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PROBLEM OF METHODS TESTING PROGRAM SYSTEMS IN IT SECTOR

The concept of word "test" in the English language is used to describe terms which are different in meaning and content: test meter, research, analysis, test operations etc [7, c. 727]. Analysis of the concept of word "testing" shows that this concept in English is also used to denote the abovementioned terms. In the Ukrainian language, the term "test" is considered as a phenomenon, and term "testing" – as a process. Hence the dualism of concepts appears which raises the question whether the concept which means a phenomenon can be simultaneously defined as a process and vice versa? In this way, inadequate translation of concepts leads to misunderstanding of the nature and purpose of testing as one of the procedures used in the IT industry. Standard ANSI / IEEE Std. 610.12 defines testing broadly as any activity of analysis of different programs (static and dynamic testing) [8].

Testing is closely related to such concepts as "error", "defect", "failure", "problem", "anomaly" to determine which there still exist differences in literature. These concepts are differently defined not only in the scientific literature of the quality and reliability of software systems, but also in the standards. In particular, the standard ANSI / IEEE-729-83 gives two definitions of the concept of failure:

1) failure is the inability of computer system or component to perform required functions within the specified limits;
2) failure is a deviation of the program from its functioning, defined by the requirements to the program [9].

During its improvement, the engineering of testing has been developed in parallel in several ways:

- research and development of test methods and criteria of testing adequacy (according to methods);
- determination of metric testing and criteria of its completion ;
- creation of software testing tools;
- formation of evaluation models of the testing process[2].

Testing lies in a dynamic checking of the program for the behavior of finite set of test data, specially selected from the input of infinite space, which should comply with the expected behavior[3]. Dynamic testing always leads to the program execution. Such concepts as "finite test" provides a theoretical possibility to create a number of tests that do need a lot of time. Incompleteness is a major problem in testing, because in practice the full set of tests can be considered as infinite. Number of tests that can be performed in a limited time, is finite. Thus, the test always involves some "compromise" between a limited period and potentially unlimited number of tests. This leads to the well-known problems of testing, such as decisions about the adequacy of testing, and management issues related to estimated costs for testing. The test methods related to the issue of adequacy of testing and selection of a limited set of tests are called selected. These testing methods, in general, differ in their approaches to the selection of the set of test data from the input space.

The inability of exhaustive testing has led to the development of the scientific literature of different techniques to reduce the set of tests and to the search for criteria of test adequacy [4].

The traditional classification methods is based on testing division into two categories – the "black box" (functional) and "white box" (structural) [2, 6] and considers two approaches to the design of tests. Modern classification of test methods is based on the approaches to designing tests. Selection of the most effective methods of testing under certain conditions and at different levels of testing is a complex problem and is associated with the analysis of risks of software systems failures.

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