



**STEVENS**  
INSTITUTE of TECHNOLOGY  
THE INNOVATION UNIVERSITY®

# CS 146: Intro to Web Programming and Project Development

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# Introduction to Project Management II



# Inception – Project Selection

- All projects start from an idea, and often multiple ideas will appear at the same time in a big company
- Selecting the right project is the first task of a good project manager, so how does one choose?
  - First identify the type of projects in front of you and make a decision based on what's better for your company
  - There are many selection models, but you should take a PM course to learn more about them

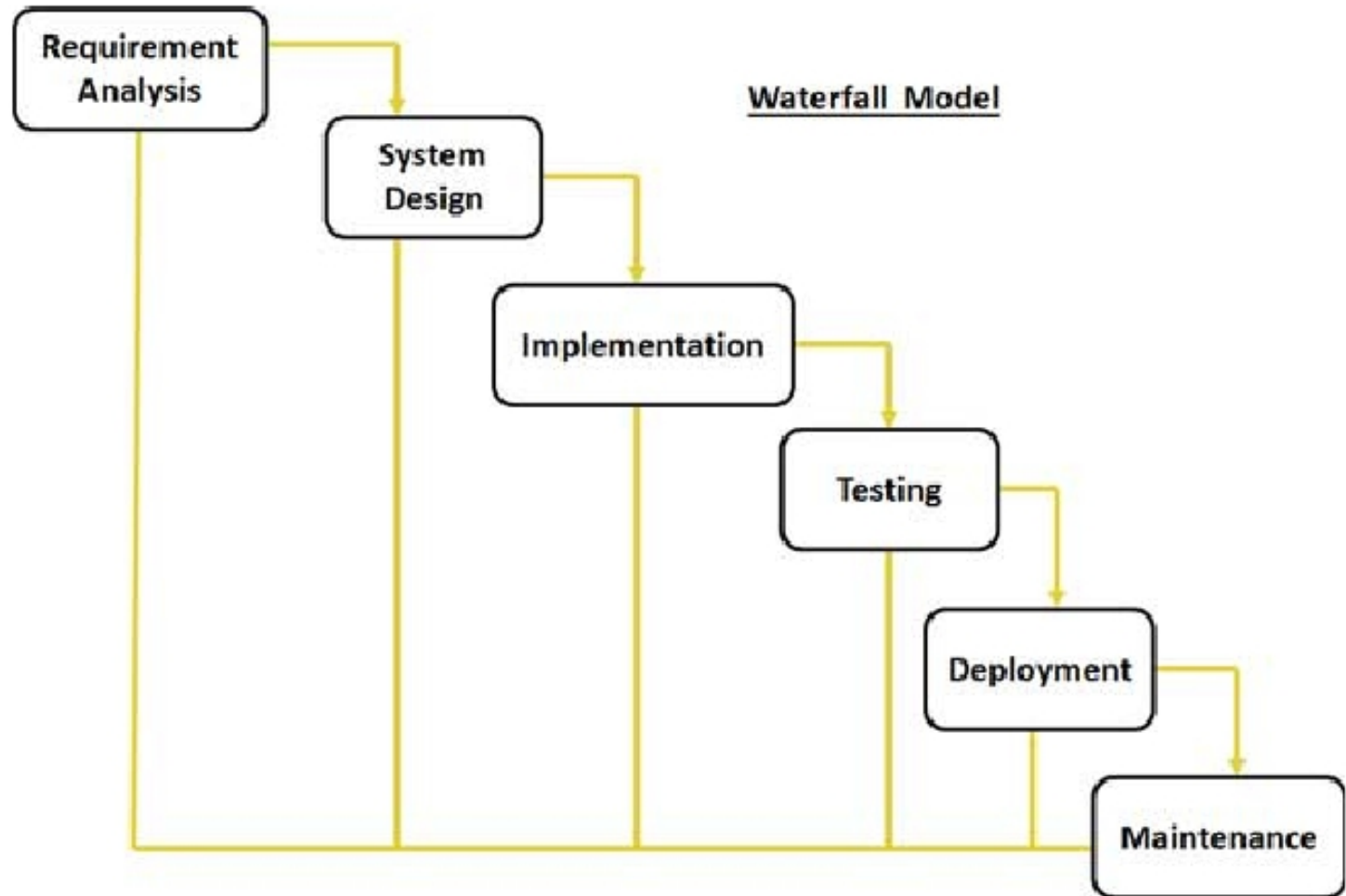


# SDLC: Waterfall Model

- The Waterfall Model was the first Process Model to be introduced
- It is also referred to as a linear-sequential life cycle model
- It is very simple to understand and use
- In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases

SDLC = Software Development Life Cycle

# Waterfall Model Visualized





# Phases of Waterfall Model

- **Requirement Gathering and analysis:** All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification doc
- **System Design:** The requirement specifications from first phase are studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture
- **Implementation:** With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing



# Phases of Waterfall Model (2)

- **Integration and Testing:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures
- **Deployment of system:** Once the functional and non functional testing is done, the product is deployed in the customer environment or released into the market
- **Maintenance:** There are some issues which come up in the client environment. To fix those issues patches are released. Also to enhance the product some better versions are released
  - Maintenance is done to deliver these changes in the customer environment



# When to Use the Waterfall Model?

- Requirements are very well documented, clear and fixed
- Product definition is stable
- Technology is understood and is not dynamic
- There are no ambiguous requirements
- Ample resources with required expertise are available to support the product
- The project is short





# Pros of Waterfall Model

- Simple and easy to understand and use
- Easy to manage due to the rigidity of the model. Each phase has specific deliverables and a review process
- Phases are processed and completed one at a time
- Works well for smaller projects where requirements are very well understood
- Clearly defined stages
- Well understood milestones
- Easy to arrange tasks
- Process and results are well documented



# Cons of Waterfall Model

- No working software is produced until late during the life cycle
- High amounts of risk and uncertainty
- Not a good model for complex and object-oriented projects
- Poor model for long and ongoing projects
- Not suitable for the projects where requirements are at a moderate to high risk of changing; so risk and uncertainty is high with this process model
- It is difficult to measure progress within stages
- Cannot accommodate changing requirements
- Adjusting scope during the life cycle can end a project
- Integration is done as a "big-bang" at the very end, which doesn't allow identifying any technological or business bottleneck or challenges early

# Gantt Charts

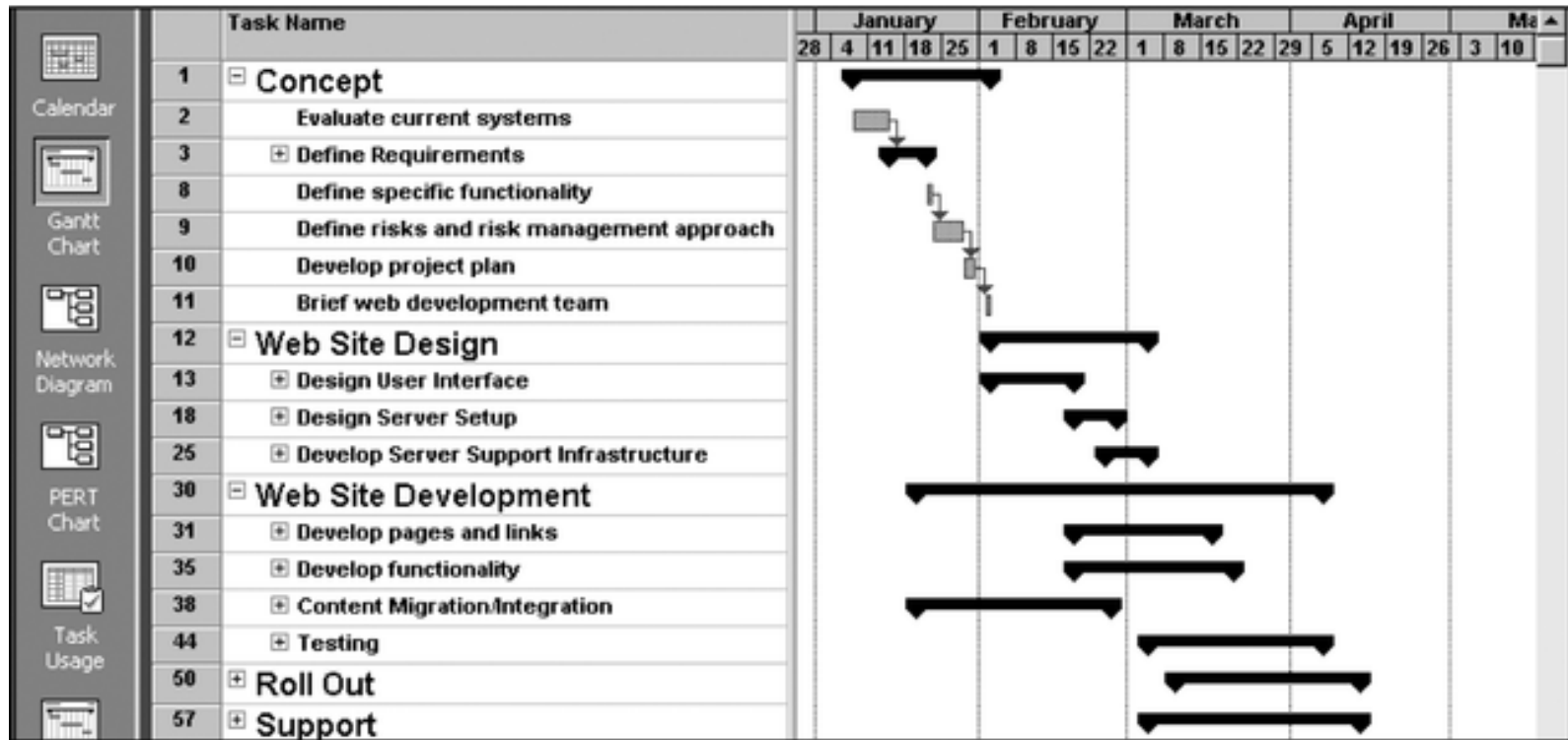


Figure 1-3. Sample Gantt Chart in Microsoft Project 2002

The WBS is on the left, and each task's start and finish date are shown on the right using a calendar timescale. Early Gantt Charts, first used in 1917, were drawn by hand.



# Beginning Requirements Analysis

- Before requirement development begins, identify all the stakeholders for the project
  - Understand how stakeholders will be affected by the project's outcome
  - Understand what stakeholder's involvement or influence will be in the project
- Without this planning you may miss key stakeholders, requiring additional sessions to get their inputs



# Elicitation

- Observation
- Interview with stakeholders
- Existing documentation
- JAD sessions
  - Joint Application Design
  - Workshop where knowledge workers, IT specialists, and management meet to define and review business requirements
- User stories
- Use cases

# Acceptance – Definition of Done!

All stakeholders must have a common understanding of “done”



Basic definition of “done” means the requirement is designed, built, tested, and accepted by stakeholders



# Requirements Document - Summary

- A good requirements document is a simple, complete, and well-structured
- 4 key points must be addressed
  - Description of the problem
  - Basic approach of solution
  - Constraints (time, budget, etc.)
  - How success will be measured (how do we know we're done?)



# Characteristics of Good Requirements

- Complete
  - Requirements should be as complete as possible—no open-ended requirements
- Testable
  - Must be able to create a test for all requirements
- Consistent
  - Requirements must be consistent with each other—no conflicts
- Design Free
  - Software requirements should be specified in the business perspective rather than the software perspective
- Unambiguous
  - Use "shall" and other related words. Don't be wishy-washy





# Will, Must, Shall, Should

Verb	Definition	Example
Shall	Indicative of a requirement	A report shall be needed to list everyone in the group with blue eyes
Must	Critical Requirement Constraint	There must be a new eligibility interface designed for the new drug vendor
Will	Declaration of fact	The group termination reports SR9999 will be changed to reflect the new term date format
Should	Goal	Use of patch 334555 should improve performance of batch billing by 50%