Self-Driving Cars and ROS 2

Lecture 1

★ Development Environment

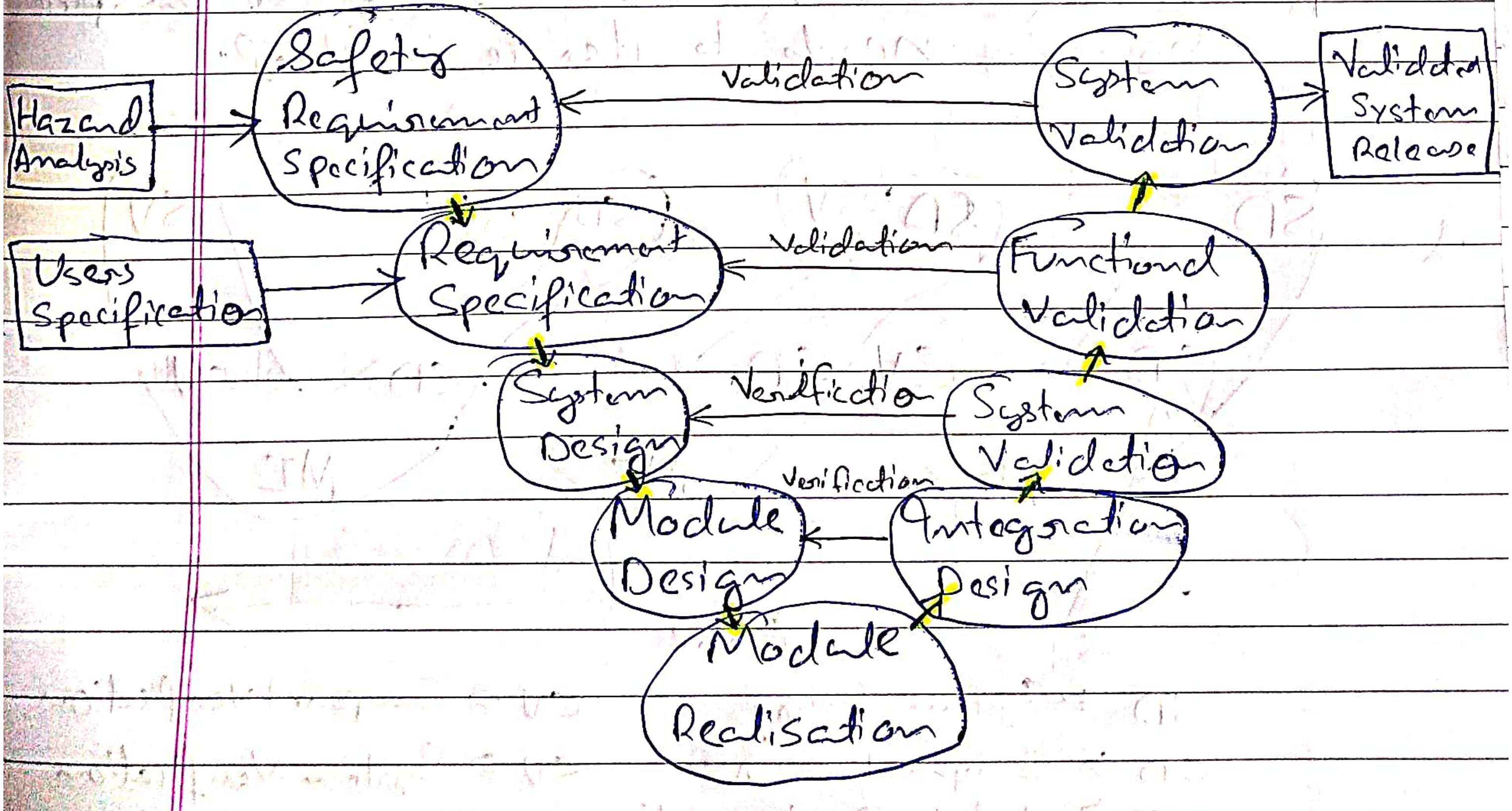
ade ⇒ Awesome development environment
- → It is a simple wrapper around docker
- → by Apex.AI

★ Popular Software Development Models

① V-Model

⇒ It is focused on traceability, validation and verification in between every phase.

⇒ It's Segmented into chronological development phases with no iterations in between.



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② Agile

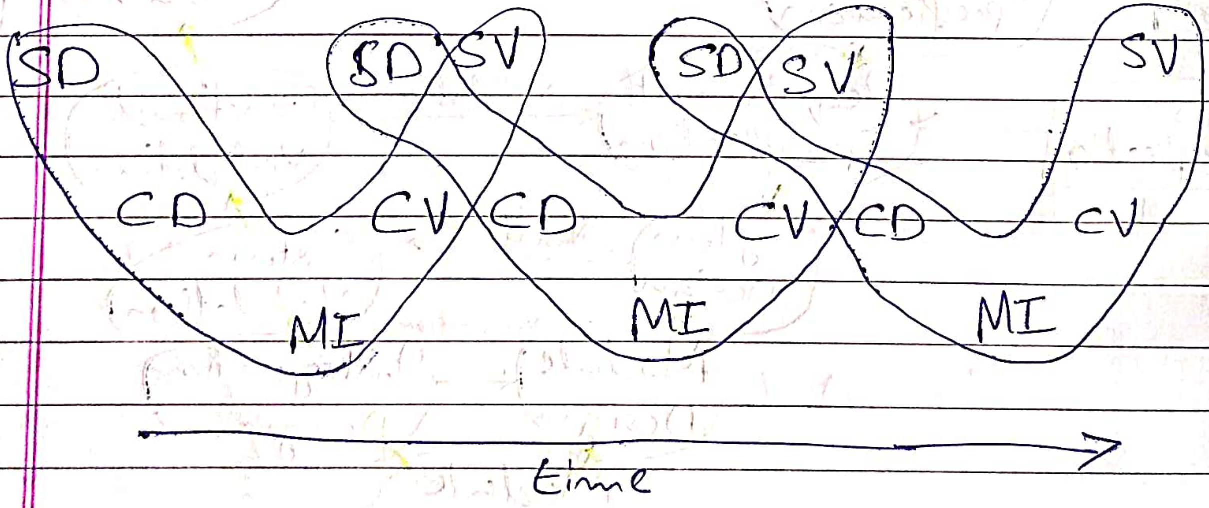
⇒ Agile Methods like Scrum or Extreme Programming are human orientated development models.

⇒ Design, tests and requirements can evolve over time by iterations.

⇒ This is Ideal for Knowledge Intense development where requirements cannot be defined right from the project Start with your customer.

③ Agile System Engineering

⇒ To combine the best from agile methods and traceable V-model method. the complete engineering needs to iterate in itself.



SD ⇒ System design
CD ⇒ Component design
MI ⇒ Module Implementation
CV ⇒ Component Verification
SV ⇒ System Verification

★ Design Goals

① Reliability ⇒ Executable code consistently fulfills all requirements in a predictable manner.

② Portability ⇒ Source code is portable (not compiler or linker dependent)

③ Maintainability ⇒ Source code is written in a manner that is consistent, readable, simple in design, and easy to debug.

④ Testability ⇒ Source code is written to facilitate testability.

⑤ Re-usability ⇒ The design of reusable components is encouraged. Component reuse can eliminate redundant development and test activities.

⑥ Extensibility ⇒ Requirements are expected to evolve over the life of a product. Thus, a system should be developed in an extensible manner.

⑦ Readability ⇒ Source code is written in a manner that is easy to read, understand, and comprehend.

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★ Unit Testing

⇒ Structured code Coverage is a measure of the completeness of Software testing showing which area of the Source code are exercised in the application during the test.

⇒ This provides a Convenient way to ensure that Software is not released with untested code.

★ Integration Testing

⇒ Complete perception can be tested based on large datasets if you have labeled ground truth.

⇒ To create closed loop integration test you will need a Simulation like Gazebo that can be integrated into continuous integration pipelines.

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