

Software Engineering - Lecture 3

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January 20, 2015

1 Testing

Testing is a very important step in a software process. It allows to:

- Prevent bugs before the production and maintenance step
- Check the functionality of the application whether it is working as per requirements
- Making the overall system reliable

Some useful definitions:

SUT System Under Testing

DOC Dependent On Component

Levels of testing

There are three levels of testing each distinguished by the components to test and their dependencies.

Unit testing

The purpose here is to test single classes or methods in isolation. There are two types of testing:

Black box Choose test data without looking at implementation. Test just I/O

Glass/white box Choose test data with knowledge of implementation. Test the internal logic of the subsystem or object

Integration testing

Tests different parts (modules, classes) of the system working together. It is done, like unit testing, by the developer.

End-to-end testing

Test the whole system including the external resources such as databases, APIs etc...End-to-End testing requires no access to or understanding of the code base. It is carried out by an independent user which is driven by quality rather than delivery (like the developer in unit testing). In this stage the overall system is tested under stress in order to cover the maximum number of edge cases.

Process

The basic steps in testing are:

- Choose input data/configuration
- Define the expected outcome
- Run program/method against the input and record the results
- Examine results against the expected outcome

There are different approaches to testing: manual and automated. Manual testing is more tedious and error-prone whereas automated testing is more powerful using a test framework.

We are going to use the TestNG (Next Generation) Open source automated testing framework inspired from JUnit but introduces additional features in order to deal with integration and end-to-end testing. (installation and usage in the lecture notes).