

Class 1 - Introduction to Software

Testing

- What is Software
- Product and Project
- Differentiation in IT companies
- Testing
- SDLC process
- STLC
- Logical questions

What is software?

- A **Software** is a collection of computer programs that helps us to perform a task.

- Types of Software:

- **System software**

Ex: Device drivers, OS, Servers, Utilities, etc.

- **Programming software**

Ex: compilers, debuggers, interpreters, etc.

- **Application software**

Ex: industrial automation, business software, games, telecoms, etc.

Types of Applications

• Desktop Applications or Standalone Applications

Desktop applications are stand-alone application which runs on system and laptops.

Internet connection is not required for accessing the application

No Internet connection required to access the application.

Runs on systems or laptops having low specifications

Easy to install

Only for single user

Easy update.

• Web Applications

Web applications are accessed by the user through a web browser with an active network connection.

Examples of commonly-used web applications include: Amazon, Flipkart, online Banking.

• Mobile Applications

A mobile application, also referred to as a mobile app or simply an app, is a computer program or software application designed to run on a mobile device such as a phone, tablet.

Mobile application can be accessed via online and offline

Product and Project

- Project - If the software is developed for the specific customers is called project.
- Material cloth - Stitching
 - TCS
 - Infosys
 - Wipro

- According to marketing requirement and develop a software that is called as Product.
 - Readymade material
 - Microsoft - MS office
 - Google products like Gmail,
 - WhatsApp
 - Hangout

Difference Between Product and Project

Product	Project
Permanent (until decommissioned)	Beginning and end date
Long-lived feature team	Short-term project team
Adaptive planning (iterative)	Predictive planning (up-front)
Continual improvements	One-off delivery
Evolving customer needs	Project requirements
Investment delivers benefits / KPIs	Investment delivers scope

Product Based Company

- Creates their own product from the scratch based on the marketing trends and to overcome the existing application defects and to come up with new ideas

Project or Service Based Company

- Based on the customer requirements develop a software and that is applicable only to the specific customer.

- What is Testing,
- Why we need to testing,
- How to do testing.
- Types of Testing
- Scope of Testing in Software Field

What is Software Testing?

- **Software Testing** is a part of software development process.
- **Software Testing** is an activity to detect and identify the defects in the software.
- The **objective of testing** is to release **quality product** to the client.

Why do we need testing?

- Ensure that software is **bug free**.
- Ensure that **system meets** customer requirements and software specifications.
- Ensure that system meets **end user expectations**.
- Fixing the bugs identified after release is expensive.

For Example

- We are spending lots of money in a project for developing it.
- If we didnt do the testing properly, we will face
 - bad reputaiton
 - customer statisfication
 - Reliability

Software Quality

- **Quality:** Quality is defined as justification of all the requirements of a customer in a product.
 - **Note:** Quality is not defined in the product. It is defined in the customer's mind.
- Quality software is reasonably
 - Bug-free.
 - Delivered on time.
 - Within budget.
 - Meets requirements and/or expectations.
 - Maintainable.



Why there are bugs in software?

- Miscommunication or no communication
- Software complexity
- Programming errors
- Changing requirements
- Lack of skilled testers

Etc..

Types of Testing

Manual Testing

- Manual testing includes testing a software manually, i.e., without using any automated tool or any script

Automation testing

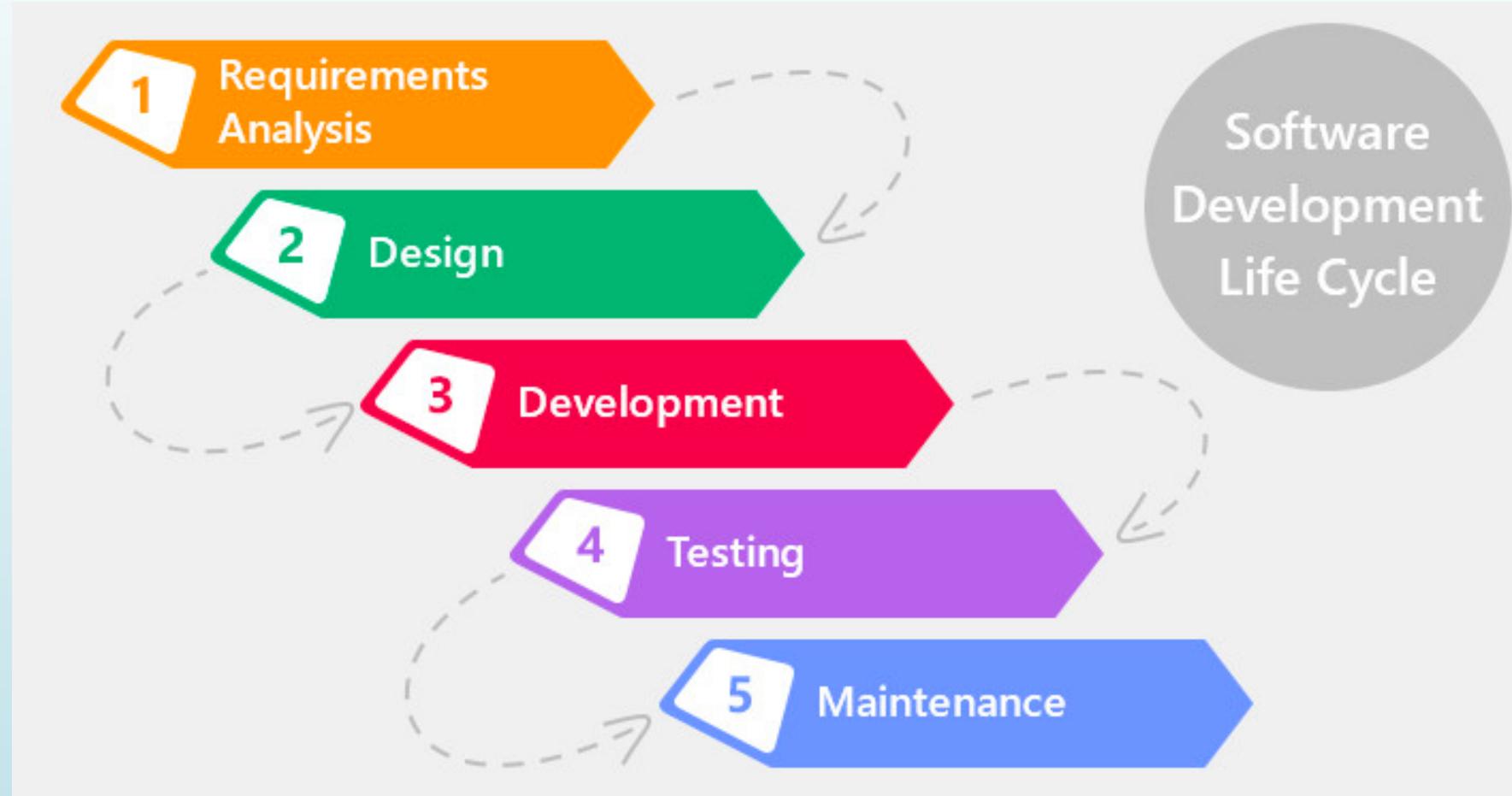
- It is process of testing an application using a automation tool to find the bugs.

Difference between Developer and Tester

- Developer test an application only in the positive scenarios whether it is working or not.
- Developer has a knowledge only specific to the module that they have developed
- But tester acts as a user and do the testing in the customer point of view.
- Tester will gain more knowledge about the product
- Tester do the testing in both positive and negative scenario.

Software Development Life Cycle

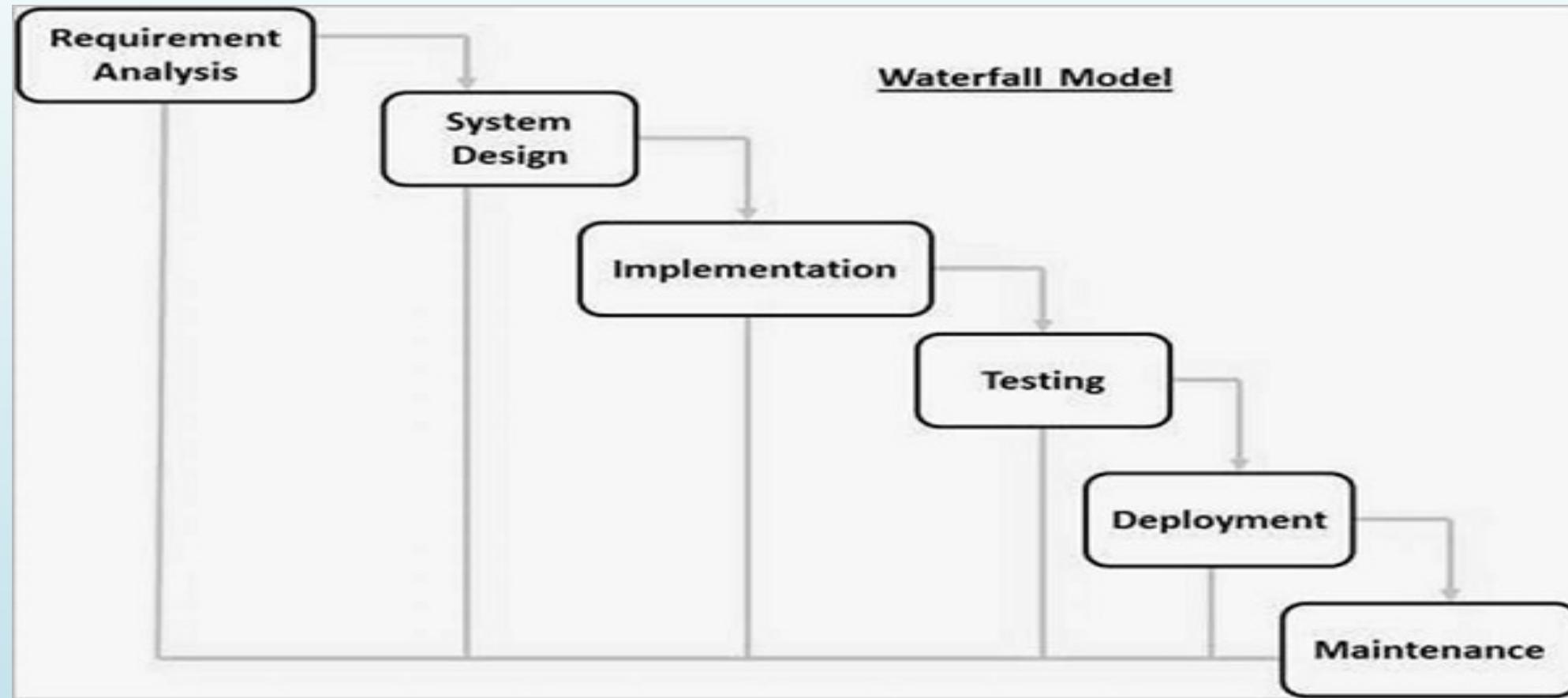
- Five Phase in SDLC



Types of SDLC Model

- Waterfall Model
- Prototype Model
- Sprial Model or Increment model
- V - Model
- Agile Model

WaterFall Model



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- First Process Model and Earliest SDLC approach that was used for software development to be introduced.
- It is also known as “linear-sequential life cycle model”.
- Simple to understand and use.
- Each phase must be completed before the next phase can begin and there is no overlapping in the phases.

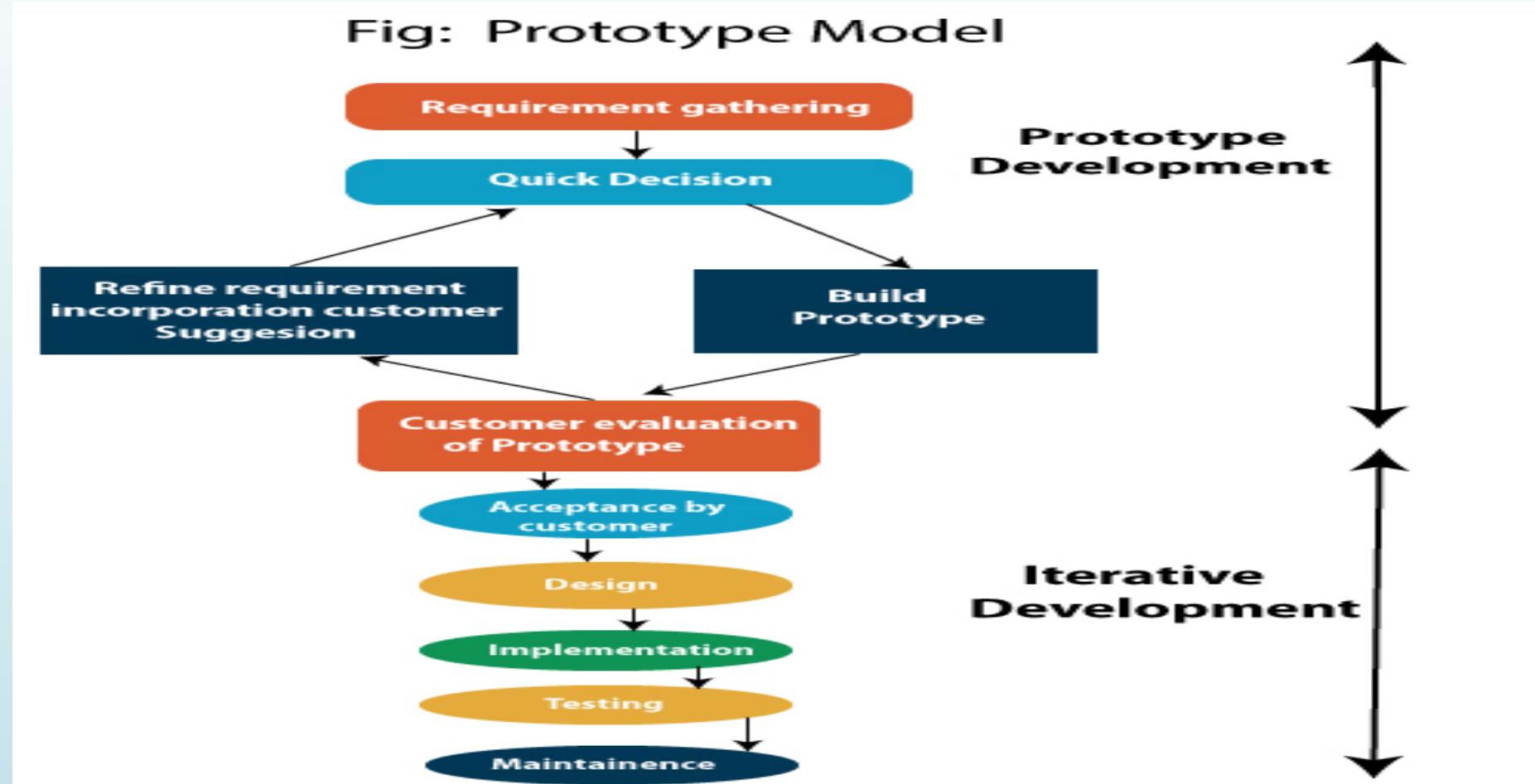
Advantages

- 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.

DisAdvantages

- Makes changes difficult
- Delays testing until after completion.
- Time consuming
- This model doesnot suit for rapidly updating projects.

Prototype Model



Two Phases in Prototype Model

- Prototype Development
- Iterative Development
- Displays the functionality of the product under development, but may not actually hold the exact logic of the original software.
- Once received the confirmation from the client , original software has been developed.

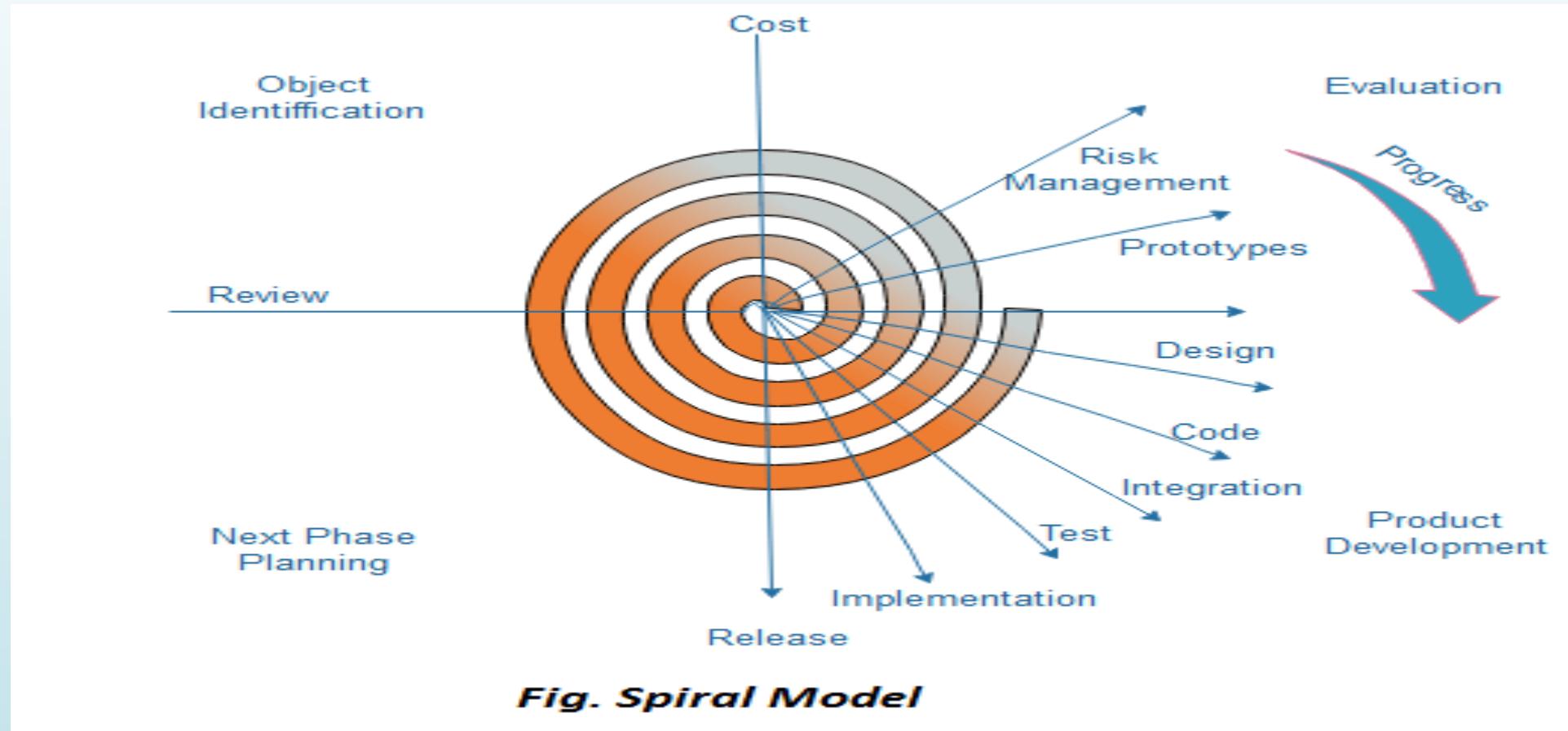
Advantages

- Reduce the risk of incorrect user requirement
- Good where requirement are changing/uncommitted
- Support early product marketing
- Reduce Maintenance cost.
- Errors can be detected much earlier as the system is made side by side

DisAdvantages

- Require extensive customer collaboration
- Costs customer money
- Needs committed customer
- Difficult to finish if customer withdraw
- May be too customer specific, no broad market
- Difficult to know how long the project will last.
- Prototyping tools are expensive.
- Special tools & techniques are required to build a prototype.
- It is a time-consuming process.

Spiral Model



- It is a combination of waterfall model and Prototype model.
- Each phase in spiral model begins with desired goal and ends with client reviewing.
- Software is developed in the series of incremental releases.

Phases of Spiral model

- Communication- with Customer
- Planning - Analysis the risk factor.
- Modeling
- Construction
- Deployment.

Advantages and Disadvantages

Advantages

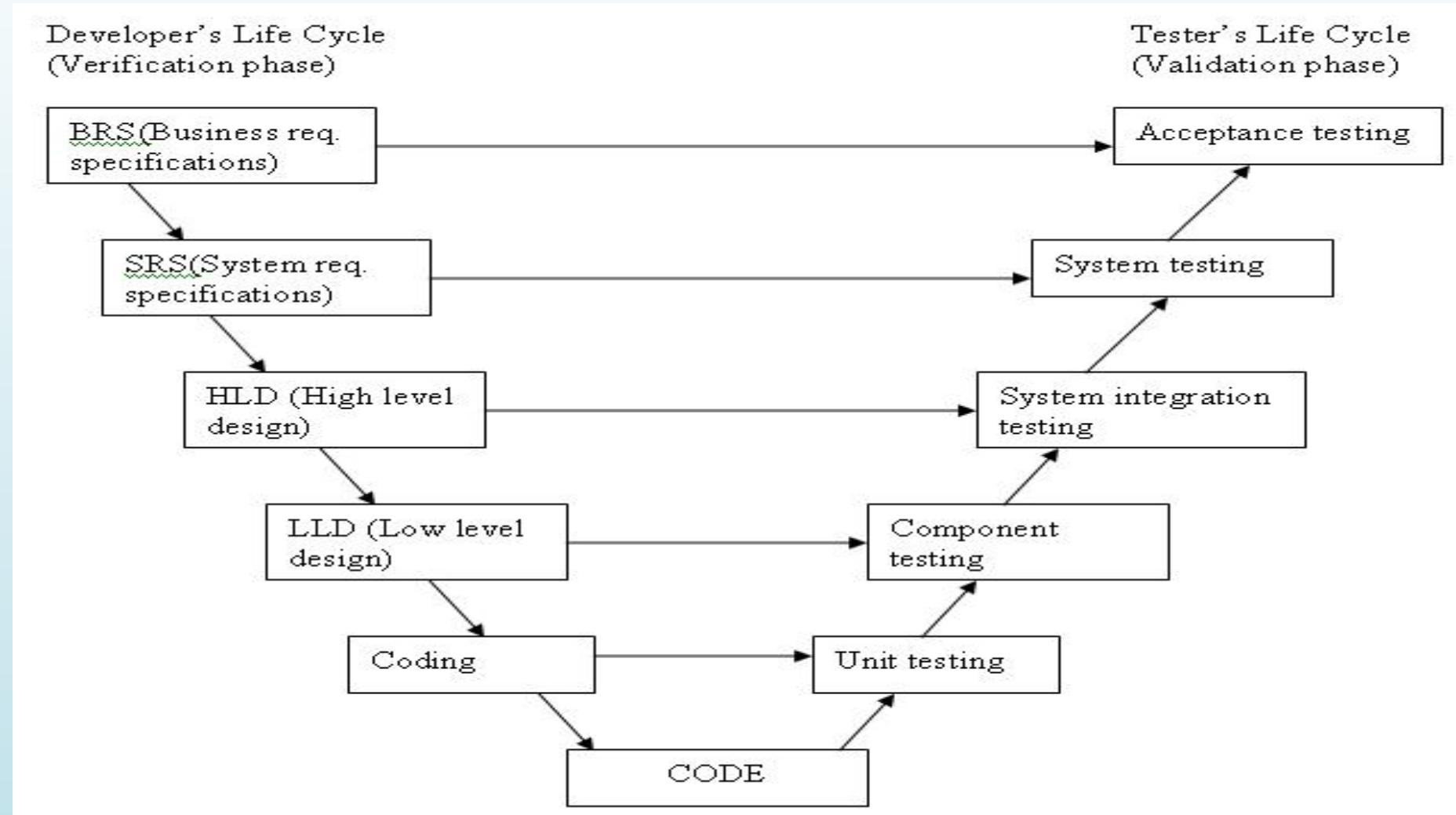
- High amount of risk analysis
- Useful for large and mission-critical projects.

Disadvantages

- Can be a costly model to use.
- Risk analysis needed highly particular expertise
- Doesn't work well for smaller projects.

- It is also called as Validation and Verification Model.
- V-model is an extension of the waterfall model
- V model Test plan is done in parallel to development
- Verification is done by QA team(Project manager, Technical lead, Team Lead)
- Validation is done by QC Team (only testers)

Phases of V model



When To use V - Model

- The V-shaped model should be used for small to medium sized projects where requirements are clearly defined and fixed.
- The V-Shaped model should be chosen when technical resources are available with needed technical expertise.
- High confidence of customer is required for choosing the V-Shaped model approach. Since, no prototypes are produced, there is a very high risk involved in meeting customer expectations.

Advantages and Disadvantages

- Advantages

- Simple and easy to use.
- Testing activities like planning, test designing happens well before coding. This saves a lot of time. Hence higher chance of success over the waterfall model.
- Proactive defect tracking – that is defects are found at early stage.
- Works well for small projects where requirements are easily understood.

- Disadvantages

- Software is developed during the implementation phase, so no early prototypes of the software are produced.
- If any changes happen in midway, then the test documents along with requirement documents has to be updated.

Difference of Verification and Validation

Verification

1. Verification is the static testing.
2. To make sure “ Are we building the product right?”
3. Methods used in verification are reviews, walkthroughs, inspections and desk-checking.
4. It can find the bugs in the early stage of the development.
5. Quality assurance team does verification.
6. It comes before validation.

Validation

1. Validation is the dynamic testing.
2. To make sure “Are we building the right product?”
3. Testing and validating the actual Product.
4. It checks whether the software meets the requirements and expectations of a customer or not.
5. It can only find the bugs that could not be found by the verification process.
6. Quality Control team does Validation.
7. It comes after verification.

- Agile is a software development methodology to build a software incrementally using short iterations of 1 to 4 weeks so that the development is aligned with the changing business needs.

Main Roles in Scrum Team

- Project Owner – who has the responsibility of managing the product backlog. Works with end users and customers and provide proper requirement to the team to build the proper product.
- Scrum Master – who works with scrum team to make sure each sprint gets complete on time. Scrum master ensure proper work flow to the team.
- Scrum Team – Each member in the team should be self-organized, dedicated and responsible for high quality of the work.

- Product backlog is maintained by the project owner which contains every feature and requirement of the product and maintains the road map of the product.
- Sprint backlog can be treated as subset of product backlog which contains features and requirements related to that particular sprint only.

What is a Task board in Agile?

- Task board is dash board which shows progress of the project. It contains:
 - User Story: which has the actual business requirement.
 - To Do: Tasks that can be worked on.
 - In Progress: Tasks in progress.
 - To Verify: Tasks pending for verification or testing
 - Done: Completed tasks.

Daily Stand Up meeting

The daily stand-up is an everyday meeting (most preferably held in the morning) in which the whole team (Scrum Master , developer , tester) meets for almost 15 minutes to find answer to the following three questions

- What was done yesterday?
- What is your plan for today?
- Is there any impediment or block that restricts you from completing your task?

The daily stand-up is an effective way to motivate the team and make them set a goal for the day.

Impediments

Impediments are the obstacles or issues faced by scrum team which slow down their speed of work.

Some of the impediments are given as

- Resource missing or sick team member
- Technical, operational, organizational problems
- Lack of management supportive system
- Business problems
- External issues such as weather, war etc
- Lack of skill or knowledge

Sprint Planning Meeting

- It is the first meeting to before start working on the sprint.
- A meeting in which all the Scrum roles (product owner, scrum team, and scrum master) have a discussion about the
 - team's priority features and
 - product backlog items is known as sprint planning meeting.
- This meeting is held every week and lasts for almost 1 hour.
- Sprint planning is done in collaboration with the whole scrum team.

Sprint retrospective meeting

- A meeting in which all the Scrum roles (product owner, scrum team, and scrum master) have a discussion about the
 - good part of the sprint,
 - the bad part of the sprint, and
 - the sprint improvements is known as sprint retrospective meeting.
- This meeting that is held at the end of the sprint; it lasts for 2-3 hours.
- For the most effective meeting, the whole Scrum team, including the product owner, should attend and participate.