

TESTING STRATEGIES

LECTURE # 28

LECTURE BY ENGR.SIDRA



OBJECTIVES

- The objective of this chapter is to introduce software testing and software testing processes. When you have read the chapter, you will:
 - Understand the stages of testing from small to large;
 - Have been introduced to different types of testing;
 - Understand debugging;
 - Know the important differences between unit, integration, validation and system testing.

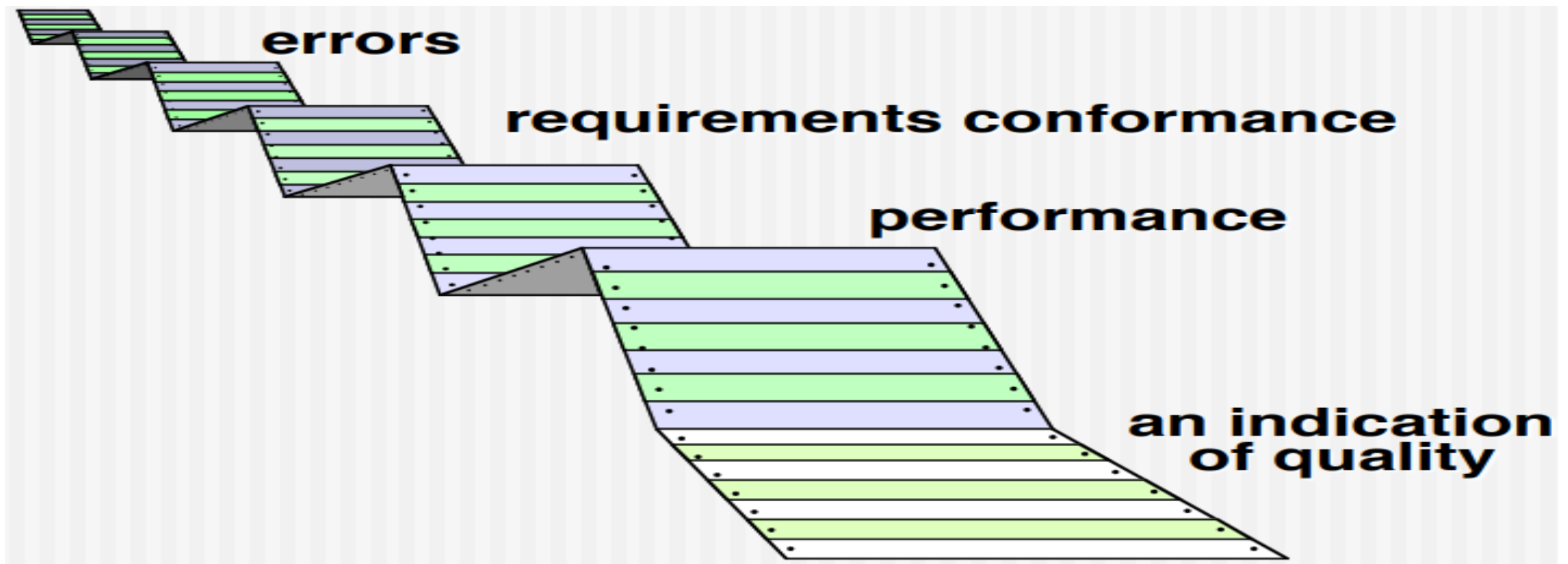


SOFTWARE TESTING

- Testing is the process of exercising a program with the specific intent of finding errors prior to delivery to the end user.
- Testing is intended to show that a program does what it is intended to do and to discover program defects before it is put into use.
- The testing process has two distinct goals:
 - To demonstrate to the developer and the customer that the software meets its requirements.
 - To discover situations in which the behavior of the software is incorrect, undesirable, or does not conform to its specification.
- Testing can only show the presence of errors, not their absence.



WHAT TESTING SHOWS?



V & V

- **Verification** refers to the set of tasks that ensure that software correctly implements a specific function.
 - The software should conform to its specification. Meets the SW documented requirements.
- **Validation** refers to a different set of tasks that ensure that the software that has been built is traceable to customer requirements.
 - The software should do what the user really requires. Meets the customer expectations.
- Boehm [Boe81] states this another way:
 - **Verification:** "Are we building the product, right?"
 - **Validation:** "Are we building the right product?"



V & V CONFIDENCE

- Aim of V & V is to establish confidence that the system is 'fit for purpose'.
- The level of confidence depends on:
 - Software purpose
 - The level of confidence depends on how critical the software is to an organization.
 - User expectations
 - Users may have low expectations of certain kinds of software.
 - Marketing environment
 - Getting a product to market early may be more important than finding defects in the program.



WHO TEST THE SOFTWARE?



developer

**Understands the system
but, will test "gently"
and, is driven by "delivery"**

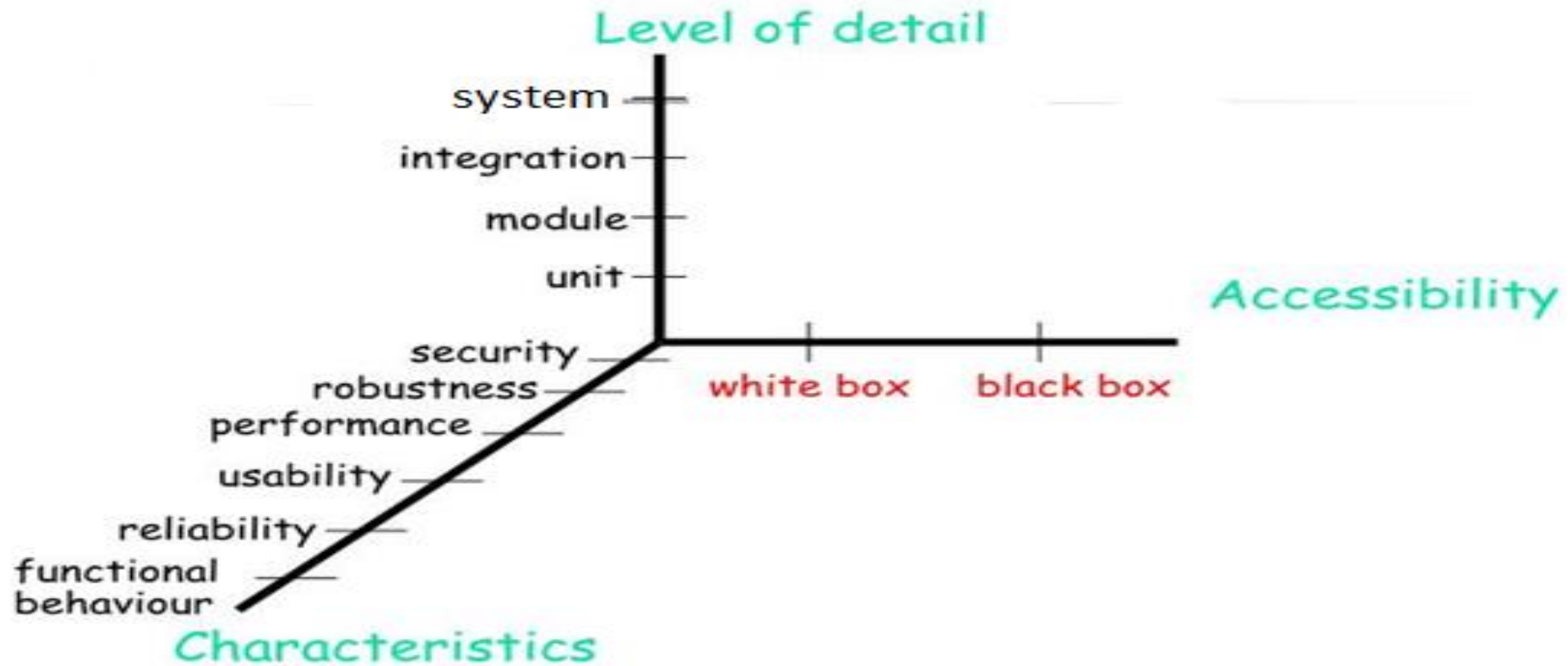


independent tester

**Must learn about the system,
but, will attempt to break it
and, is driven by quality**



TYPES OF TESTING



TESTING STRATEGIES

- A strategy for software testing provides a road map that describes the steps to be conducted as part of testing, when these steps are planned and then undertaken, and how much effort, time, and resources will be required.
- Therefore, any testing strategy must incorporate test planning, test case design, test execution, resultant data collection and evaluation.
- A strategy for software testing must accommodate low-level tests that are necessary to verify that a small source code segment has been correctly implemented as well as high-level tests that validate major system functions against customer requirements.
- A strategy should provide guidance for the practitioner and a set of milestones for the manager. Because the steps of the test strategy occur at a time when deadline pressure begins to rise, progress must be measurable, and problems should surface as early as possible.



STRATEGIC ISSUES

- Specify product requirements in a quantifiable manner long before testing commences.
- State testing objectives explicitly.
- Understand the users of the software and develop a profile for each user category.
- Develop a testing plan that emphasizes “rapid cycle testing.”
- Build “robust” software that is designed to test itself (reroute or cleanly terminate)
- Use effective technical reviews as a filter prior to testing
- Conduct technical reviews to assess the test strategy and test cases themselves.
- Develop a continuous improvement approach for the testing process.

