Lecture Objectives:

1) Define validation and verification.
2) Explain the term IV & V
3) Define the terms fault, error, and failure.
4) Define testing, test failure, and debugging.
5) Explain the requirements for a fault to be observed (Reachability, Infection, Propagation)
6) Explain the concept of test case values
7) Explain expected results
8) Explain test set.
9) Explain test script.
• What is verification?

Making sure it works.

Initial requirements are met.

Make sure what was made is what person wanted.
• What is validation?
• **Validation**
  - The process of evaluating software at the end of software development to ensure compliance with intended usage.

• **Verification**
  - "Testing Activities"
  - The process of determining whether the products of a given phase of the software development process fulfill the requirements established during the previous phase.

Definitions (IEEE)

Technical skills.
Validation:

Are we building the right product?

Are we building the right product?

Validation

Aren't we building the right product?
Independent Verification (IV&V)

- Activity is done by non-developers

Verification

- Testing of the software

Validation

- Ensuring that the software meets the customer’s needs

Government contracts.
Like any field, software testing comes with a large number of **specialized terms** that have particular meanings in this context.

Some of the following terms are **standardized**, some are used consistently throughout the literature and the industry, but some **vary** by author, topic, or test organization.

The definitions here are intended to be the **most commonly** used.
Definitions

- **Software Fault** - A defect present in the software → wrong line of code
- **Software Error** – An incorrect internal state that is brought on by a software fault.
- **Software Failure** – an externally visible incorrect behavior of the software.
Introduction to Software Verification
1. **Reachability**: The location or locations in the program that contain the fault must be reached.

2. **Infection**: The state of the program must be incorrect.

3. **Propagation**: The infected state must propagate to cause some output of the program to be incorrect.

- User behavior must be wrong.
Testing Definitions

- **Test Case Values**
  - The input necessary to complete some execution of the software under test

- **Expected Results**
  - The results which are to be produced if and only if the program satisfies the intended behavior

- **Test Set**
  - A set of test cases used to test software

- **Executable Test Script**
  - A test case that is prepared in a form to be executed automatically on the test software and produce a report.