# Introduction to Software Engineering

Session II
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# The Software Process

- **A <u>structured set of activities</u> required to develop a software system**
  - Specification
  - Analysis, design and implementation.
  - Validation
  - Evolution

- **A <u>software process model</u> is**
  - **an abstract representation of a process**
  - it presents a description of a process from some particular perspective

# Client Developer and User

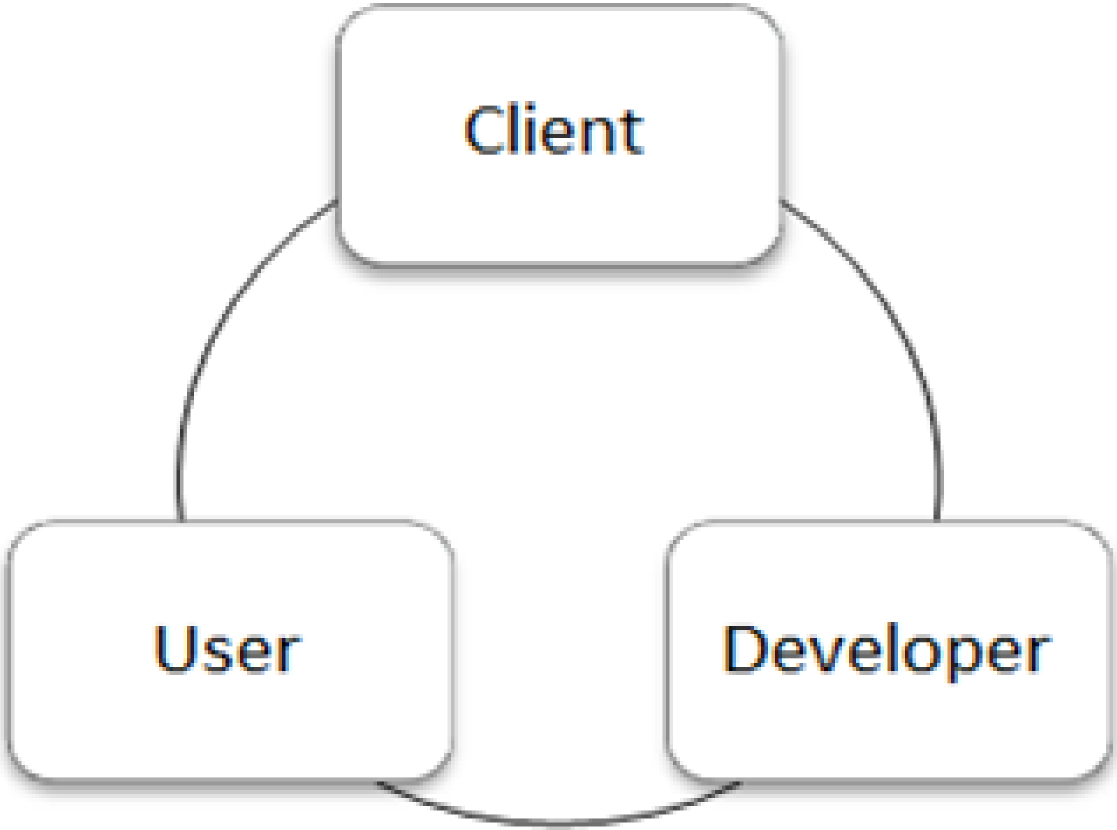


Fig. Relationship of Client Developer and User

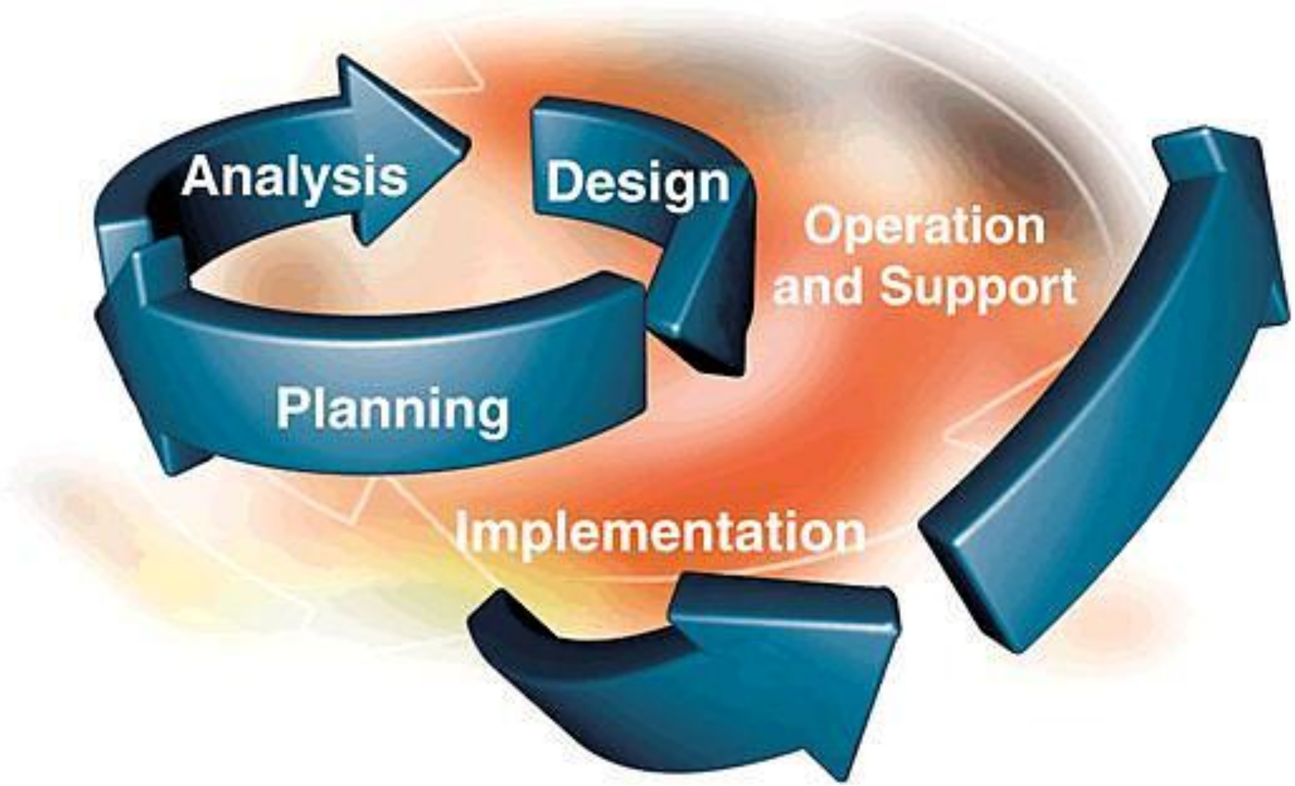
# Client Developer & User

- Client
  - Individual or organization that wants a **product to be developed.**
- Developer
  - Are the members of the organization **responsible for building software.**
- User
  - Person on whose behalf the client has commissioned the product & **who will utilize the software.**

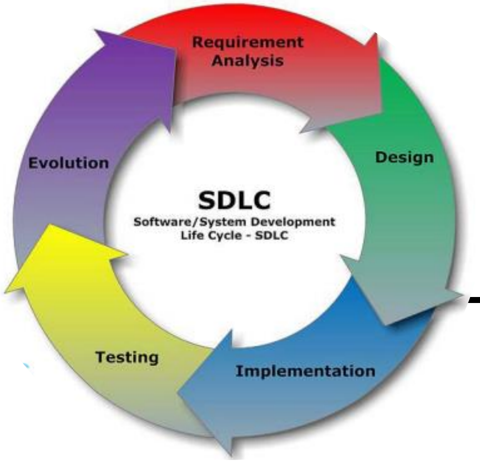
# Three Types of Software: Based on the Functionality

- **Custom software:**
  - It is written for **one client**.
- **Commercial off-the-shelf (COTS) software:**
  - It has **multiple copies and the copies are sold** at much lower prices to a large number of buyers.
  - It is developed for "the market".
  - That is, there are no specific clients or users until the software has been developed and is available for purchase.
  - Shrink-wrapped software, Clickware
- **Open-source software:**
  - It is developed and **maintained by a team of volunteers and may be downloaded** and used free of charge by anyone.

# The SDLC Phases



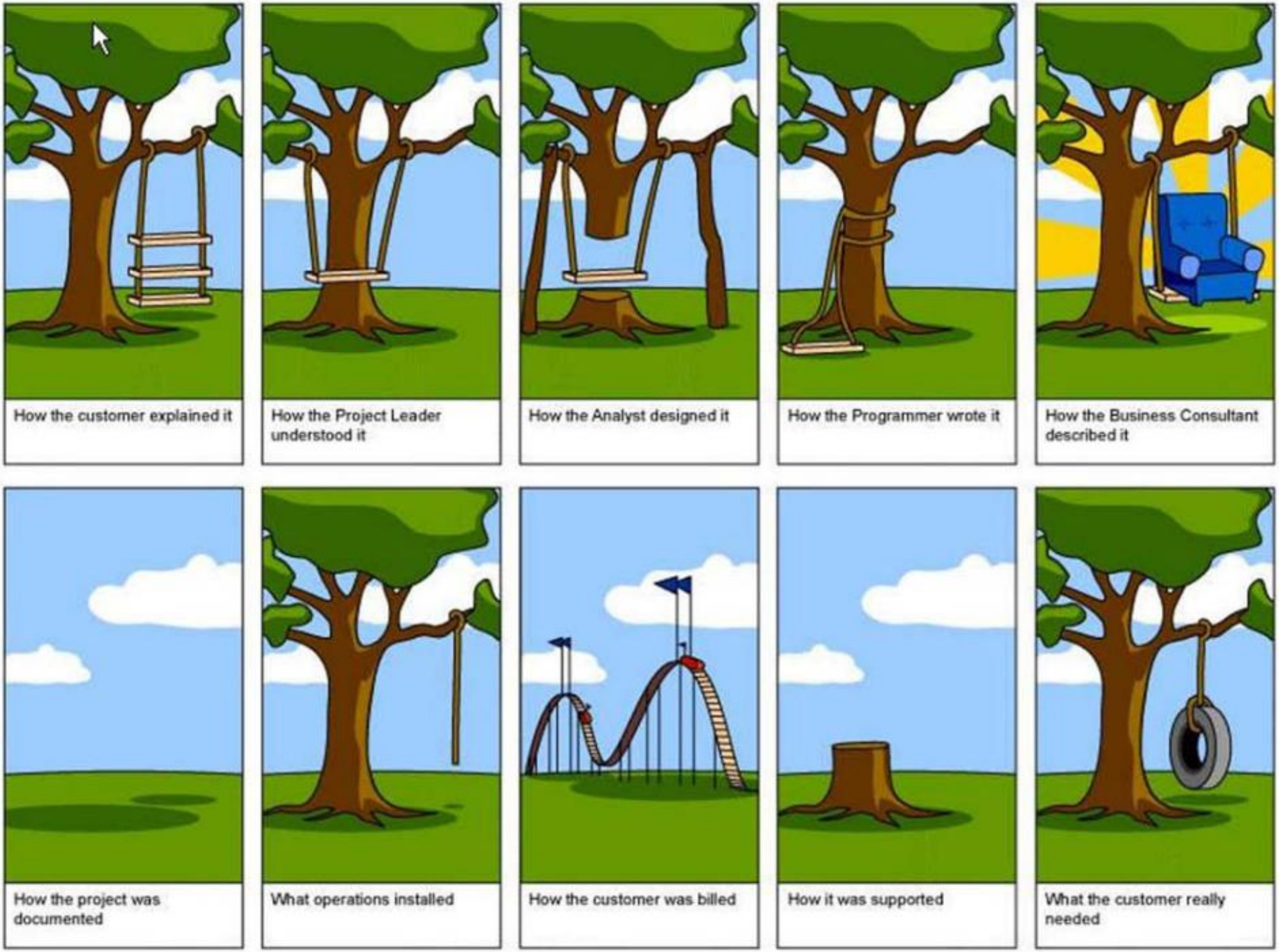
# Software Development



- SE: study of the techniques and theory that support the development of **high-quality software**

- End result: we are looking to **meet the needs** of the:
  - client (person or organization)
  - user (the people using the software)

- Hence we need Software Development Cycle



How the customer explained it

How the Project Leader understood it

How the Analyst designed it

How the Programmer wrote it

How the Business Consultant described it

How the project was documented

What operations installed

How the customer was billed

How it was supported

What the customer really needed

# Software Life-cycle Model

- **SDLC :**
  - Software Development Life Cycle.
  - Software Development Process.
  - process used by software industry **to design, develop and test high quality** software.
  - aims to produce a high quality software that meets or exceeds customer expectations, reaches **completion within times and cost estimates.**

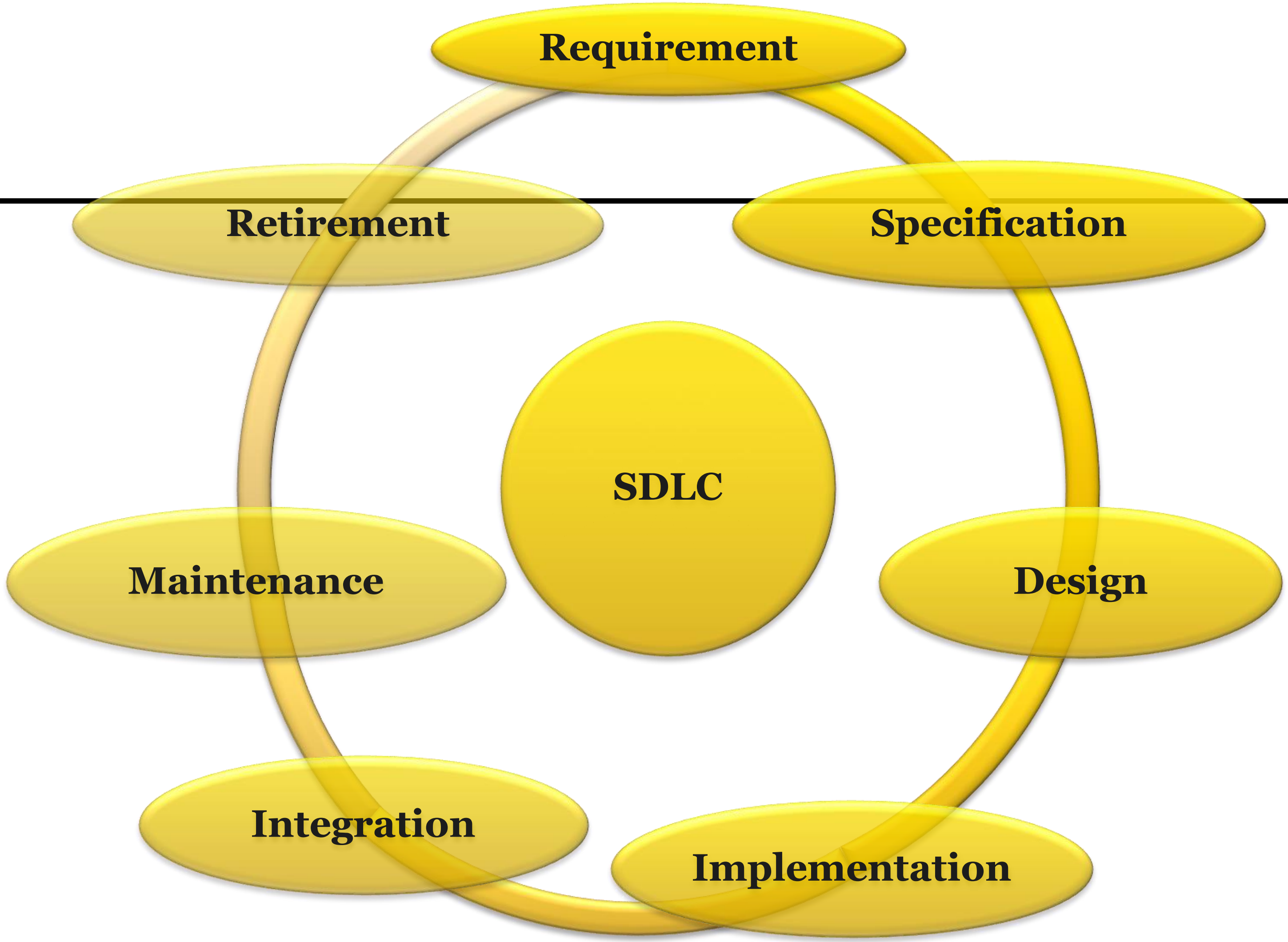


**Fig. Software Development Life Cycle**

# Software Life-cycle model

1. Requirements phase
2. Specification phase
3. Design phase
4. Implementation phase
5. Integration phase
6. Maintenance phase
7. Retirement

- **Requirement Phase :**
  - The concept is **explored and refined**, and the client’s requirements are elicited.

- **Specification Phase :**
  - The client’s **requirements are analyzed and presented in the form of the specification** document.
  - A software **project management plan** should be produced to describe the proposed software development in detail.

- **Design Phase :** Describe how the product does it!
  - **Architecture design:** The product as a whole is broken down into components, called modules.
  - **Detailed design:** Each module is then designed
- **Implementation Phase :**
  - The various components undergo **coding and testing (unit testing)** separately.

- **Integration Phase :**
  - The components of the product are combined and tested as a whole.

  - **Acceptance Testing:**
    - The client tests the product functions when the developers are satisfied with the product.
  - The implementation phase ends when the **product is accepted by the client and installed on the client’s computer.**
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- **Maintenance Phase :**
  - It **includes all changes** to the product once the product has been delivered and installed on the client's computer and passes its acceptance test.

- **Retirement Phase:**
  - It occurs when the **product is removed from service**.
  - This occurs when the **functionality provided by the product no longer is of any use** to the client organization.

# Strengths and weaknesses of SDLC

| Sr No | Strengths | Weaknesses |
|---|---|---|
| 1 | Control | Increased development time |
| 2 | Monitor Large projects | Increased development cost |
| 3 | Detailed steps | Systems must be defined up front |
| 4 | Evaluate costs and completion targets | Rigidity |
| 5 | Documentation | Hard to estimate costs, project overruns |
| 6 | Well defined user inputs | User input is sometimes limited |
| 7 | Ease of maintenance | |
| 8 | Development and design standards | |
| 9 | Tolerance changes in MIS staffing | |