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Project Title: Electricity Power Software Lab Set up through Plan Review (Phase 1)

Department:	Software and Test Research Track	Employer:	NRI
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Project Necessity: In recent years, many specialized and applied software in various fields of knowledge are being produced and developed in Niroo Research Institute. In the studies conducted in one of the projects of The ICT research group, by examining 20 software projects in various departments for last 10 years, it has been determined that in 40% of the software projects, no tests has not been applied, while the tests performed in other projects were incomplete and have not been in accordance with software engineering principles. In the best cases, only a part of the performance tests have covered. Nowadays A number of software projects have been outsourced, which need to be checked for the necessary tests at delivery phase. In addition, the process of software testing in the field of electricity is growing in Niroo Research Institute such as network market power management software, meter data management (MDM), TurboTech maintenance software and smart electricity meter software are examples of this. In one view, setting up a laboratory to integrate this activity and utilize specialized knowledge in this field is essential.

Project Goals: In order to initially study the needs and methods of software testing, the project "Design of software quality assessment reference laboratory" was conducted in 2012 in the Department of Information and Communication Technology (former computer). After the end of the project, due to time constraints and conditions, it was not possible to set up a laboratory. Now, with the passage of time and the changes that have taken place over the past years, the studies need to be reviewed and updated, and it is also necessary to add clauses to complete the plan. Determining the process and scope of the software laboratory and updating the documentation has been one of the goals of this project.

Abstract: One of the most basic steps in building and delivering a software product is the testing process. This step is doubly important in the use of industrial systems. An overview of the various software purchased in the electrical industry and discarded due to inefficiency indicates the need for careful testing of the software by professional methods. Since software testing scientifically requires special tools, attention to past experiences, software that has not been professionally tested reveals the importance of having such a laboratory in the electricity industry. In other words, software is a key element in many of the systems and defines the behavior of many networks, including financial networks, telecommunications, web, smart grids, and other infrastructures of modern life. Despite the many and varied factors in software reliability testing, including meticulous design and process management, software

testing is method for evaluating software. Testing during development, inspection and delivery is essential to reduce defects in the operating environment and increase the quality of the system. Usually, the quality of the software is measured by the number of defects, tests performed and the amount of system coverage by the tests. Software testing are classified into two general categories of functional and non-functional tests (such as security, accessibility, load and performance).

Steps and Methodologies: The ultimate goal of this project is to research and update the previous plan to set up a software laboratory in the initialized and complementary phase. In the first stage of the project, the focus is on setting up a physical laboratory for specialized electrical industry software with basic facilities. The second stage has a cognitive project on the specialized software laboratory of the electricity industry (supplementary phase). This stage including 1) updating the needs of Software laboratory, 2) updating the specifications and features of similar laboratories inside and outside of the country, 3) updating the selection of quality assessment standards and software test reporting, and 4) Updating of automated tests and necessary tools. The third stage, in completing the second stage, deals with other aspects of recognizing the laboratory, and includes the following sections: 3) Updating the study and determining the spatial, installation, etc. requirements of the laboratory space, and 4) Economic evaluation and market study, 5) Feasibility study of the tests studied in the laboratory design project, 6) Presenting the laboratory setup schedule (Supplementary phase), 7) Investigation of laboratory certification.

Main Results (technical outputs, patents, papers, books, reports, etc.): According to the research, the report of the second phase of the project includes reviewing the needs of a Software laboratory for electrical industry software, objectives and services of the laboratory, determining the specifications and features of similar laboratories in Iran and the world, studying the standards and tools used in Separate chapters are described in tabular form. This report will be the basis for selecting the tools and standards required in the third phase of the project to determine the scope and process of testing in the laboratory. In the report of the third phase of the project, in the first chapter, the necessity of setting up a laboratory, in the second chapter, the necessary software and hardware in the laboratory along with cost estimation are examined and determined. The third chapter was devoted to the study and determination of spatial and installation requirements of laboratory space. The fourth chapter includes economic evaluation and market study, the fifth chapter deals with how to certify the laboratory, and in the last chapter, the laboratory set-up schedule (supplementary phase) was presented.