**Module 1: ST - Introduction and Fundamentals**

1. **What is SDLC?**

* SDLC stands for software development life cycle. SDLC is a structured process to design, develop and test good quality software. If we divide software development life cycle into different phases like requirement analysis, designing, programming/construction, and operation and maintenance then testing should accompany each of the above phases.

1. **What is software testing?**

* Software testing is a process to identify correctness, completeness and quality of developed software**.**

1. **What is agile methodology?**

* Agile methodology is widely use model in software development process. Agile methodology is a project management frame work that breaks down projects into several dynamic phases.

1. **What is SRS?**

* SRS stands for software requirement specification. SRS is a complete description of the behaviour of the system to be developed. That includes sets of use cases that describe all of the interaction that the users will have it with software.

1. **What is OOPS?**

* OOPS (Object oriented programming system) is a way of writing computer programs where organize code into small, reusable pieces called object.

1. **Write basic concepts of OOPS?**

* There are six fundamental concepts of OOPS object, class, encapsulation, inheritance, polymorphism, abstraction.

1. **What is Object?**

* An object is a component of a program that knows how to perform certain action and how to interact with other element of the program.

1. **What is class?**

* Class is a blueprint for creating objects, providing initial values for state and implementation of behaviour.

1. **What is encapsulation?**

* Encapsulation is bundling of data with the method that operating on data into one unit.

1. **What is inheritance?**

* Inheritance is one in which a new class is created that inherits the features from the already existing class.

1. **What is polymorphism?**

* Polymorphism is a concept that entities in code can have more than one form or is a concept that allows object of different classes to be treated as objects of common class.

1. **Draw Usecase on online book shopping**

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| **Actor** | * search book in browser book name ex: book name is kube * list of website opens for the said book * select link amazon.in * check the details of book you selected * Add to card. (There are some other option for buying like: EMI option, used book option, compare other seller on amazon.in etc. * View cart * Proceed to buy * Select a payment method * Select cash on delivery * Continue * Place your order which have all details of your order, discount and promotion code, delivering address, change payment method, arriving date etc. * Select place your order to finalize the order. |

1. **Draw Usecase on online bill payment system (paytm)**

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| **Actor** | * Search in browser paytm and select it. * It shows no of recharge option like mobile recharge, DTH recharge, loan EMI, Fastag, electricity,gas etc. * Select electricity bill. * It shows different electricity provider companies and it also have search bar to find your regional electricity provider by typing your state or biller name. * Select torrent power * Select you city (ahmedabad) * Add your service number. It also have option to save your bill as home, mom, office, other etc. * Proceed. * It shows your due payment and select proceed to pay. * Select a payment method UPI * Enter UPI ID * Select pay * Confirm payment |

1. **Write SDLC phases with basic introduction**

* There are six phases of SDLC

1. **Requirement gathering:** it is most important and necessary stage in SDLC. In this phase involves gathering information about software requirements from customer, project organizer and BA. Before creating product, a core understating of product is necessary. There are two types of requirements Functional requirement and non functional requirement. Short document is created to specifies all the things that needed to be define and create during the entire project (**S**oftware **R**equirement **S**pecification)

**Functional requirement** describe service or function of the software/product

**Non functional requirement** is refer to characteristics of a software system that are not relate to specific function of software

1. **Analysis:** In this phase the basic project is design with all available information. This is the building blocks of basic project. In this phase all the analysis perform before developing software like computer programming language, machines, packages, application architecture, distributed architecture layering, memory size, algorithm and many other engineering detail are analysed.
2. **Designing:**  In this phase software designer come up with best architecture for the software based on SRS. With the requirement define in SRS, multiple designs for the product design in Designing Document Specification (DDS) client assessed by customer/client. After evaluating all possible factors, the most practical and logical design is chosen for software development.
3. **Implementation phase:** It also called development phase. In this phase developer get down to business and start converting the software designing into tangible form. Developer developed software based on SRS and DDS using appropriate programming language. The end deliverable of this phase is product it self.
4. **Testing:** After the product is generated, it is tested against the requirement to make sure that the product are solving the needs gathered during requirement phase. Testing is necessary to ensure smooth execution of software. This phase ensure that the product confronts the quality of requirement of SRS.
5. **Maintenance:** After detail testing, the conclusive product is released to the real environment. It is important to ensure that the product run smooth in real environment after retrieving beneficial feedback, company releases it as it is or auxiliary improvements to make it further helpful for the end user.
6. **Explain phases of waterfall model**

* Water fall model is the basic SDLC model. It is linear model that is rigid phase: one phase ends, the next begins. It’s a one-way model.

It has six phases

1. **Requirement:** The first phase involves gathering requirement from client and analyzing them to understand the scope and objective.
2. **Designing:** Once the requirement are gathered and understood, the designing phase begins. This involves creating a detailed design document that outlines system components, user interface and software architecture.
3. **Development:** development phase include implementation involves coding software based on the designing specification.
4. **Testing:** In this phase the software has been tested to ensure that it meets the requirement and free from defect.
5. **Deployment:** Once the software has been tested and approved, it is deployed to the production environment.
6. **Maintenance:** The final phase of waterfall model is maintenance which involves fixing any issue that arise after the software has been deployed and ensuring that it continues to meet the requirements over time.
7. **Write phases of spiral model**

* Spiral model was widely used model in Software industries. It is in synchronise with the natural development process of any product and it also involves minimum risk for the customers as well as developer firm.

1. **Planning:** During this phase object is determine. Find alternative and constrain.
2. **Risk analysis:** In this phase thoroughly analyzes the risk of all possible solutions.
3. **Engineering:** In this phase focused on building or developing the actual software and testing the same. In this phase developer create physical product.
4. **Customer evaluation:** This is the final phase in which performance of the newly developed software gets tested and evaluated. Developer analyzed their past work to learn before starting a new project. After this step they can start planning for the next phase and repeat the cycle. In the end software company releases the product in market
5. **Write agile manifesto principles.**

* Agile model is combination of iterative and incremental model. It is mainly focus on process adaptability and customer satisfaction by rapid delivery of working software product.
* Agile model break the product in to small task.
* Agile manifesto listed below

1. **Individual interaction:** Agile focuses on the importance of effective communication and collaboration among team members. Agile methodology values working with individual team members in collaboration efforts rather than relying on tools to accomplish a project. **Ex:** A manager using this strategy may encourage a full team meeting rather than running test with software tool in order to solve a process problem.
2. **Working software:** Prioritizes the delivery of functional software as the primary measure of progress. While documentation important in any project for accuracy and accountability purposes, the agile methodology strategy generally prefers real-time reaction to problems rather than continuous documentation. **Ex:** When reacting to problem in a system, an agile project manager may work to fix the issue before documenting every detail concerning the incident.
3. **Customer collaboration:** Encourages customers and stakeholders to have active involvement throughout the development process. In agile project management, a group working on a project may prefer to collaborate with other departments or companies rather than negotiate the terms of their contract. This is so that they adhere to their set goals more reliably, rather than changing goals to meet project result.
4. **Respond into change over following plan:** On changing requirements, embracing flexibility and ability to adapt even late in the development process. While project managers who use agile methodology prefer to not change contract terms, they generally prefer change response instead of adhering to a plan fully. **Ex:** If the team recognize that the plan currently in place is not feasible, they change aspects of their process rather than the current goal to help meet needs.
5. **Explain working methodology of agile model and also write pros and cons.**

* Agile model is combination of iterative and incremental model. It is mainly focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile model break the product in to small task.
* Pros of agile methodology

1. Timely delivery: Agile focus on product placement, the agile strategy allows a department to deliver product to client as quickly as possible.
2. Adaptability: The improvement increment between product delivery dates are small, projects can easily change and adapt when underneath an agile strategy. This allows production to continue at an acceptable rate while improving the process continuously.
3. Ease of collaboration: Because agile working requires much feedback between the client and employees, agile methodology introduces a great system for collaborating between both customer and other department
4. Increase performance improvement:
5. Promotes team work
6. Functionality can be developed rapidly and demonstrated
7. Delivers early partial working solution
8. Resource requirement are minimal
9. Suitable for fix and changing environment
10. Minimal rules and documentation easily employed
11. Little or no planning required easy to manage gives flexibility to developer

* Cons of agile method

1. Not suitable for handling complex dependencies.
2. More risk of sustainability and extensibility
3. An overall plan agile leader and agile PM practice is must without which it will not work.
4. Strict delivery management
5. Depends heavily on customer interaction
6. There is high individual dependency, since there is minimal documentation generated.
7. Due to lack of documentation technology transfer to new team is difficult.
8. **Draw usecase on online shopping using COD.**

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| **Actor** | * Open application (amazon) * In a search bar type product name (diaper). Next page has list of diaper brands open * Filter tab use (size: L and Brand: pampers) * Select desire product * Add to cart * Proceed to buy. * Select payment method (card, amazon pay, UPI, COD, amazon pay balance) * Select cash on delivery * Continue and place your order (has all detail about item, delivery charge, promo code etc. It also have delivery address, payment changing method) * Select place your order to finalize the order. |

1. **Draw usecase on online shopping product using payment gateway.**

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| **Actor** | * Open application (amazon) * In a search bar type product name (diaper). Next page has list of diaper brands open * Filter tab use (size: L and Brand: pampers) * Select desire product * Add to cart * Proceed to buy. * Select payment method (card, amazon pay, UPI, COD, amazon pay balance) * Select card payment select debit card. It has all other card option for payment * Enter card number, CVV number, Card expiry date and name on card. * It will ask OPT. Enter OTP. * And it shows expected delivery dates of product, |