SOFTWARE DEVELOPMENT LIFECYCLE

* Process used by software industry to design, develop and test high quality softwares.
* Aims to produce a high quality software that meets or exceeds customer expectations, reaches completion within time and cost estimates.
* Comprises of 7 phases:

1. Formation: Can be inception of a fresh product idea, solution idea, improvement of a current product etc.
2. Requirement/ planning: Business rules,security requirements,use cases, sample screen designs. All of these should be confirmed by the client before design stage
3. Design: Both Logical design and physical design, will be reviewed by various departments.
4. Construct: Development happens at this stage; programmers will check possibility to reuse earlier codes
5. Test: To ensure whether the system works properly
   * Unit Testing: Testing the code we have written in units using some dedicated tools like Junit,Munit etc. It ensures that we have written the code in the right direction; checking for right syntaxes, taking care of exception,error handling(technical analysis of the code) etc.
   * Functional Testing: Checking whether our client requirements are met on a functional basis.
6. Product Release:This is like getting the keys of a newly constructed house; here we release our code to production environment

* Processes like DevOps ,CICD are present
* Deployment: development machines> QA machines >Production machines
* Deployment can be automated,no need of manual work

1. Post Implementation: Enhancement and maintenance of the product by creating units like help desks

WATERFALL MODEL IN SDLC

* Sequential/linear development life cycle; no phase can be started before or simultaneously with the previous or current one
* Disadvantage: Can not go back to previous phases, possibility of customer dissatisfaction is higher, time consuming
* Advantages: saves money and time, progress can be easily measured
* Relevance of waterfall model: can be used in projects which has a defined scope, budget, well trained team members etc.

AGILE MODEL

* Proposed to overcome the disadvantages of Waterfall SDLC model
* Combination of iterative and incremental process models
* Based on self organisation, collaborative work
* Focus on product adaptability and customer satisfaction using rapid delivery of working software product
* Breaks the product into small incremental builds, which are provided in iterations
* Splits project into different stories, stories again divided into different tasks
* Provides more flexibility as far as the client is concerned, customer will be able to have a say during each stage of product completion
* Advantages: High Customer involvement,Lesser risk, Better quality
* Disadvantages: dedicated team is required, hard to execute, documentation can be ignored

SCRUM FRAMEWORK

* A way to implement the Agile model
* Replaces the programmed algorithmic approach with a heuristic one, focuses on self-organization to deal with upredictability and to solve complex problems
* Divides the whole process of SDLC to iterations and in each iteration, core features are identified,applied and after each iteration a functional product is handed over to the client for feedbacks.
* After each ieration/ sprint, challenges faced, failures, successes of particular tasks are evaluated with the involvement of the client.
* Based on empiricism- progress is based on observations of reality, not fictitious plans.

SCRUM ROLES

* Product Owner – sole owner for the scrum methodology, have the idea about the product
* Scrum Master
* Scrum Development team – includes architects, programmers, testers, UI designers etc.

SCRUM MASTER

* Keeps track of the scrum principles, values, stories etc.
* Also called project manager
* Acts as a coach- like a facilitator between developent, testing teams,product owner etc, protects the team against external interferences (eg: unable to access a database for testing purpose)

SCRUM ARTIFACTS

* Product backlog
* Sprint backlog
* Increment(Sprint Goal)

DIFFERENCE BETWEEN PRODUCT BACKLOG & SPRINT BACKLOG

* Product backlog is an ordered list of everything that is known to be needed in a project. It contains the user stories for the entire project. It is dynamic and continuously evolving
* User stories are features, functions and requirements which deliver value to the customer
* Sprint backlog is a set of product backlog items selected for the sprint, with a plan for delivering the product increment and realizing the sprint goal. It makes use of inferences from the previous Retrospective meeting
* An increment is the sum of all product backlog items completed during a sprint and of all previous sprints. At the end of a new sprint, the new increment must be DONE

WHAT IS EPIC AND STORY

* [**Stories**](https://www.atlassian.com/agile/project-management/user-stories), also called “user stories,” are short requirements or requests written from the perspective of an end user.[**Epics**](https://www.atlassian.com/agile/project-management/epics) are large bodies of work that can be broken down into a number of smaller tasks (called stories).

SCRUM EVENTS OR CEREMONIES

* Organization of the backlog - by scrum master and product owner
* Sprint planning – planning,score mechanism,negotiations over the score,duration and assignment of stories inside backlogs happens at this stage(What,How,When)
* Sprints
* Sprint execution – actual development appens here
* Daily scrum/standup – master is organising the standup; work done so far, plans, obstacles are discussed here; master discussing and analyzing the overall statistics of individual teams, time boxed at 15 minutes daily
* Sprint review – Inspect the increment, adapt the product backlog if needed; It involves product owner also. Time boxed at 1 hr per week
* Sprint retrospective - master does an overall analysis of paticular sprints, focus on improvements on scrum methodology of our organization, last week of sprint after it we take care of whether all the aspects of the agile model are followed properly, suggestions come up before the team for improvements in the future

SPRINT VELOCITY

* Before the sprint execution happens, we have a spring planning/grooming session, story pointing session(using planit broker) and a discussion about our groups’ working capacity or speed. This is called Velocity

WHAT IS GROOMING

* Grooming (or refinement) is a meeting of the Scrum team in which the product backlog items are discussed and the next sprint planning is prepared.
* [Product grooming is critical in product management](https://hygger.io/blog/what-is-product-backlog-grooming-in-product-management/) because it means keeping the backlog up to date and getting backlog items ready for upcoming sprints.

JIRA BOARD

* Tool used for implementing Scrum methodology where master/ product owner will have facilities to create EPICs, stories, subtasks etc.
* A board displays issues from one or more projects, giving you a flexible way of viewing, managing, and reporting on work in progress

COMPARISON OF AGILE AND WATERFALL

* Scope : Waterfall model is ideal if the scope is defined. It does not accommodate for large chages. Agile model is useful in the case of an undefined scope. It is more flexible to changes proposed in between
* Customer: Customer is more involved in an agile model. Here,The customer get a functional product after each iteration. But in the case of a waterfall model, the customer does not get a functional product until all phases are completed succesfully
* Team: Agile model demands a synchronised work between different teams whereas waterfall model needs individual team efforts mostly
* Cost: As the Agile model demands more synchronised efforts, it demand more cost compared with waterfall

RESPONSIBILITIES OF PRODUCT OWNER

* Product owner is the entity who have a wholesome idea about the end product
* He involves in Sprint reviews, provides feedback about what backlogs are DONE and what are not
* He also involves in organization of backlogs with the SCRUM MASTER.