

11 Software Integration Testing

Testing fundamentals:

Attributes of a good test:

- A good test has a high probability of finding an error
- Good test is not redundant
- Good test should be “best of breed”
- Good test should be neither too simple nor too complex.

Approaches to Testing: Any engineered product can be tested in one of two ways:

1. Knowing the specified function that a product has been designed to perform, tests can be conducted that demonstrate each function is fully operational while at the same time searching for errors in each function
2. Knowing the internal workings of a product, tests can be conducted to ensure that “all gears mesh” that is internal operations are performed according to specifications and all internal components have been adequately exercised.

White Box Integration testing: uses implementation knowledge of the control structures described as part of component level design to derive test cases

White box tests can be only be designed after source code exists and program logic details are known.

Logical paths through the software and collaborations between components are the focus of white box integration testing

Integration testing: is a systematic technique for constructing the software architecture while conducting tests to uncover errors associated with interfacing.

Top-Down Integration: Incremental approach to construction of the software architecture. Highest level to lower level

- Main control module is used as a test driver

Bottom up integration testing: begins construction and testing with atomic modules components at the lowest levels in the program structure.

- Driver is written to coordinate test case input and output.

Continuous Integration: The practice of merging components into the evolving software increment at least once a day.

Smoke testing is an integration testing approach that can be used when software is developed by an agile team using short increment build times.

Advantages of smoke testing:

- Integration risk is minimized

- Quality of the end product is improved
- Error diagnosis and correction are simplified
- Progress is easier to assess

Integration Testing Work Products:

- An overall plan for integration of the software and a description of specific tests is documented in a test specification
- Test specification incorporates a test plan and a test procedure and becomes part of the software configuration
- Testing is divided into phases and incremental builds that address specific functional and behavioural characteristics of the software

Regression Testing:

- Is the re-execution of some subset of tests that have already been conducted to ensure that changes have not propagated unintended side effects
- Whenever software is corrected, some aspect of the software configuration, or the data that is changed.