

## TESTING. BASIC CONCEPTS OF TESTING SOFTWARE

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### *Анотація*

*У даній доповіді розглянуто основні концепції та види тестування програмного забезпечення, а також окреслено важливість приділення йому великої уваги у інших сферах.*

**Ключові слова:** *тестування, програмне забезпечення, тест-кейси, баги.*

### *Abstract*

*This paper examines the basic concepts and methods of software testing, and highlights the importance of paying attention to testing in other areas.*

**Keywords:** *testing, software, test cases, bugs.*

Nowadays, due to the constant improvements in the development of software, it is necessary to devote more and more time to check it properly. The aim of the paper is to reveal the basic features and types of testing, and the ways for its automatization. It also highlights the importance of testing in other areas in our days.

The most important goal of testing is to prepare the product for release. If a program or a site has not been tested properly, it can lead to great economical losses. That is why testing should be given proper attention and cannot be overlooked or ignored.

The main task of the testers is to find bugs. A bug can be defined as a deviation of the factual result from the expected result. In fact, any testing is a search for bugs. All the bugs can be subdivided into the following sub-categories:

1. We will know (or already know) the expected result;
2. We will know (or already know) the actual result;
3. We compare paragraph 1 and paragraph 2. [1]

However, a question arises how a tester knows the expected result? To do this, specifications of the tested object should be known. A specification can be described as a detailed description of how the software is supposed to function. A bug can be defined as a deviation from the specification. It is the developers of a product who write specifications in which they clearly define all the features and characteristics of the product. The testers are also to write a set of tests or so called test cases that are applied for testing. Their function is to check whether the program works correctly in accordance with the documentation. The test cases represent a sequence of actions to obtain a result and compare it with the result given in the specification. The result of each test case is pass or fail. If a fail occurs, there is probably a bug in a program. The number of performed tests is not limited and depends mainly on the wish and the time of a person responsible for this work.

Since the testing of the product is often given very little time a person responsible for testing needs to be able to distribute it properly. A tester should set priorities in the execution of the test cases. It is primarily recommended to start with basic tests, the aim of which is to check the basic functionality of the program.

All the tests are to be performed according to the pre-set plan. There are regression and progressive testing types. While performing a progressive testing, testers check new features the program has gained after improvements. During regression testing, old capabilities are tested again.

As for the classification of testing, Black Box testing, White Box testing and Gray Box testing are usually defined. The Black Box testing does not include the code testing. Often, such a procedure is carried out on certain patterns of the user's behavior. That is, in case of Black Box testing, we check the software program as if it would have been done by the user. On the one hand, with such testing, we can calculate the steps of average users and predict the most common mistakes, but at the same time hidden bugs will often be missed.

The White Box testing is often called the Glass box or the Open box. With the White Box testing, the tester examines the structure of the code on which the program is written and on its basis produces test cases that will check for possible errors. So, we check the most vulnerable places, but hardly ever find any errors that an

ordinary user will find. If we compare these two approaches, it would be better to use their combination, or the so-called the Gray Box testing that combines both approaches - the Black Box and the White Box. Thus, we will test both code vulnerabilities and possible user errors covering the largest area of product testing.

It can be concluded that the Black Box testing is the kind of work performed mainly intuitively with the help of test cases. The White Box testing focuses on checking for possible errors in the code. The best type of testing is the Gray Box testing. But it should be noted that the combination of the two first types is the most effective one.

It should be noted that one of the main things of the testing is the testing classification. It is worth mentioning cases based on the object of testing. During software testing, functional testing is carried out first, which shows whether the program is working properly and in accordance with the documentation. At this stage, if the program does not work properly, debugging is carried out. This is followed by UI testing which checks the presence of all the elements described in the documentation. It also checks if the interface is user friendly. The next is speed and reliability testing. It is one of the main tests that checks websites or programs while using the site by many people as well as the checking of the download speed. Later on, the security of user data is tested. This is very important when dealing with confidential user information. In the process of programs or sites checking, it is important to conduct compatibility tests on other platforms. While testing sites, testers use different browsers, and in case of programs – different operating systems.

The finished product is tested by two types of testers: alpha testers and beta testers. Alpha testers are company employees whose sphere of responsibility is to test a program or a site. They have the source code and can use it to test the White or Gray Box, which allows them to find hidden errors. After the program has passed the alpha testing, a company can open access for a program to be tested by beta testers. Beta testers are users who use an early version of the program and agree that the errors can occur while using the program. Having found out a bug, they report it to the company and coders fix them. Beta testers are often simple users or novice testers.

To save time, most testers often use specially designed software for test automatization, used, for example, to perform test cases, to create new accounts or to perform algorithms according to the test case. There are a lot of programs applied in software testing. One of such programs is Silk Test. Silk Test is a tool for automated function and regression testing of enterprise applications. Silk Test identifies all the windows and controls the test application as objects and definitions all of the properties and attributes of each window. Thus, it supports an object-based implementation. [2] Silk Test identifies any mouse movements and keystrokes, enabling testing against custom objects in program. This program supports testing of different technologies: mobile (iOS, Android) .NET (WinForms, WPF), Java (Swing, SWT), DOM, IE, Firefox, Chrome, Edge, Safari, SAP Windows GUI. [3]

Another program is called Ranorex Studio. Ranorex Studio empowers testers with a complete toolset for end-to-end testing of desktop, web and mobile applications in a single license. [4]

There are a lot of free testing programs such as Xenu's Link Sleuth, Clip2net, Firebug, Apache JMeter and other programs. With these programs you can save time for other things, such as creating test-cases for another program.

In conclusion, it is necessary to say that testing is an integral part of any project in most modern areas, especially in software testing. Testing is not always limited to the search for bugs and errors. In modern meaning, testing prepares the program for release. The main goal of software testing is to prevent bugs, before a customer encounters them. Nowadays, we need to pay more attention to testing of other things that surround us, such as safety of your private information, devices that you have in your pockets and other things.

## СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

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