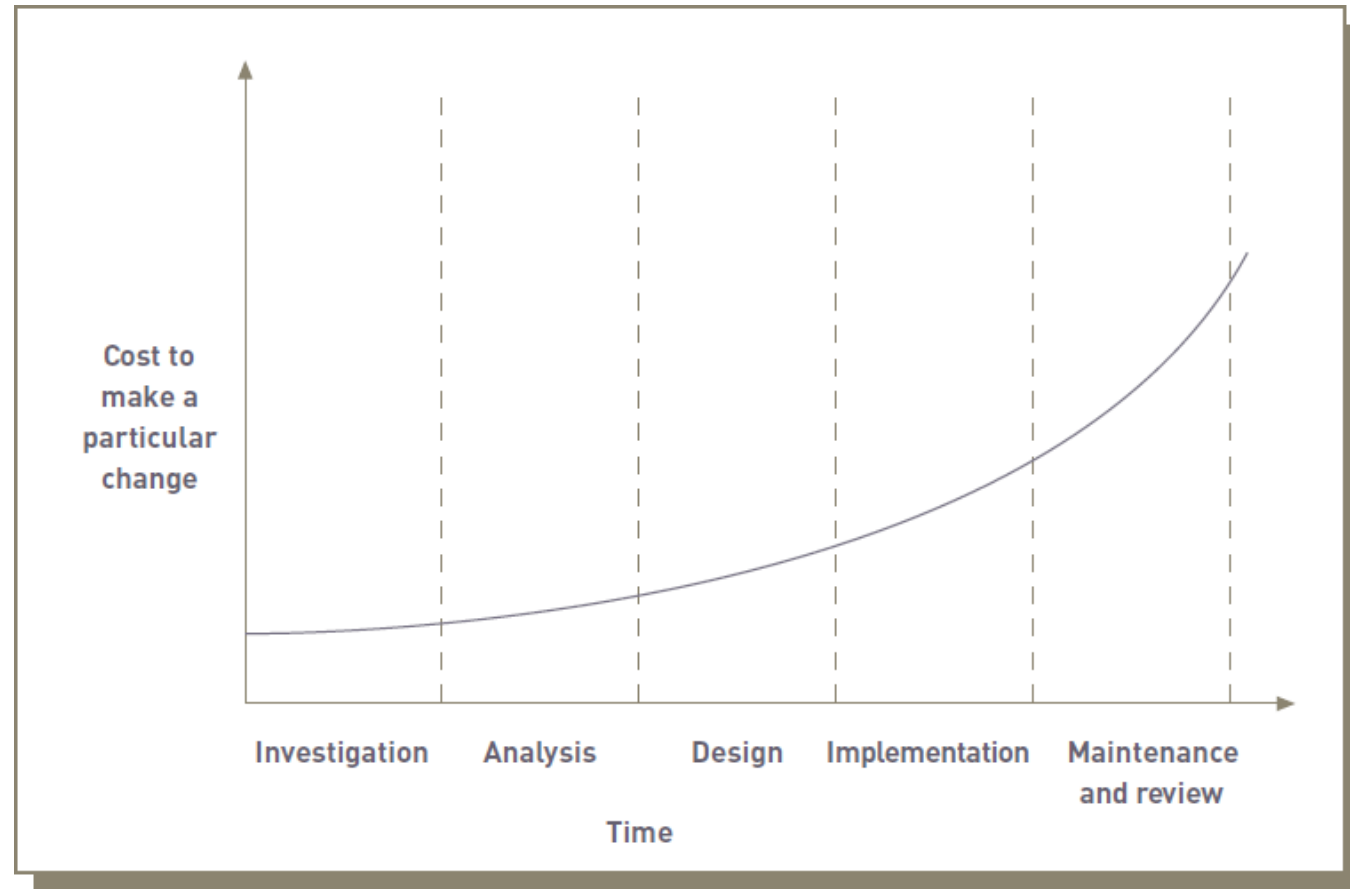
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Aligning corporate and IS Goals



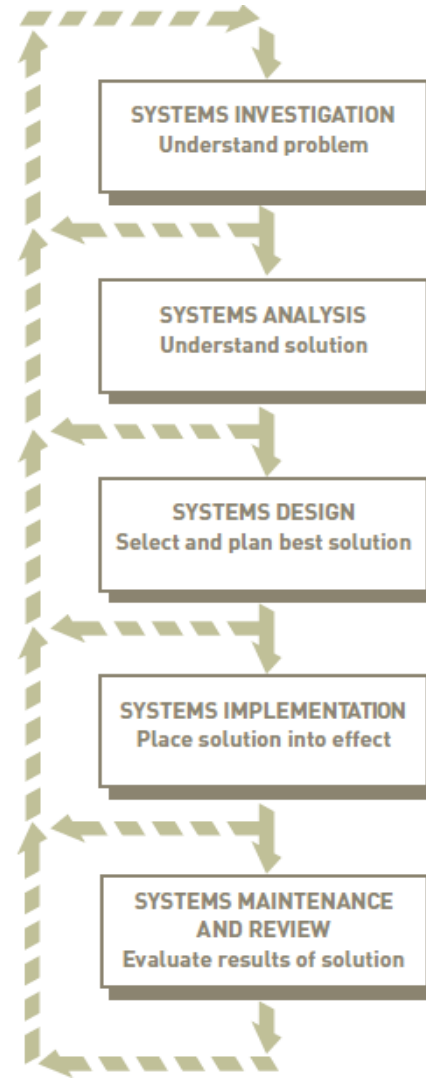
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Relationships between timing of errors and costs



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Traditional SDLC



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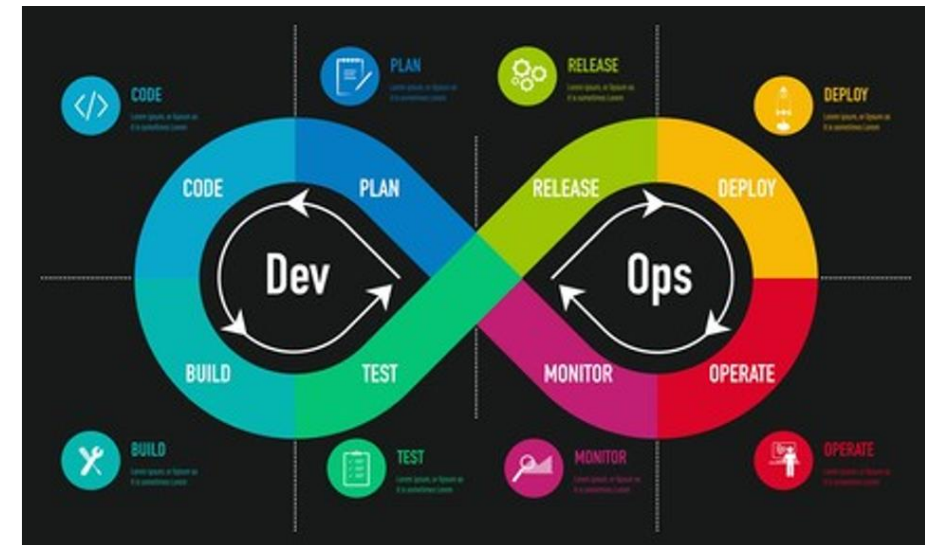
SDLC

- **Systems investigation:**
 - Identifies problems and opportunities and considers them in light of business goals
- **Systems analysis:**
 - Studies existing systems and work processes to identify strengths, weaknesses, and opportunities for improvement
- **Systems design:**
 - Defines how the information system will do what it must do to obtain the problem's solution
- **Systems implementation:**
 - Creates or acquires various system components detailed in systems design, assembles them, and places new or modified system into operation
- **Systems maintenance and review:**
 - Ensures the system operates as intended
 - Modifies the system so that it continues to meet changing business needs



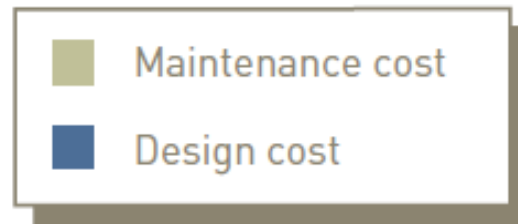
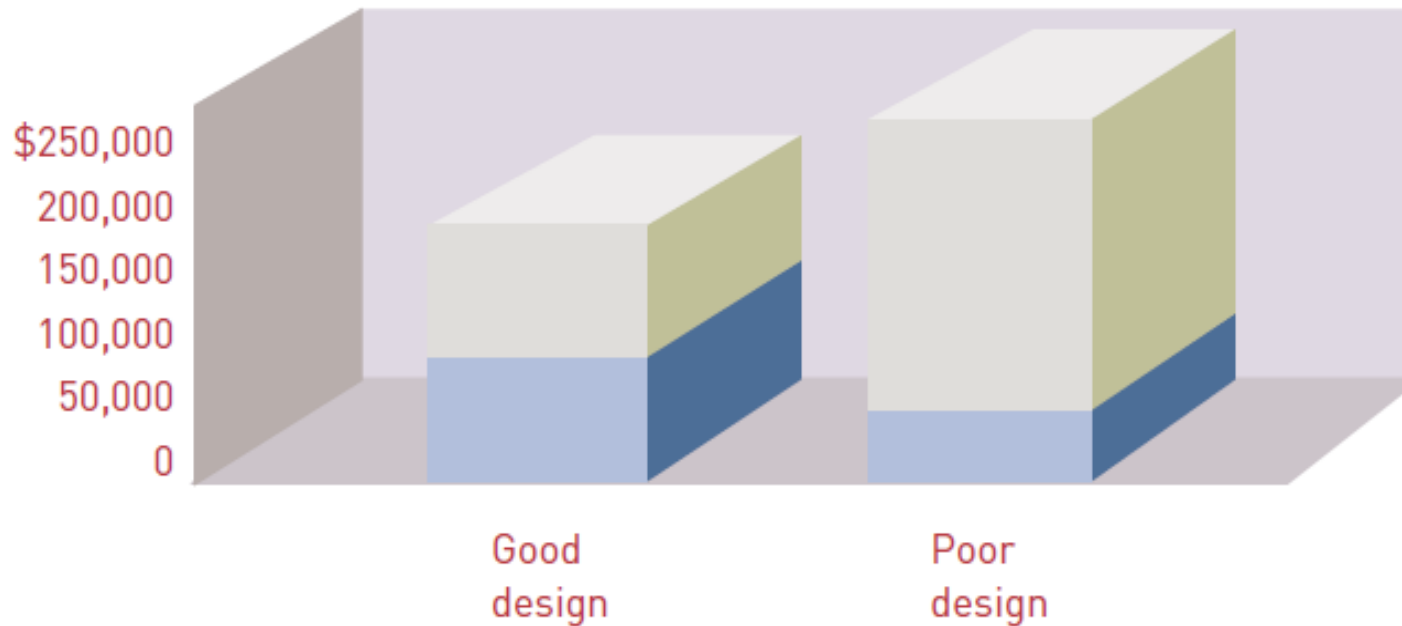
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SDLC versus DevOps



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Relationship between design and total costs



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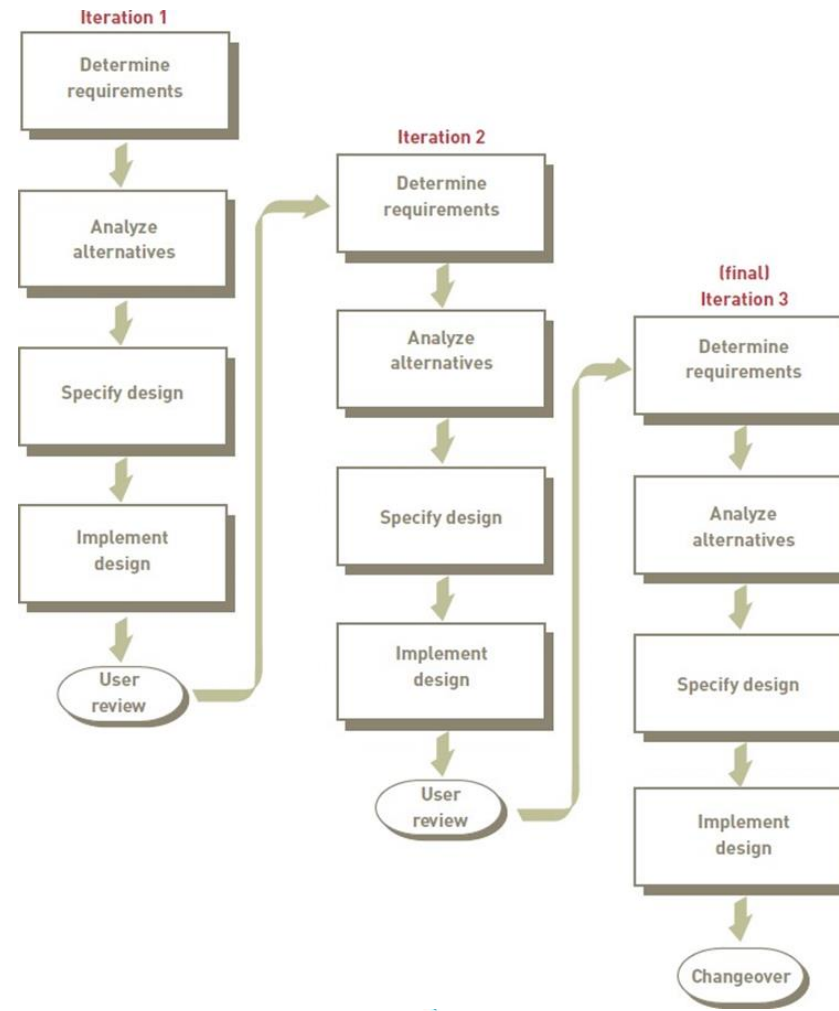
Prototyping

- **An iterative approach**
- **Operational prototype:**
 - **Prototype that works**
 - **Accesses real data files, edits input data, makes necessary computations and comparisons, and produces real output**
- **Nonoperational prototype:**
 - **A mock-up, or model**
 - **Includes output and input specifications and formats**



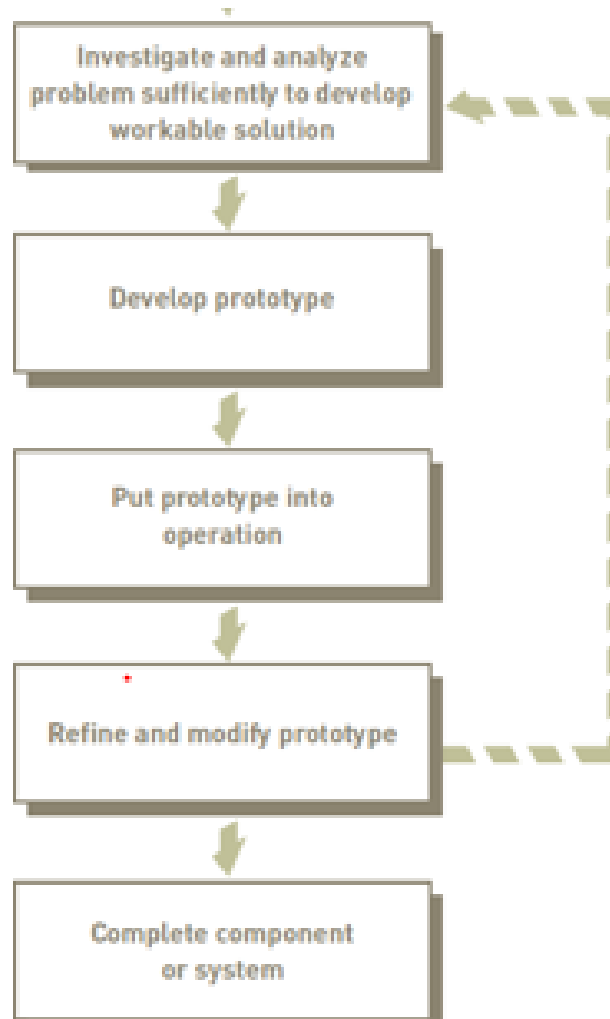
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Prototyping



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Refining during Prototyping



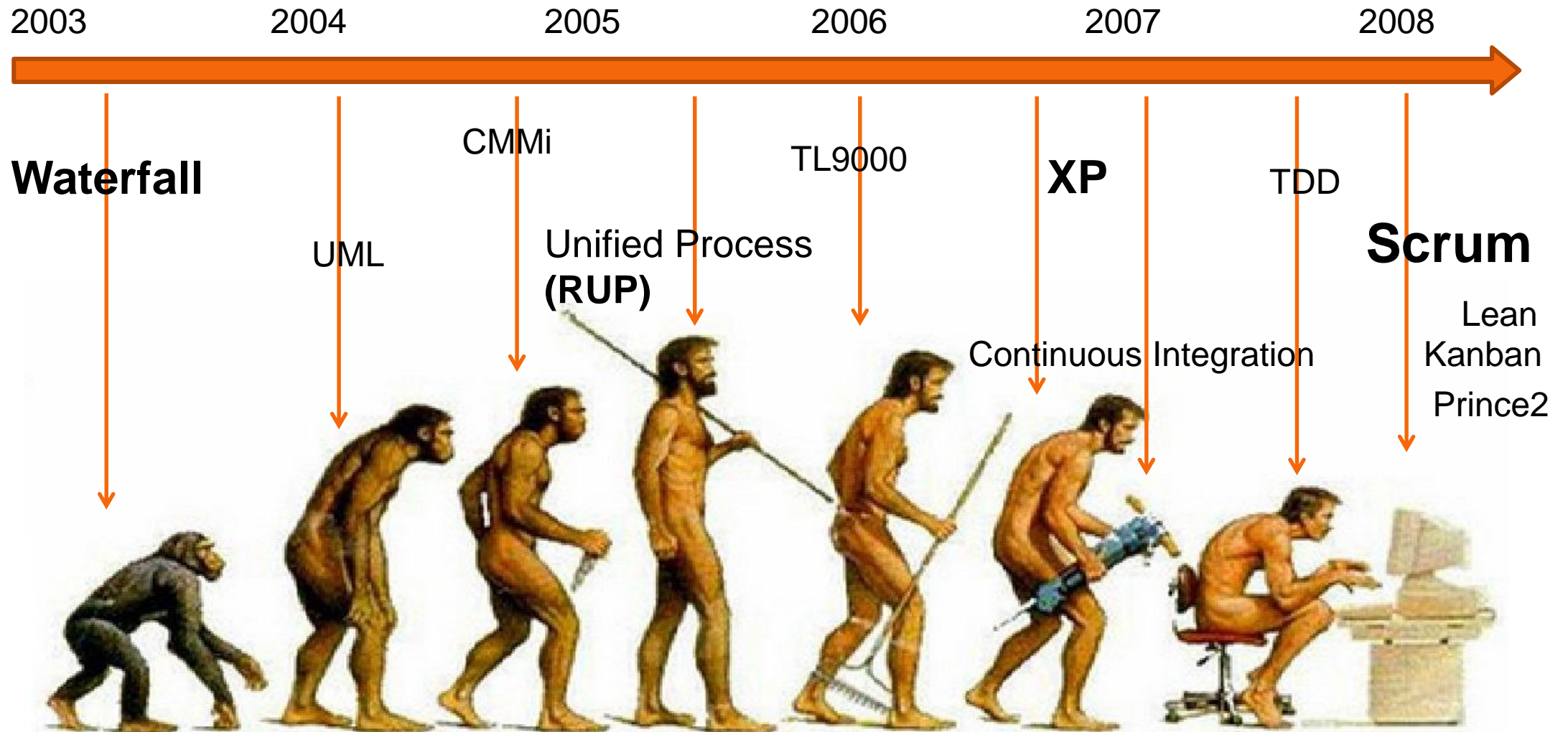
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Agile Methodologies



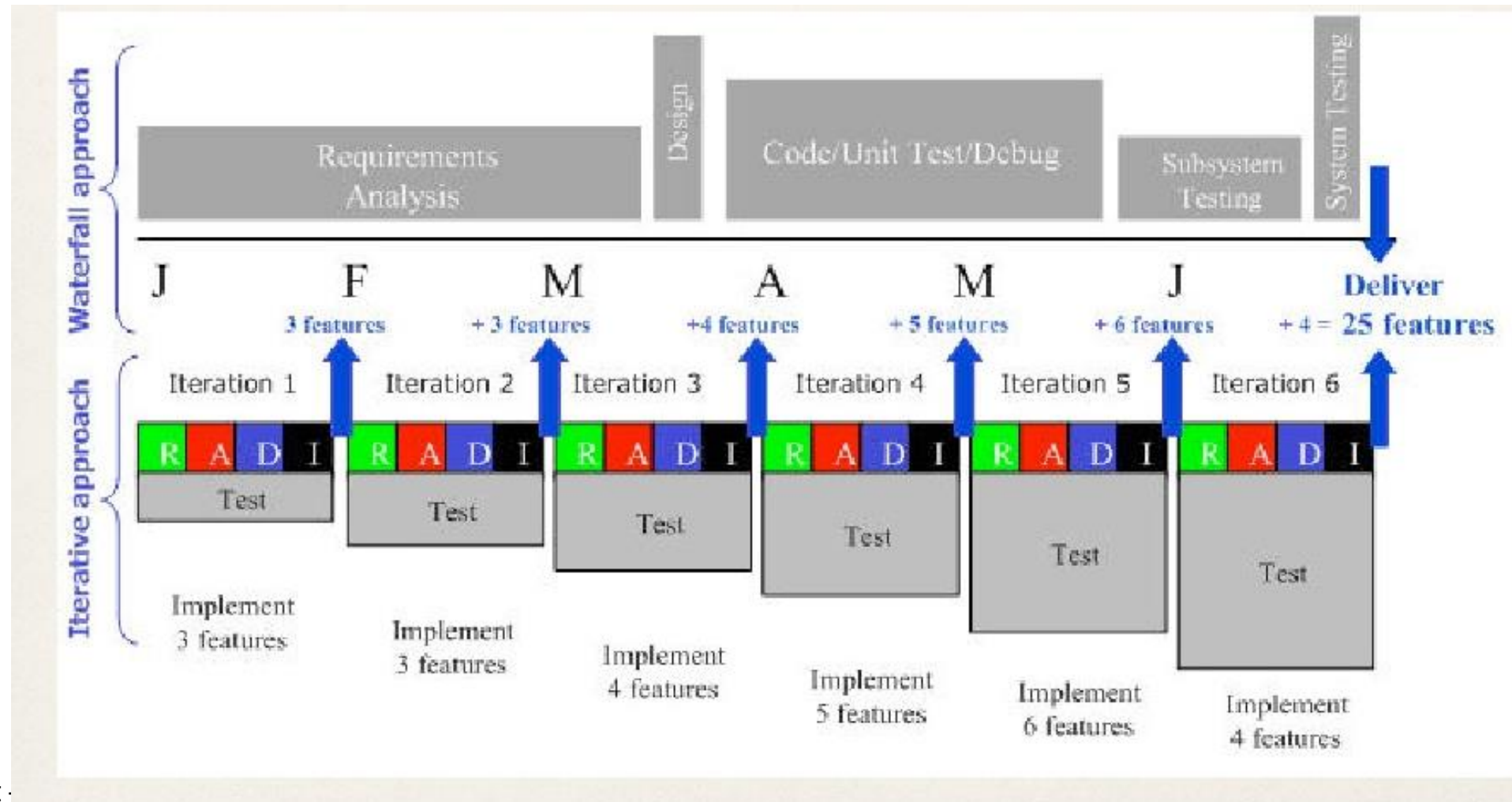
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History of Evolution



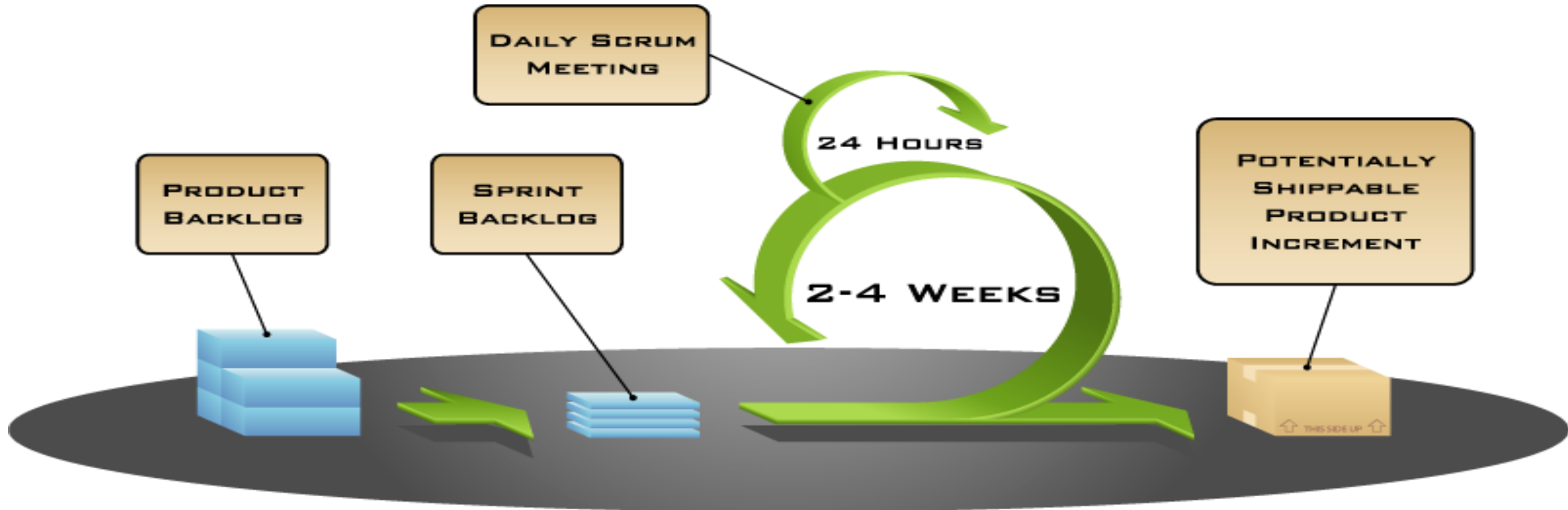
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Scrum versus Waterfall



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Putting it all together



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Change Equation

$$R = Q \times A$$



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Degree of Change

- **Continuous improvement projects versus reengineering:**
 - Continuous improvement projects have a high degree of success
 - Reengineering projects tend to have a high degree of risk but also a high potential for benefits
- **Managing change:**
 - It is essential to recognize and deal with existing or potential problems



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Requirements Analysis

- **Purpose is to determine user, stakeholder, and organizational needs**
- **Techniques used to capture systems requirements:**
 - Asking directly
 - Critical success factors (CSFs)
 - IS plan
 - Screen and report layout
 - Requirements analysis tools



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Converting Organizational goals into Systems Requirements



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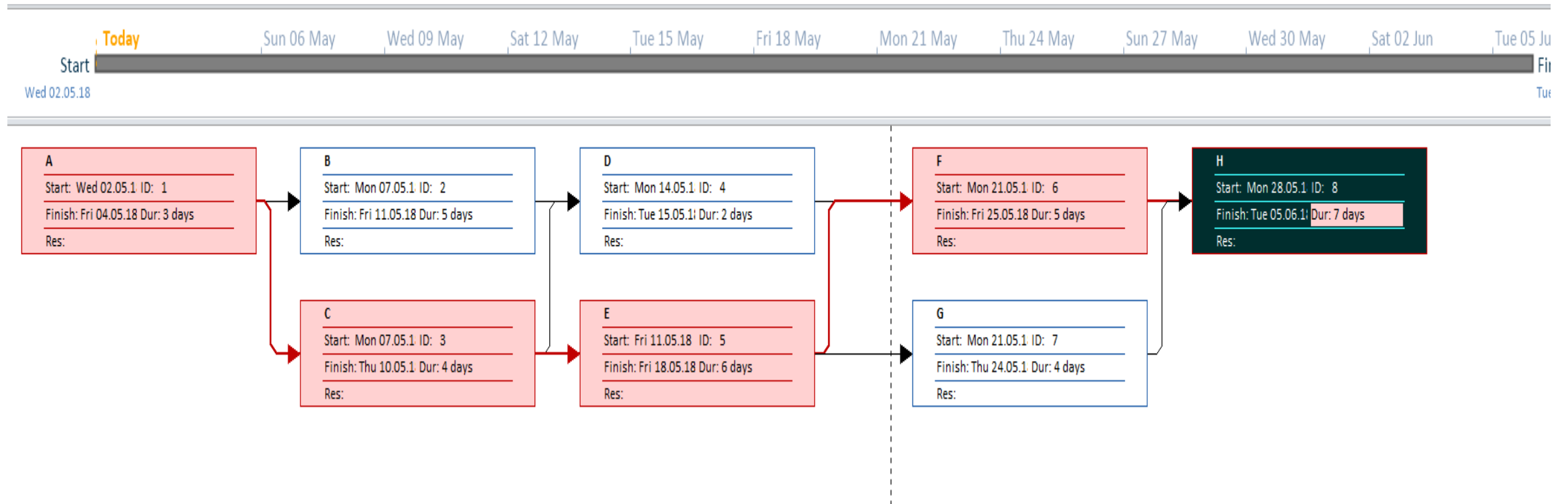
Use of Project Management Tools

- **Project schedule:**
 - Detailed description of what is to be done
- **Project milestone:**
 - Critical date for completion of a major part of the project
- **Project deadline:**
 - Date that the entire project is to be completed and operational
- **Critical path:**
 - Activities that, if delayed, would delay the entire project



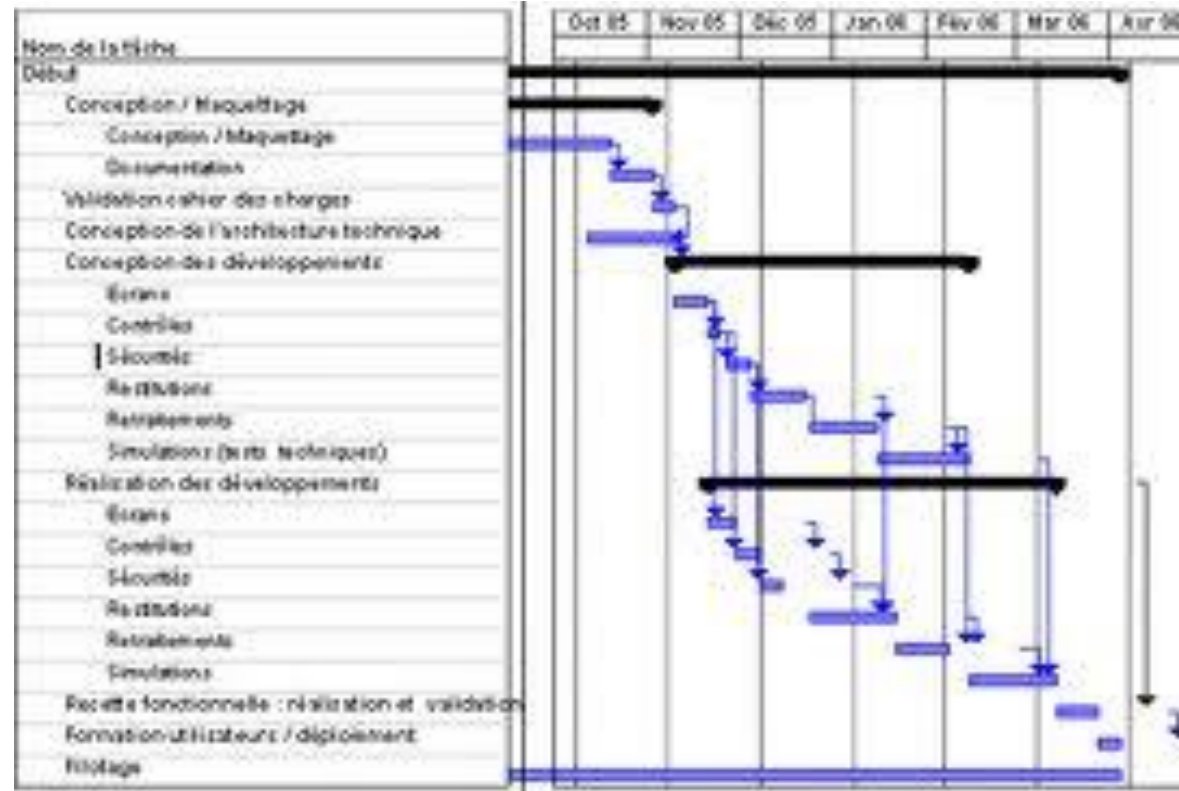
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PERT



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Gantt



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Use of Project Management Tools

- **Program Evaluation and Review Technique (PERT):**
 - Creates three time estimates for an activity:
 - Shortest possible time
 - Most likely time
 - Longest possible time
- **Gantt chart:**
 - Graphical tool used for planning, monitoring, and coordinating projects

