Software Engineering

Lecture 2

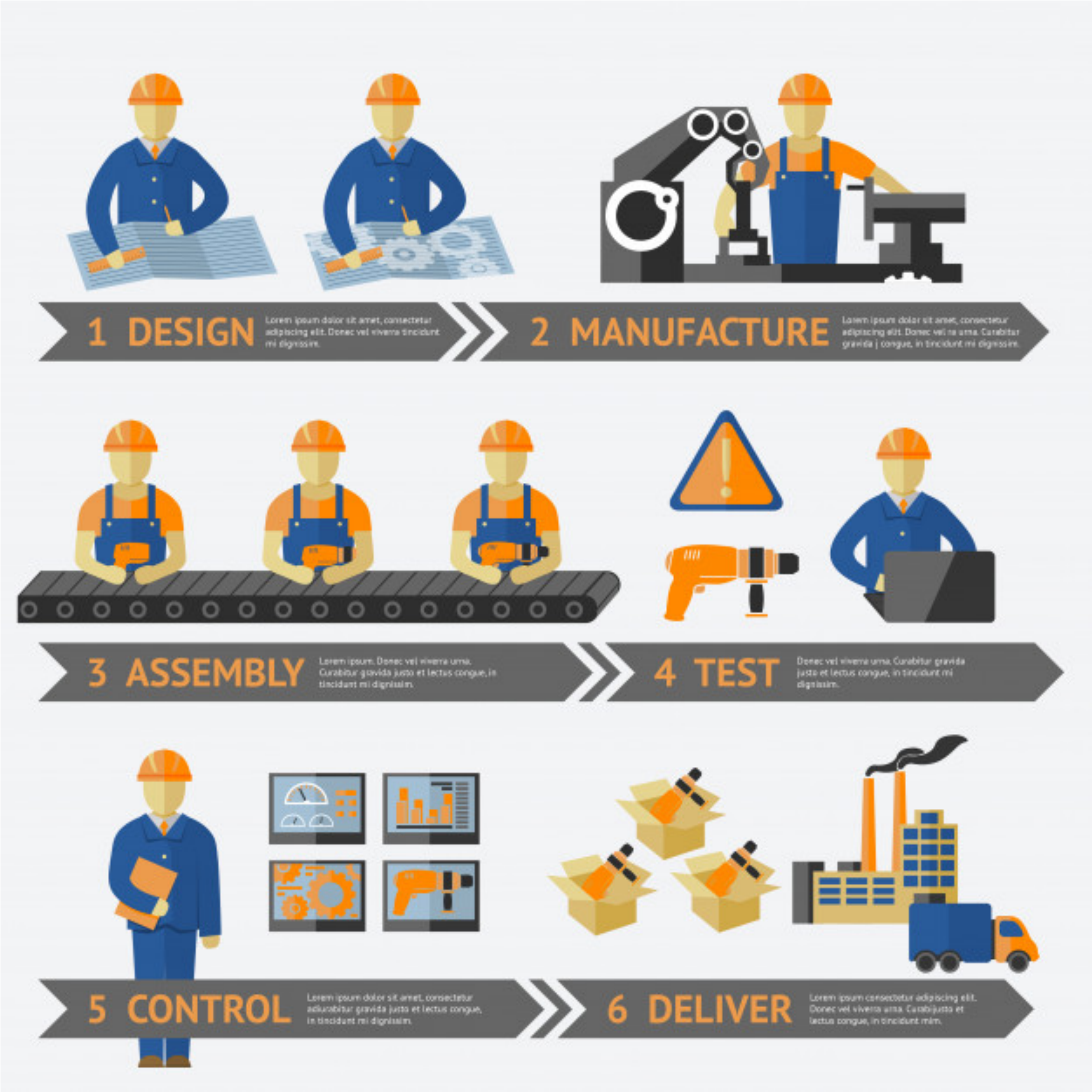
Lectures	Topics
1	Introduction to Software Engineering
2	Software Development Process (SDLC Activities) - SDLC Activity: Specification or Requirement Engineering - SDLC Activity: System Modeling/Design - SDLC Activity: Implementation - SDLC Activity: Testing - SDLC Activity: Evolution - SDLC Activity: Deployment/Installation - SDLC Activity: Maintenance
3	SDLC Activity: Requirement Engineering - Requirement Elicitation - Requirement Analysis and Management - Requirement Validation
4, 5, 6	SDLC Activity: System Modeling/Design - Context Modeling - Data Modeling - Structural/Architectural Modeling - Process Modeling - UI/UX Modeling
7,8,9	SDLC Activity: Implementation (Coding, tools, GIT – Version management, IDE, RESTFUL architecture)
10	SDLC Activity: Testing
11	SDLC Activity: Deployment (tools to deploy, cloud computing)
12	SDLC Activity: Maintenance

Agenda

- To know General Software Development Activities
    - Specification
    - Design
    - Implementation
    - Testing
    - Evolution
    - Deployment/Installation
    - Maintenance
- Software Process Model
    - Classical Model
    - Modern Model

2.0 Software Development Processes

A set of activities required to develop a software system.



2.1 Software Development Activities (SDLC)

- Also called Generic Process or activities
- Generic SDLC activities
    1. Specification
    2. Design
    3. Implementation
    4. Testing
    5. Evolution
    6. Deployment/Installation
    7. Maintenance

2.1.1 Specification

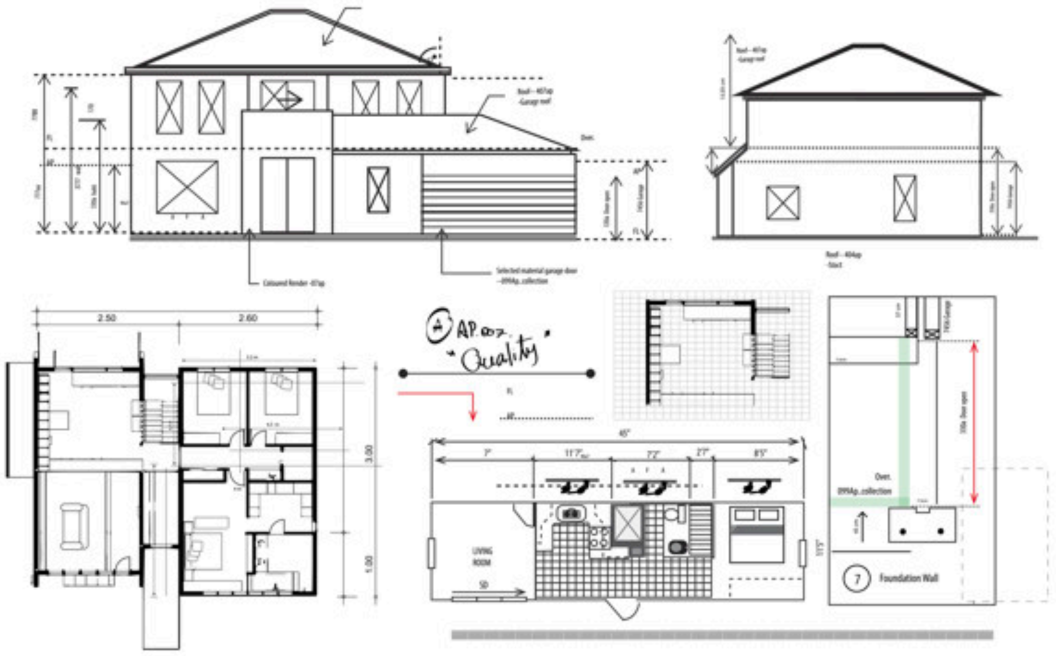
- Also called Requirement Engineering Phase
- Defining what system do
- [+] Will have a separate dedicated class for this to discuss more in detail

2.1.1 Specification

Following are the activities carried out during software specification:

1. Requirement identification is carried out using different fact finding techniques (Questionnaire, interviews, document sampling, research)
2. Requirement specification is prepared where functional, non-functional and usability requirements are identified. The document resulting from this is called SRS (System Requirement Specification)
3. Requirement validation to check if the requirement have been drafted, created as per user's view or not.

2.1.2 Design / Modeling

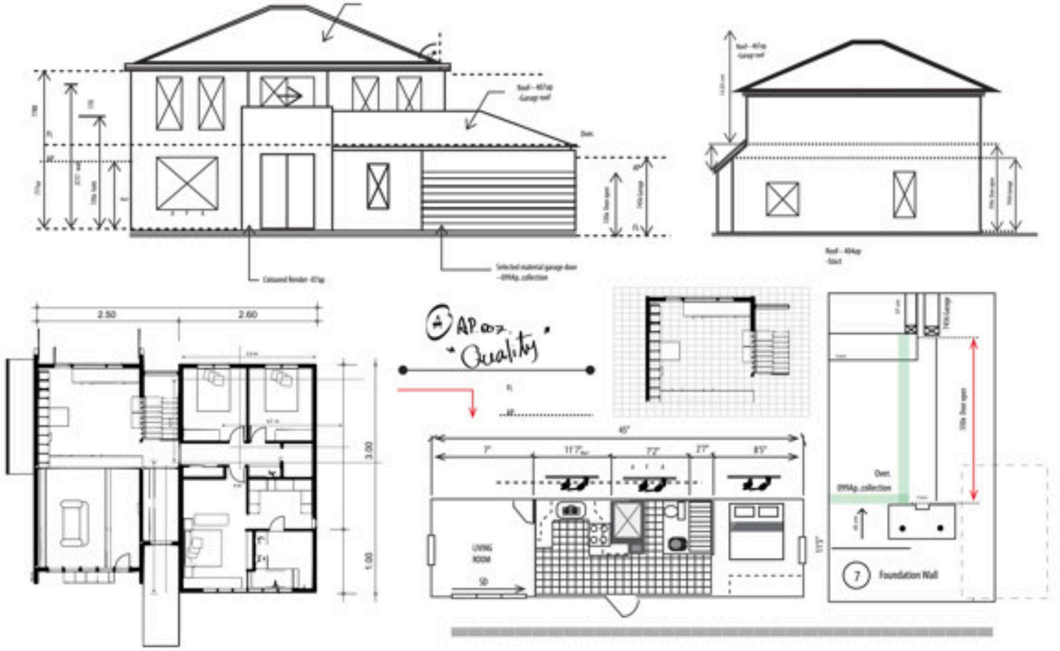


- Process of converting textual requirements (from Specification phase) into graphical representation is a Design phase.
- Also called modeling (Textual to graphical representation)
- [+] Will have a separate dedicated class for this to discuss more in detail

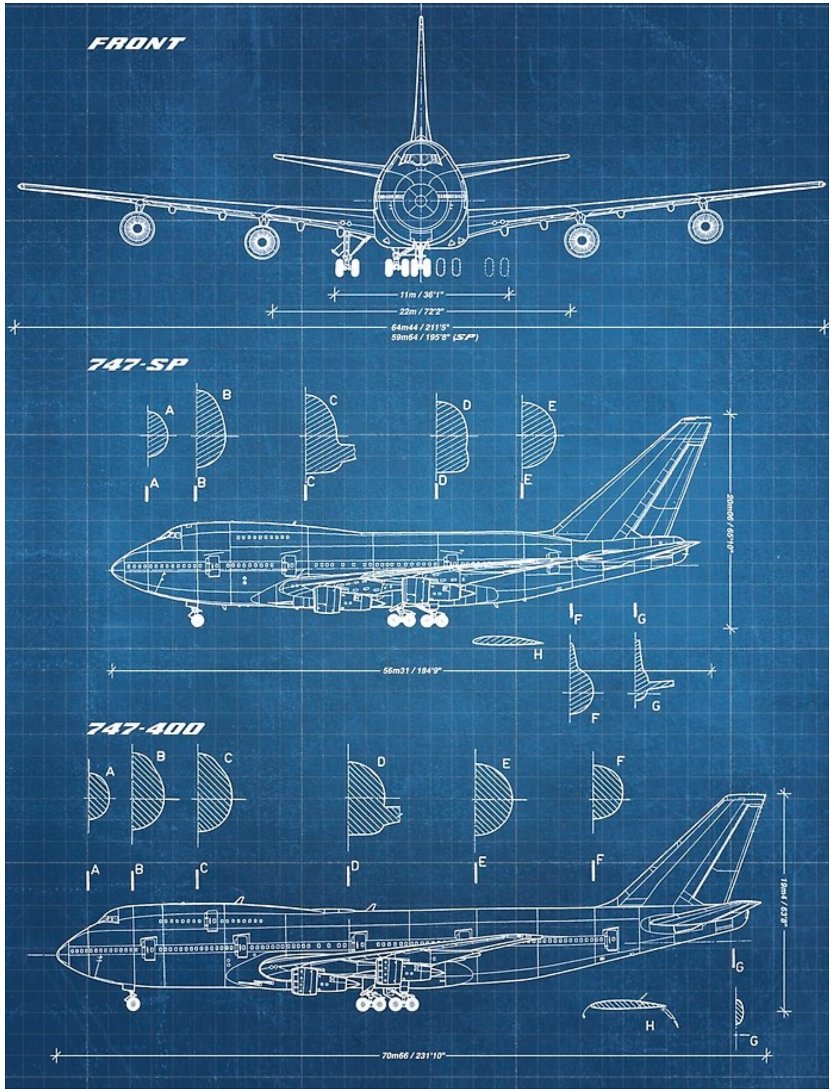
2.1.2 Design

Activities carried out in this phase:

1. UI Modeling (Interface Design)
2. Context Modeling
3. Data Modeling (Database Design)
4. Process Modeling (Flow Design)
5. Architecture Modeling (Structure Design)



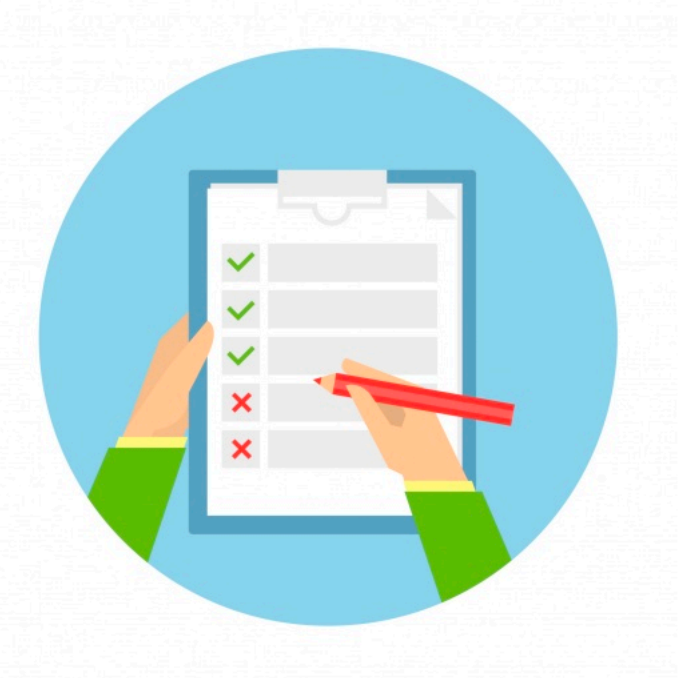
2.1.3 Implementation



- Translating the design into executable programs
- Writing the actual executable code by referring to design models

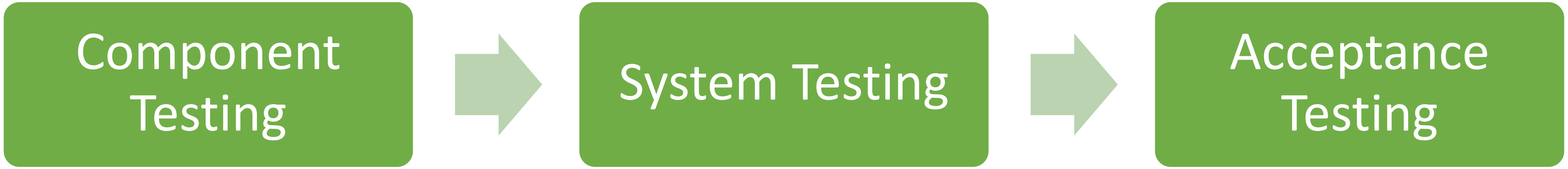
2.1.4 Testing

- Checking if the system is what the customer really wants
- Testing approaches: Verification and Validation (V&V)
- [+] Will have a separate dedicated class for this to discuss more in detail



2.1.4 Testing

Flow of Testing



Component Testing

System Testing

Acceptance Testing

2.1.4 Testing

Testing Domain

1. Component testing

   Individual components are tested independently

2. System testing

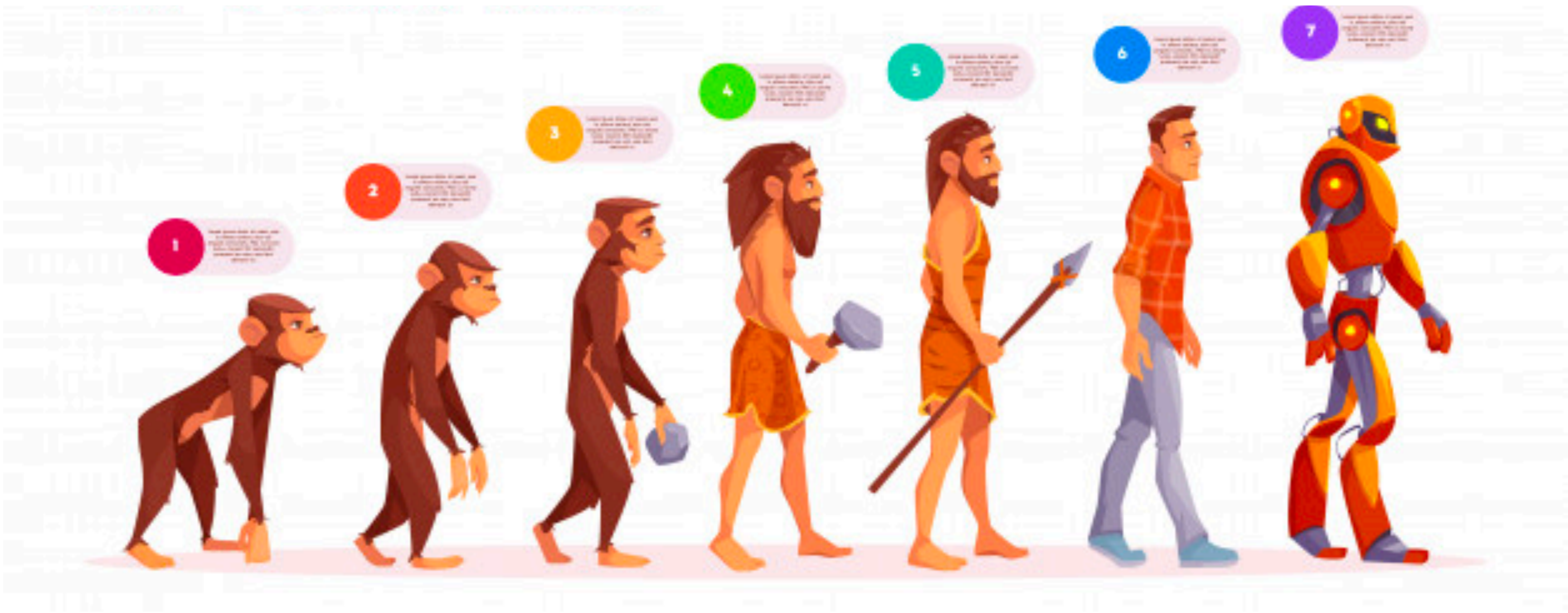
   Testing the system as a whole

3. Acceptance Testing

   Testing with customer data to check that the system meets the customer’s needs.

2.1.5 Evolution

- Changing the system in response to changing customer needs.
- As requirements change through changing business circumstances, the software that supports the business must also evolve and change Deployment/Installation



2.1.6 Deployment/Installation

- Deploying the system after the successful system development.
- **Transferring from test environment to production environment**
- Installing the system in client’s environment or production environment

2.1.7 Maintenance

- Post Support after deployment and installation
- System update also comes under this phase

2.2 Software Process Models / Development Methodology

- A software process model is an abstract representation of a process. It presents a description of a process from particular perspective (Carrying out the same generic process activities but in different manner and organization)

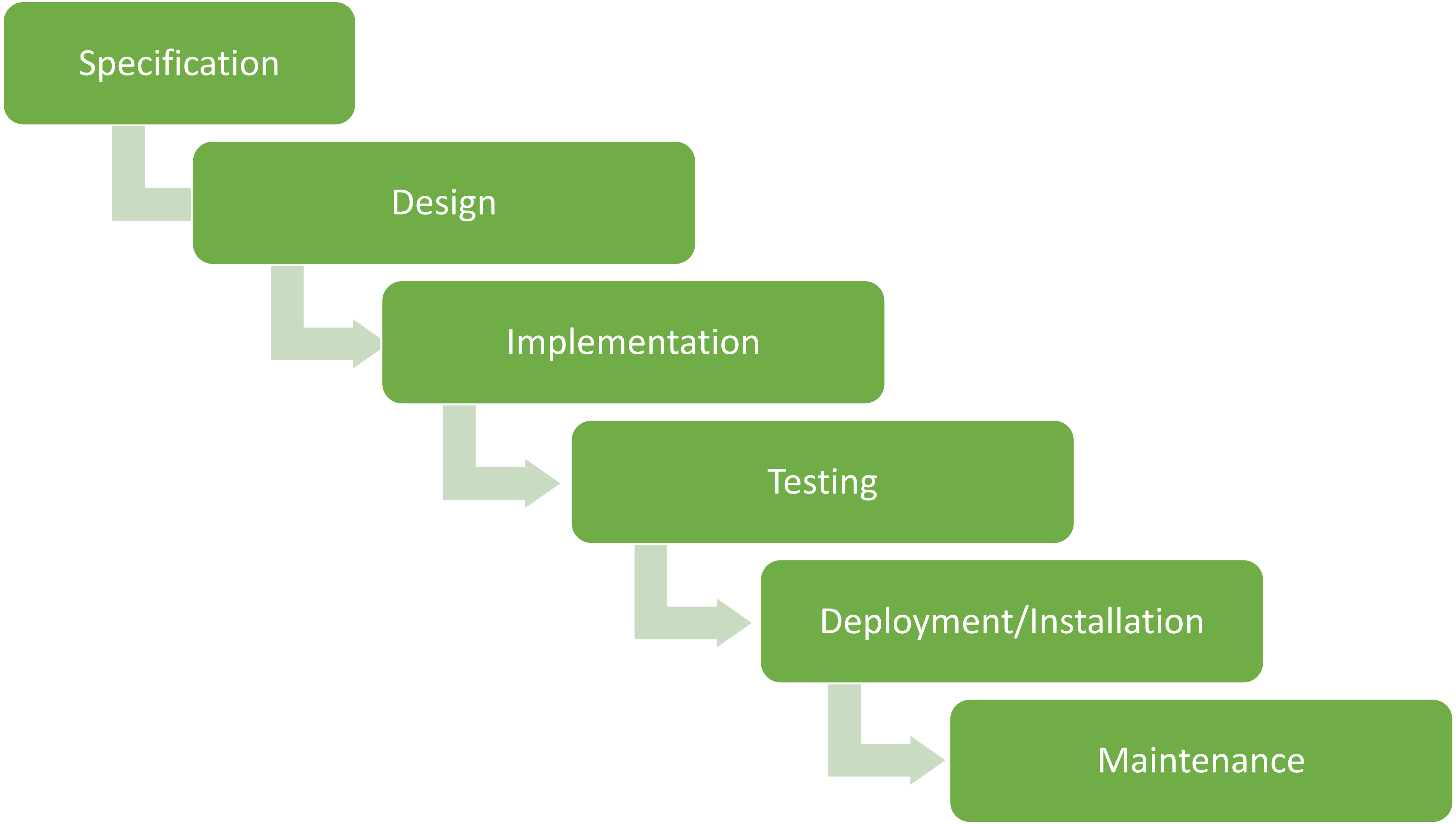
2.2 Software Process Models

- A software process model is an abstract representation of a process. It presents a Generally, there are two software process models:
  - Classical Model: Waterfall Development Model
  - Modern Model: Incremental Development Model

2.2.1 Classical Model

- The Waterfall Development Model
- In waterfall development model, generic software development activities are organized in sequential order.
- Based on rigorous upfront overall plans
- Treats process and data as separate component.

2.2.1 Classical Model


Specification

Design

Implementation

Testing

Deployment/Installation

Maintenance

2.2.2 Modern Model

- Incremental Development Model
- In incremental development model, generic software development activities are interleaved and the set of activities are iterated.
- Treats processes and data into single component called as object.
- It incorporates agile/adaptive software development methodologies.
- Attempts to develop a system incrementally by building a series of smaller systems.

Thank you