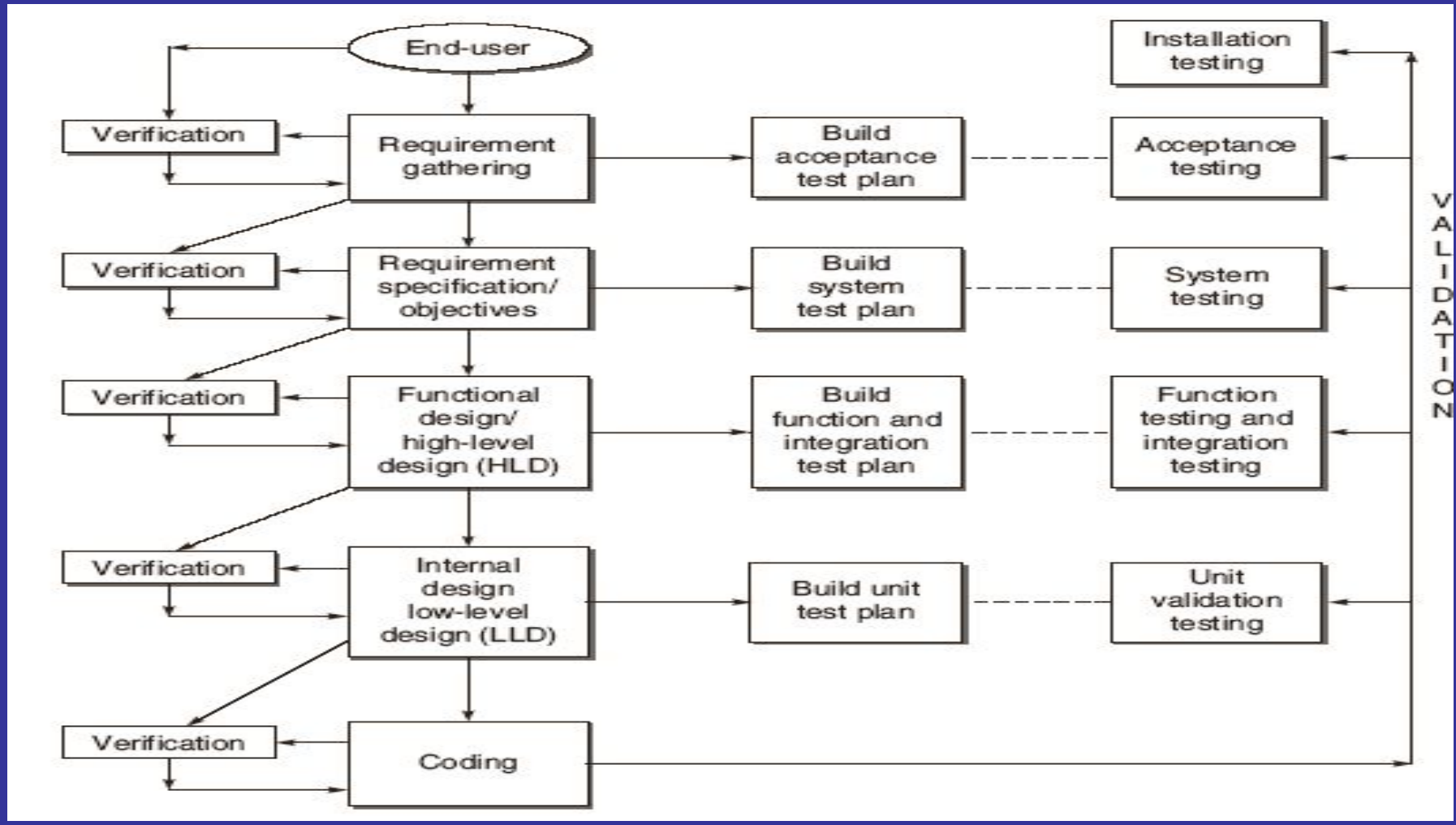
Chapter 3
Verification and Validation

OXFORD
HIGHER EDUCATION

Objectives

- V diagram provides the basis for every type of software testing.
- What are various verification activities?
- What are various validation activities?
- How to perform verification at each stage of SDLC?
- What are various validation test plans?

Verification and Validation (V & V) Activities



Verification of Requirements

Correctness
Unambiguous
Consistent
Completeness

Updation
Traceability
Backward Traceability
Forward
Traceability.

Verification of High Level Design

OXFORD
HIGHER EDUCATION

Verification of Data Design

- Check whether sizes of data structure have been estimated appropriately.
- Check the provisions of overflow in a data structure.
- Check the consistency of data formats with the requirements.
- Check whether data usage is consistent with its declaration.
- Check the relationships among data objects in data dictionary.
- Check the consistency of databases and data warehouses with requirements in SRS.

Verification of High Level Design

OXFORD
HIGHER EDUCATION

Verification of Architectural Design

- Check that every functional requirement in SRS has been take care in this design.
- Check whether all exceptions handling conditions have been taken care.
- Verify the process of transform mapping and transaction mapping used for transition from the requirement model to architectural design.
- check the functionality of each module according to the requirements specified.
- Check the inter-dependence and interface between the modules.
- Coupling and Module Cohesion.

Verification of High Level Design

OXFORD
HIGHER EDUCATION

Verification of User-Interface Design

- Check all the interfaces between modules according to architecture design.
- Check all the interfaces between software and other non-human producer and consumer of information.
- Check all the interfaces between human and computer.
- Check all the above interfaces for their consistency.

Verification of High Level Design

- Check that the response time for all the interfaces are within required ranges.
- Help Facility
- error messages and warnings

Verify Low Level Design

- Verify the SRS of each module.
- Verify the SDD of each module.
- In LLD, data structures, interfaces and algorithms are represented by design notations; so verify the consistency of every item with their design notations.

How to Verify Code

- Check that every design specification in HLD and LLD has been coded using traceability matrix.
- Examine the code against a language specification checklist.
- Verify every statement, control structure, loop, and logic
- Misunderstood or incorrect Arithmetic precedence
- Mixed mode operations
- Incorrect initialization
- Precision Inaccuracy
- Incorrect symbolic representation of an expression
- Different data types
- Improper or nonexistent loop termination
- Failure to exit

Validation

- Developing tests that will determine whether the product satisfies the users' requirements, as stated in the requirement specification.
- Developing tests that will determine whether the product's actual behavior matches the desired behavior, as described in the functional design specification.
- The bugs, which are still existing in the software after coding need to be uncovered.
- last chance to discover the bugs otherwise these bugs will move to the final product released to the customer.
- Validation enhances the quality of software.

Validation Activities

Validation Test Plan

- Acceptance Test Plan
- System Test Plan
- Function Test Plan
- Integration Test Plan
- Unit Test Plan
-

Validation Test Execution

- Unit Validation Testing
- Integration Testing
- Function Testing
- System Testing
- Acceptance Testing
- Installation Testing