كلية العلــــوم

قســـــم الانـــظــمــة الـطبية الـذكـــية

المحاضرة السابعة

Software engineering

المادة : Software engineering

المرحلة : الثالثة

اسم الاستاذ: م.د أحمد عدنان المحنا

B- V-Shaped Model

It is an extension of the waterfall model that emphasizes the verification and validation of the product. Testing of the product is planned in parallel with a corresponding phase of development to form the typical V - shape as shown in the following Figure (7.1).
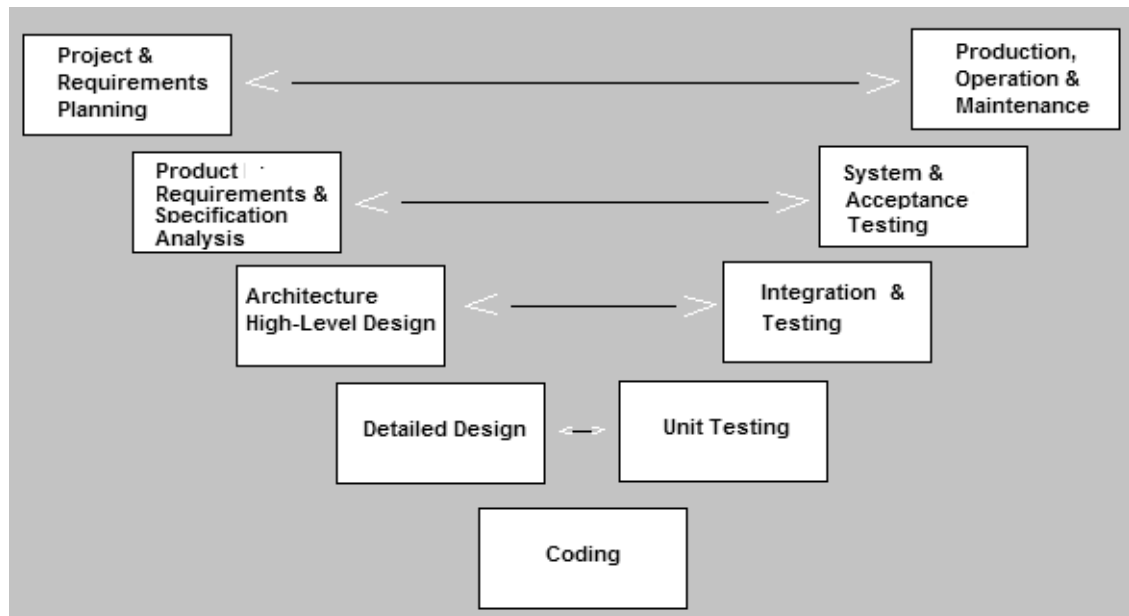

Figure 7.1: The V-Shaped model lifecycle.

V-Shaped Steps:

1- Project and Requirements Planning – allocate resources

2- Product Requirements and Specification Analysis – complete specification of the software system

3- Architecture or High-Level Design – defines how software functions fulfill the design

4- Detailed Design – develop algorithms for each architectural component

5- Production, operation and maintenance – provide for enhancement and corrections

6- System and acceptance testing – check the entire software system in its environment

7- Integration and Testing – check that modules interconnect correctly

8- **Unit testing** – check that each module acts as expected

9- **Coding** – transform algorithms into software

V-Shaped Model Advantages:

1. Simple and Easy to use.
2. Works well for where requirements are easily understood.
3. Verification and validation of the product in the early stages of product development.
4. Higher chance of success over the waterfall model due to the development of test plans early on during the life cycle.
5. Each phase has specific deliverable and must be testable.
6. Project management can track progress by milestones.

V-Shaped Model Disadvantages:

1. Very inflexible, like the waterfall model.
2. Does not easily handle concurrent events or iterations (i.e. phases).
3. The software is developed during the implementation phase, so no early prototypes of the

    software are produced.

4. Does not easily handle dynamic changes in requirements.
5. The model doesn't provide a clear path for problems found during testing phases.
6. Costly and required more time, in addition to a detailed plan.

When to use the V-Shaped Model

- Requirements are well defined, clearly documented and fixed.

- Product definition is stable.

- Technology is not dynamic and is well understood by the project team.

- There are no ambiguous or undefined requirements.

- The project is short.