Module 1

Agile (Scrum), V-Model, RAD, DevOps

Activity from Previous lecture

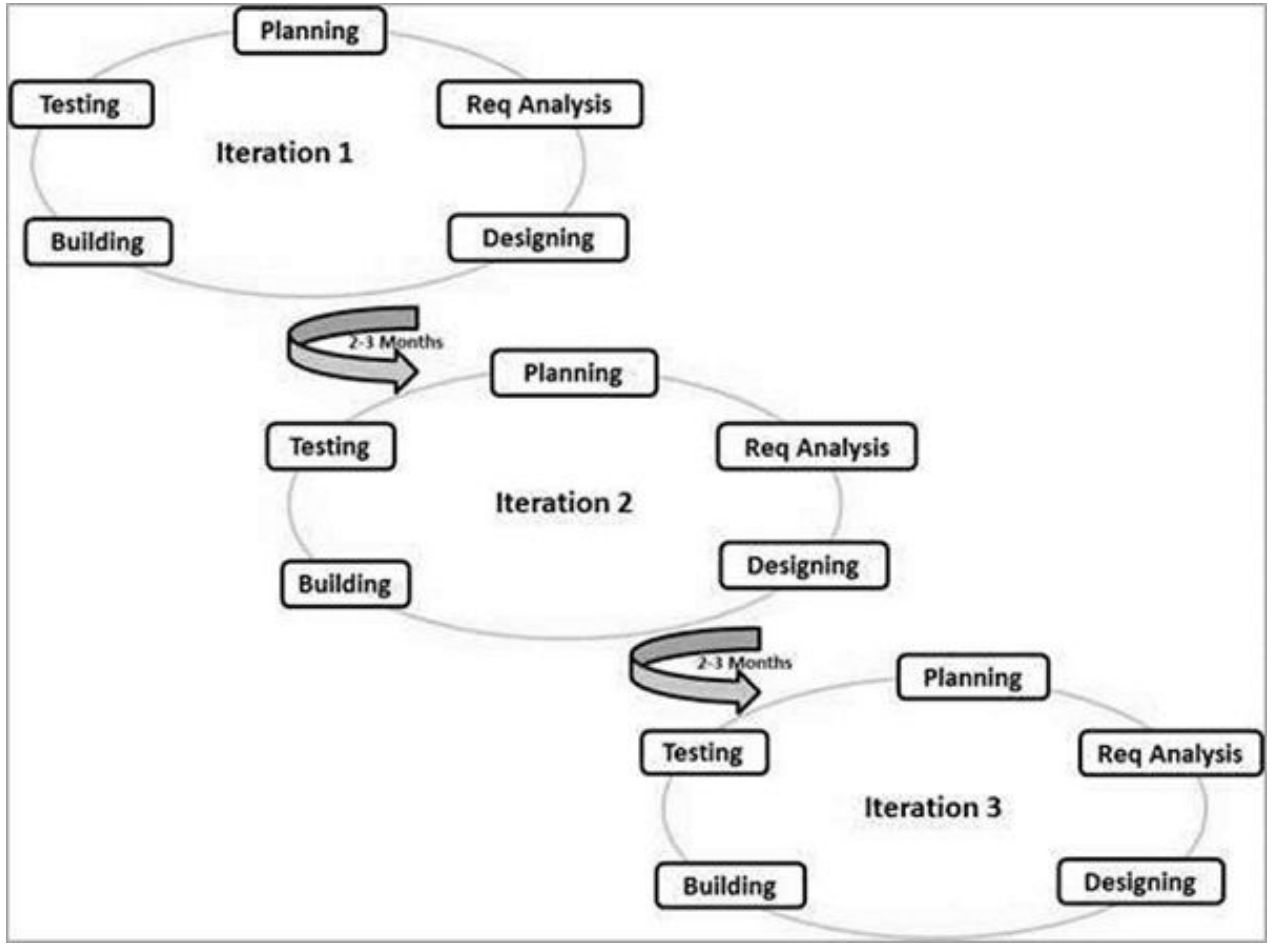
- Compare between Waterfall model and spiral model.
- Real time Applications of Spiral model.

What is an Agile Model?

- The Agile Model is an incremental and iterative process of software development.
- It defines each iteration’s number, duration, and scope in advance.
- Every iteration is considered a short “frame” in the Agile process. model, which mostly lasts from two to four weeks.

- Agile Model divides tasks into time boxes to provide specific functionality for the release.
- Each build is incremental in terms of functionality, with the final build containing all the attributes.
- The division of the entire project into small parts helps minimize the project risk and the overall project delivery time.

Diagrammatic Representation:



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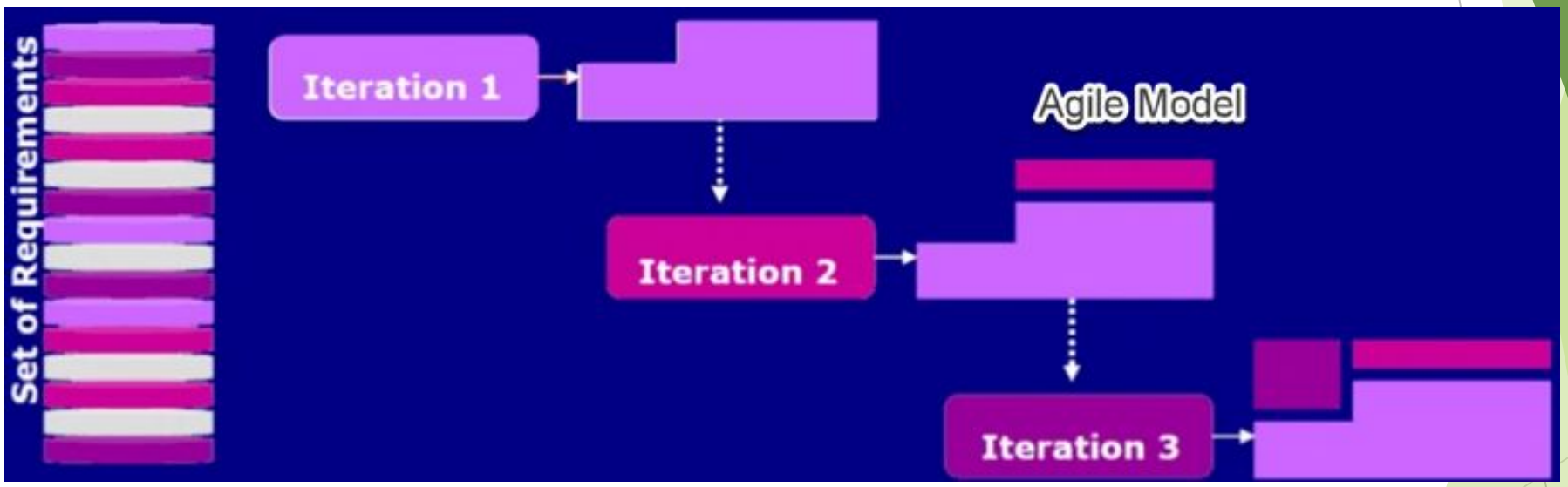


Following are the Agile Manifesto principles –

- **Individuals and interactions** – In Agile development, self-organization and motivation are important, as are interactions like co-location and pair programming.
- **Working software** – Demo working software is considered the best means of communication with the customers to understand their requirements, instead of just depending on documentation.
- **Customer collaboration** – As the requirements cannot be gathered completely in the beginning of the project due to various factors, continuous customer interaction is very important to get proper product requirements.
- **Responding to change** – Agile Development is focused on quick responses to change and continuous development.

Agile Model - Pros:

- Is a very realistic approach to software development.
- Promotes teamwork and cross training.
- Functionality can be developed rapidly and demonstrated.
- Resource requirements are minimum.
- Suitable for fixed or changing requirements
- Delivers early partial working solutions.
- Good model for environments that change steadily.
- Minimal rules, documentation easily employed.
- Enables concurrent development and delivery within an overall planned context.
- Little or no planning required.
- Easy to manage.
- Gives flexibility to developers.

Agile Model - Cons:

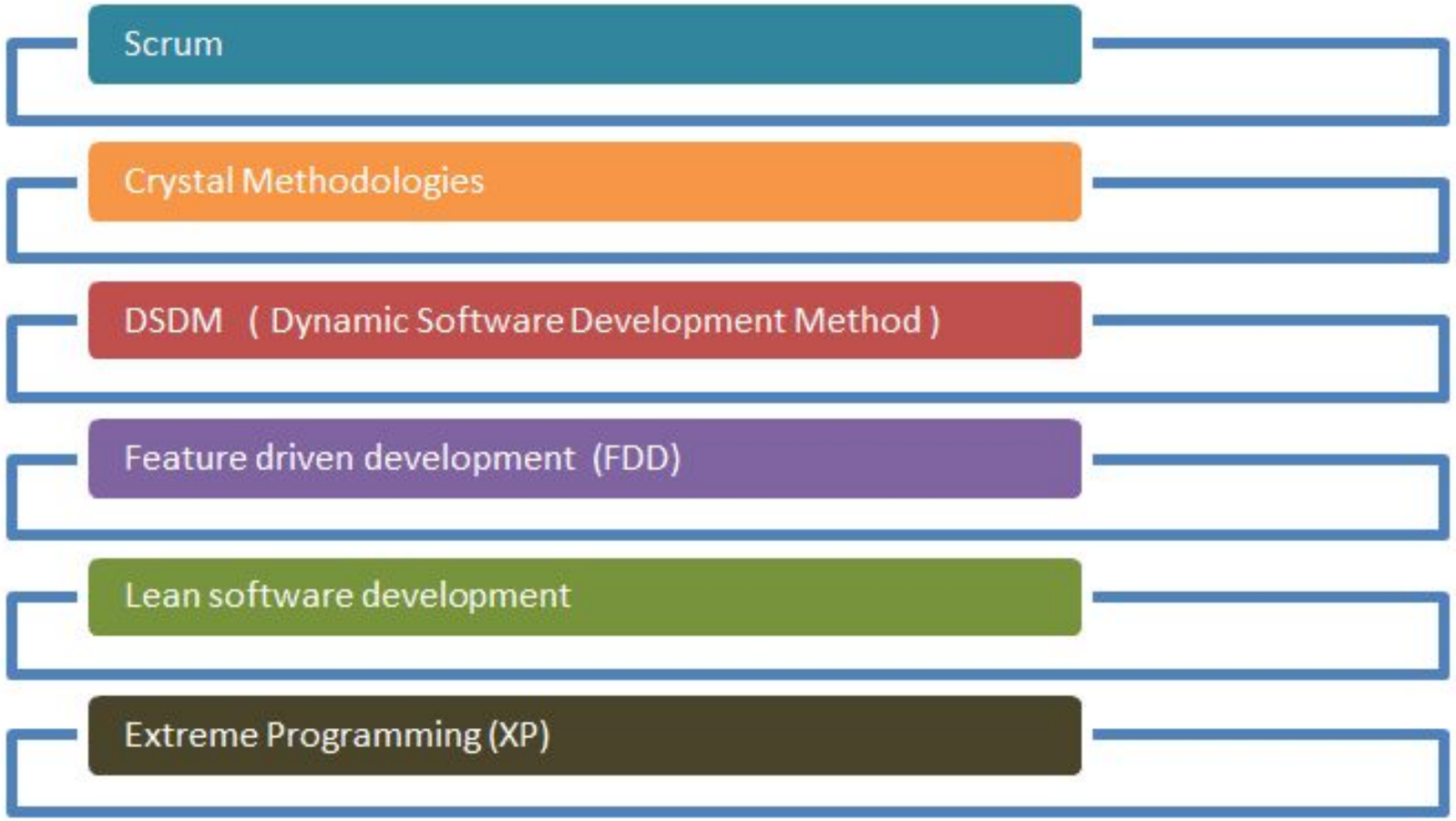
- Not suitable for handling complex dependencies.
- More risk of sustainability, maintainability and extensibility.
- An overall plan, an agile leader and agile PM practice is a must without which it will not work.
- Strict delivery management dictates the scope, functionality to be delivered, and adjustments to meet the deadlines.
- Depends heavily on customer interaction, so if customer is not clear, team can be driven in the wrong direction.
- There is a very high individual dependency, since there is minimum documentation generated.
- Transfer of technology to new team members may be quite challenging due to lack of documentation.

Companies using agile methodologies:

- Philips, Vista Print, JP Morgan Chase - just to name a few companies using #Agile development

https://www.growthaccelerationpartners.com/blog/real-life-examples-of-agile-methodology

Types of Agile/ Agile Process Model

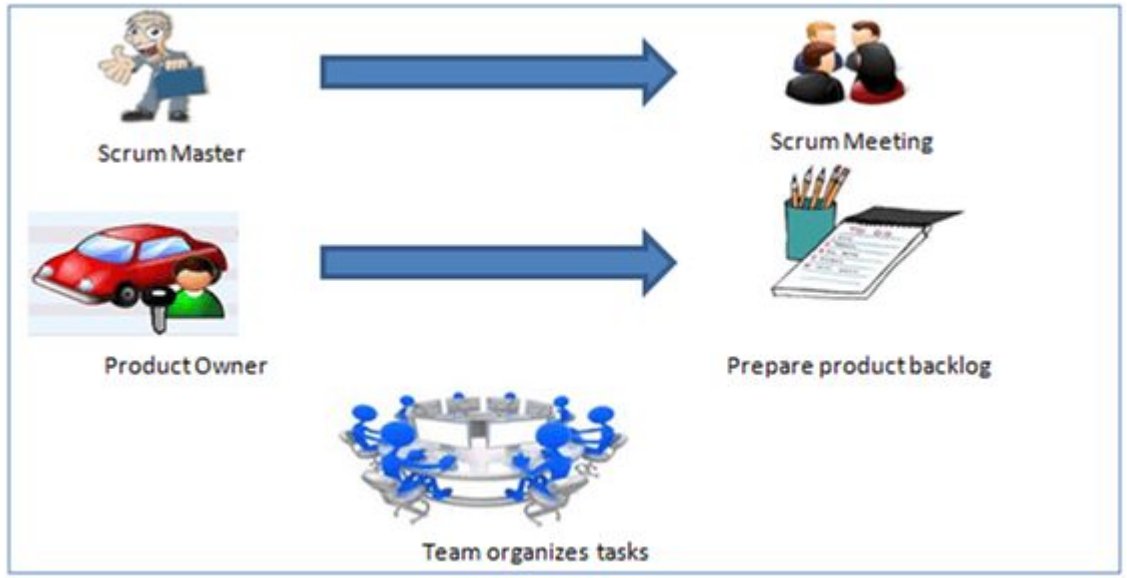


Scrum:

- SCRUM is an agile development method which concentrates specifically on how to manage tasks within a team-based development environment.
- Basically, Scrum is derived from activity that occurs during a rugby match.
- Scrum believes in empowering the development team and advocates working in small teams (say- 7 to 9 members).

Scrum Method

- Agile and Scrum consist of three roles, and their responsibilities are explained as follows:

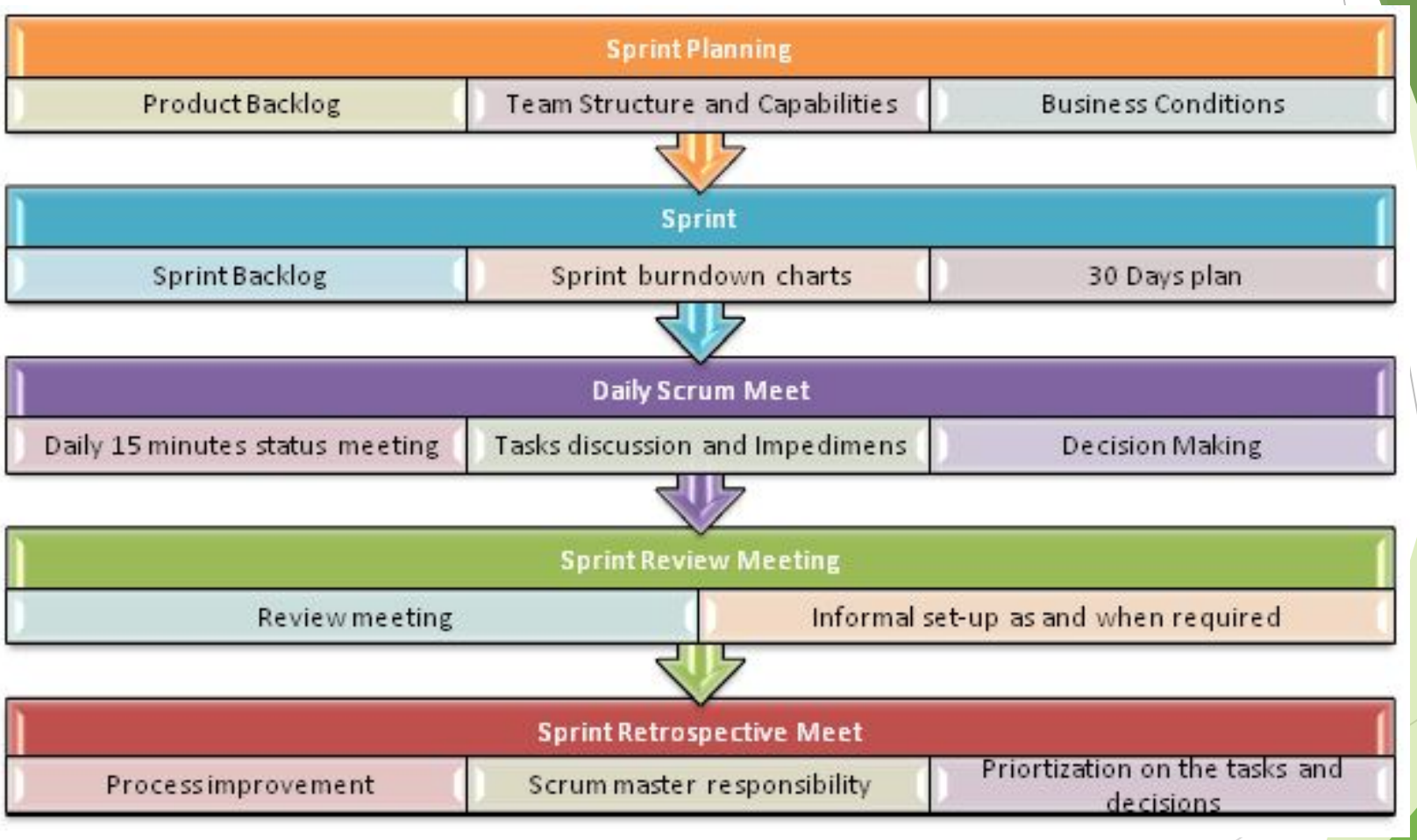


- Scrum Master
  - Scrum Master is responsible for setting up the team, sprint meeting and removes obstacles to progress
- Product owner
  - The Product Owner creates product backlog, prioritizes the backlog and is responsible for the delivery of the functionality at each iteration
- Scrum Team
  - Team manages its own work and organizes the work to complete the sprint or cycle

Product Backlog

- This is a repository where requirements are tracked with details on the no of requirements(user stories) to be completed for each release.
- It should be maintained and prioritized by Product Owner, and it should be distributed to the scrum team.
- Team can also request for a new requirement addition or modification or deletion

Scrum Practices



Process flow of Scrum Methodologies:

- Process flow of scrum testing is as follows:
- Each iteration of a scrum is known as Sprint
- Product backlog is a list where all details are entered to get the end-product
- During each Sprint, top user stories of Product backlog are selected and turned into Sprint backlog
- Team works on the defined sprint backlog
- Team checks for the daily work
- At the end of the sprint, team delivers product functionality

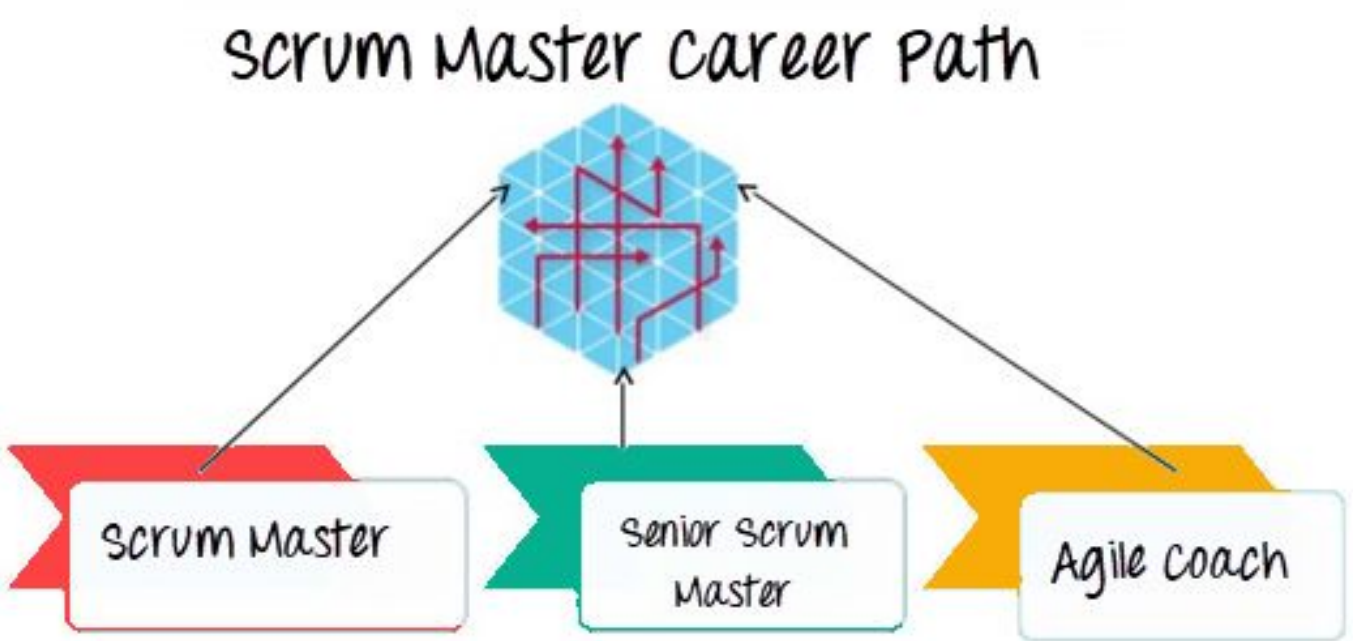
Agile Model Vs Waterfall Model

Agile Model	Waterfall Model
•Agile methodology definition: Agile methodologies propose incremental and iterative approach to software design	•Waterfall Model: Development of the software flows sequentially from start point to end point.
•The **Agile process** in software engineering is broken into individual models that designers work on	•The design process is not broken into an individual models
•The customer has early and frequent opportunities to look at the product and make decision and changes to the project	•The customer can only see the product at the end of the project
•Agile model is considered unstructured compared to the waterfall model	•Waterfall model are more secure because they are so plan oriented

•Small projects can be implemented very quickly. For large projects, it is difficult to estimate the development time.	•All sorts of project can be estimated and completed.
•Error can be fixed in the middle of the project.	•Only at the end, the whole product is tested. If the requirement error is found or any changes have to be made, the project has to start from the beginning
•Development process is iterative, and the project is executed in short (2-4) weeks iterations. Planning is very less.	•The development process is phased, and the phase is much bigger than iteration. Every phase ends with the detailed description of the next phase.
•Documentation attends less priority than software development	•Documentation is a top priority and can even use for training staff and upgrade the software with another team

•Every iteration has its own testing phase. It allows implementing regression testing every time new functions or logic are released.	•Only after the development phase, the testing phase is executed because separate parts are not fully functional.
•In agile testing when an iteration end, shippable features of the product is delivered to the customer. New features are usable right after shipment. It is useful when you have good contact with customers.	•All features developed are delivered at once after the long implementation phase.
•Testers and developers work together	•Testers work separately from developers
•At the end of every sprint, user acceptance is performed	•User acceptance is **performed** at the end of the project.
•It requires close communication with developers and together analyze requirements and planning	•Developer does not involve in requirement and planning process. Usually, time delays between tests and coding

Career Path:


Scrum Master Career Path
Scrum Master
Senior Scrum Master
Agile Coach

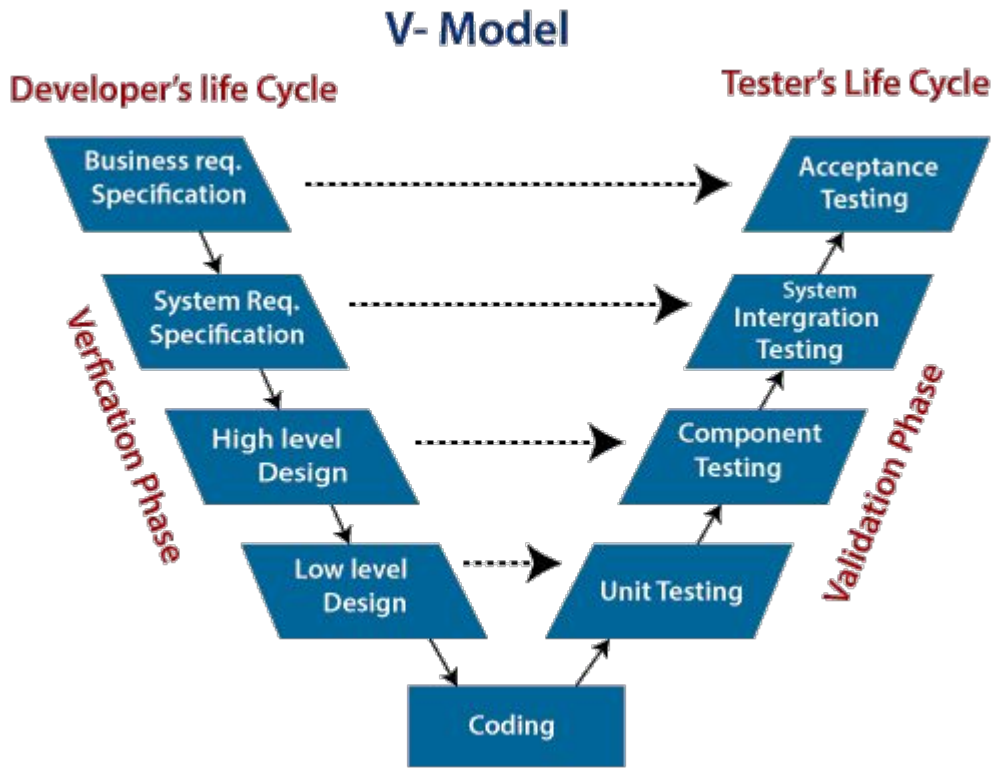
Video Links:

- https://www.youtube.com/watch?v=WjwEh15M5Rw
- https://www.youtube.com/watch?v=8dGdIcyDk1w
- https://www.youtube.com/watch?v=1iccpf2eN1Q
- https://www.youtube.com/watch?v=2Vt7lk8Ublw

V-Model:

- V-Model also referred to as the Verification and Validation Model.
- In this, each phase of SDLC must complete before the next phase starts.
- It follows a sequential design process same as the waterfall model.
- Testing of the device is planned in parallel with a corresponding stage of development.

Diagrammatic Representation:



Verification and Validation

- **Verification:** It involves a static analysis method (review) done without executing code. It is the process of evaluation of the product development process to find whether specified requirements meet.

- **Validation:** It involves dynamic analysis method (functional, non-functional), testing is done by executing code. Validation is the process to classify the software after the completion of the development process to determine whether the software meets the customer expectations and requirements.

There are the various phases of Verification Phase of V-model:

- **Business requirement analysis:** This is the first step where product requirements understood from the customer's side. This phase contains detailed communication to understand customer's expectations and exact requirements.
- **System Design:** In this stage system engineers analyze and interpret the business of the proposed system by studying the user requirements document.
- **Architecture Design:** The baseline in selecting the architecture is that it should understand all which typically consists of the list of modules, brief functionality of each module, their interface relationships, dependencies, database tables, architecture diagrams, technology detail, etc. The integration testing model is carried out in a particular phase.

- **Module Design:** In the module design phase, the system breaks down into small modules. The detailed design of the modules is specified, which is known as Low-Level Design
- **Coding Phase:** After designing, the coding phase is started. Based on the requirements, a suitable programming language is decided. There are some guidelines and standards for coding. Before checking in the repository, the final build is optimized for better performance, and the code goes through many code reviews to check the performance.

There are the various phases of Validation Phase of V-model:

- **Unit Testing:** In the V-Model, Unit Test Plans (UTPs) are developed during the module design phase. These UTPs are executed to eliminate errors at code level or unit level. A unit is the smallest entity which can independently exist, e.g., a program module. Unit testing verifies that the smallest entity can function correctly when isolated from the rest of the codes/ units.
- **Integration Testing:** Integration Test Plans are developed during the Architectural Design Phase. These tests verify that groups created and tested independently can coexist and communicate among themselves.

- **System Testing:** System Tests Plans are developed during System Design Phase. Unlike Unit and Integration Test Plans, System Tests Plans are composed by the client?s business team. System Test ensures that expectations from an application developer are met.
- **Acceptance Testing:** Acceptance testing is related to the business requirement analysis part. It includes testing the software product in user atmosphere. Acceptance tests reveal the compatibility problems with the different systems, which is available within the user atmosphere. It conjointly discovers the non-functional problems like load and performance defects within the real user atmosphere.

When to use V-Model?

- When the requirement is well defined and not ambiguous.
- 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 sample technical resources are available with essential technical expertise.

Advantage (Pros) of V-Model:

- Easy to Understand.
- Testing Methods like planning, test designing happens well before coding.
- This saves a lot of time. Hence a higher chance of success over the waterfall model.
- Avoids the downward flow of the defects.
- Works well for small plans where requirements are easily understood.

Disadvantage (Cons) of V-Model:

- Very rigid and least flexible.
- Not a good for a complex project.
- Software is developed during the implementation stage, so no early prototypes of the software are produced.
- If any changes happen in the midway, then the test documents along with the required documents, has to be updated.

Activity for next lecture

- **What is Scrum Master?**
- **Scrum Master Responsibilities?**
- **What is NOT the role of the Scrum Master?**
- **Scrum Master Skills?**
- **Characteristics of Scrum Master?**
- **What does a Scrum Master do all day?**
- **Scrum master Best Practices?**
- **Real time example for V-model.**