SSW 555: Agile methods for Software development

Homework 1: SDLC methods for Self-Driving Cars

Name: Nidhi Chovatiya CWID: 10457344

1. Waterfall Method

- Process:

  - This process includes total five stages which followed in downward direction, overlapping of step is not possible. Hence, each stage is completed very precisely, which is very important for driverless car.
  - First step is requirements, for self-driving car, it is must to decide in advance all the functionalities and features like required sensors, gear, cameras which helps to detect object near the car to avoid accidents.
  - Second step is Design, in this step considering the requirements from the first phase and give the overall planning of software which helps in defining overall system architecture.
  - Third step is Implementation, according to input from previous step whole task is divided into small task and precisely performed. After that all unit tasks are integrated.
  - Fourth step is Verification, in this step output of previous stage is verified and tested for any bugs and failures.
  - Fifth and final step is maintenance, Final product is representation of software should be in better version is very important, so for that some changes are required which is done by this stage and solve the issues which comes up at the last moment.

  Priority: This process gains second highest priority because failure result into huge loss, hence well-planned all the requirements which is collected very precisely in advance and extreme testing is done which does not give any output under uncertain situations.

- Advantages:

  - Structure of the project like self-driven car is well defined and have a clear view of outcome, which is more helpful for work planning and execution. Along with that it is easier to understand.
  - All the requirements and information are conveyed very well.

- Disadvantages:

  - Make changes in design is very difficult after completion of process. Hence, if user want some extra feature or new function in the car, then we must start from the scratch and repeat whole process.

2. Rational Unified Process (RUP)

- Process:

  - This process splits the project into four phases.

1. First phase is Inception, in this phase scope of the project is evaluated and determine the project is worth it or not. Cost and budget of the project is decided by use case model.
2. Next phase is, Elaboration, during this phase development plan and the system architecture is created and all key risks are mitigated.
3. Third phase is, Construction, during this phase software system is created using code implementation and after that it is tested.
4. Forth phase is, Transition-defines itself that transit means delivery of the final system to customer.

Priority: This process gains highest priority due to repetitive flow of the process. Hence, programmer can change in any stage where editing is needed for self-driven project.

- Advantages:

  - This process has iterative nature, which allows to make changes at any stage.
  - Though it will take more time during project development we can limit the error or bugs in the project.

- Disadvantages:
  - It is a complex and disorganized structure as each, and every phase is not well organized.

3. eXtreme Programming

- Process:

  - This process consists of twelve extreme programming practices.

1. The Planning Game is done by two type of group, business and technical. Scope, priority, and dates of every release are decided by group working with, while all the technical term like effort estimation, flow, plan, and technical consequences are decided by technical team.
2. Pair programming, it means two people write a code at one machine according to their own point of view.
3. Small releases require for every its new features must completely implement. Hence, every release should be as small as possible which contain most valuable business features.
4. Collective ownership can allow anyone to add block of code at point in the code as per their understanding.
5. Metaphor is a method in which there is simple explanation of the project, which is very easy to understand by user as well as give direction to the planning and which is agreed by all members.
6. Continuous Integration is helpful to find a person who breaks the code by testing the code after every few hours.

7. Simple Design is used for easy understanding the flow of process and has very a smaller number of classes.
8. Sustainable pace is more important. Limited working period make people eagerly work with fresh minds.
9. Testing is very essential part of any development cycle, which gives surety about the task. It provides confident to customer as well as programmer.
10. Whole Team includes customer as a part of team, who is explain their requirement and use the final product. Also, they can get some other chaos done by the interaction with programmers.
11. Refactoring is used to make the code simpler and smaller by rewriting or rephrasing the code to improve the execution.
12. Coding Standards are edited by all programmer. It reduces the need for internal commenting.

Priority: This process gain least priority for self-driven car because it is an extensive method which requires more time and money.

- Advantages:

  - Transparent relationship between customer and programmer due to open interaction and involvement. Hence, Customer get their all requirement into final product.

- Disadvantages:

  - There is continuous change in the software development. For self-driven car it is not possible, all the requirements are collected before the execution.
  - Time requirement and cost is very high.