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OPTIMIZATION OF SOFTWARE TESTS IN THE INFORMATION MANAGEMENT DIRECTORATE OF THE NATIONAL AGENCY OF LEGAL DEFENSE OF THE COLOMBIAN STATE

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В рамках этого проекта предлагается разработать и внедрить инструмент автоматизации функциональных тестов, который охватывает потребности в разработке программного обеспечения в контексте (Agencia Nacional de Defensa Jurídica del Estado) в Колумбии. В этом смысле в работе рассматривается важность и влияние функциональных тестов в рамках цикла разработки программного обеспечения и проводится сравнительный анализ существующих средств автоматизации программного обеспечения, адаптированных к потребностям организации, выбранной по результатам проведенного исследования, было установлено, что существует несколько методик автоматизированного тестирования, однако, отсутствовала методология автоматизации. В связи с этим предлагается методология автоматизации тестирования, основанная на опыте и процессах тестирования. Кроме того, представлен инструмент для записи функциональных тестов на основе открытого исходного кода, а также проведена специализированная разработка для сохранения документации тестовых случаев, выполняемых в процессе тестирования.

Ключевые слова: *функциональные тесты, автоматизация программного обеспечения*

This project proposes the development and implementation of a tool for the automation of functional tests that covers the needs in the software development in the context of the (Agencia Nacional de Defensa Jurídica del Estado) in Colombia. In this sense, the work addresses the importance and impact of functional tests within the framework of the software development cycle and performs a comparative analysis of existing software automation tools that are adapted to the needs of the organization chosen According to the results of the study carried out, it was found that there are several methodologies for automated testing, however, there was a lack of a methodology for automation. Consequently, a test automation methodology based on experience and testing processes is proposed. Additionally, a tool for the recording of functional tests based on open source is presented, and a specialized development was carried out to save the documentation of the test cases that are executed in the testing process in the entity.

Keywords: *functional tests, software automation*

Introduction. The execution of software tests plays a fundamental role in the cycle of life of computer projects, which allows guaranteeing the quality of software, prevent possible defects, guarantee that the final product complies with the end user requirements and improve production start times between others and streamline testing by helping companies get software out to faster production and with better quality (Collins, Dias-Neto, & de Lucena Jr., 2012). Therefore, it was decided to carry out this degree work that focuses on the automation of software testing applied in the particular environment of the National Agency for the Legal Defense of the State in Colombia. In this

sense, the work deals with the automation of tests from the test methodologies more relevant, the automation tools existing in the market and the processes and testing procedures used in the environment in which develops the work. It is important to keep in mind that a tool does not solve the problems inherent to the automation of tests, for this, it is It is necessary to jointly implement a methodology for the streamlining of processes themselves. For this project, the application of a methodology for the development of software for the automation of tests, although there are currently several methodologies on this field, for the purposes of this project will be addressed a methodology of tests from process automation and coding tests. Therefore, to start with, open source tools will be used for web application automation tests: Mozilla plugins Firefox as Selenium IDE 2.9.1 and Firefox macros, as a development engine will use Eclipse. (Jústiz-Núñez, and others, 2014) In addition, documentation will be made with the description of the project in a specific case as it is in the chosen organization and will conclude with the impact that has the automation of tests with the established processes and tools.

As future work it is proposed to create a tool to organize the artifacts to improve the use of them, improving the communication between testers and developers and generating better reports of the same results.

In this investigation, a process for the execution of automated tests has been defined. A tool designed for the automation of tests (selenium) was implemented, which proved to be a robust and easy integration tool with different tools, one of them JMeter, with which the integration is made to carry out load tests. The analysis of the results obtained was done in a process where 4 testers were used and it is necessary to perform tests on average of 8 cases of medium complexity use, where initially 15 cases were used, for a project that was in constant change, for the tests carried out manually the following results were obtained:

This method is applied to a test team of 4 people who perform validations in 3 different projects, the susceptible tests were identified automation, that is to say, the cases of use that were verified repeatedly, for example, login, user registration, and filling out forms.

Reducing the average validation time from 21 days to 24 hours, This job It is done in 9 modules for which one of the most important factors of complexity are the cases use, a module on average has from 6 to 32 cases.

The project proposes a test automation methodology for future projects the experiment implemented a tool tailored to the needs of the national legal defense agency of the state, giving a solution to a manifest need in what has to do with the automation of tests framed in the particular software development cycle of the organization. The implementation of the tool showed an improvement in execution times of approximately 75%. By using Selenium and being based on open source, it is a highly convenient low-cost solution, taking into account the public nature of the entity, helping to optimize testing costs. Additionally, a specialized development was carried out for ANDJE in order to obtain test statistics more easily.

Future work

It is proposed to integrate with existing tools to make reports and streamline the process of reporting, documentation, and coding of tests in order to unify the process and to include developers in the process of automating tests. Generalize the methodology carried out for the scope of the agency for other technological projects. Implement selenium tests in the Phantom browser to improve response times

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ЛОКАЛЬНАЯ СЕТЬ (LAN). КОМПЬЮТЕРЫ В КЛАССАХ НАПИСАНИЯ ESL И EFL: ОБЕЩАНИЯ И РЕАЛЬНОСТЬ

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Сейчас в Азии внедряются компьютеры локальной сети (LAN), используемые в американских писаниях Lclasses в течение примерно десятилетия. Более десятка университетов и колледжей в Гонконге, Японии, Сингапуре и Тайване установили локальные компьютеры для обучения написанию за последние два года, и планируется еще несколько установок.
Ключевые слова: *LAN, ESL, EFL, Lclasses, эффективность ЛВС, компьютерные сети, локальных сетей.*

Computers in the local area network (LAN), used in the American Lclasses for about a decade, are now being introduced in Asia. More than a dozen universities and colleges in Hong Kong, Japan, Singapore and Taiwan have installed local computers for learning to write over the past two years, and several more installations are planned.
Keywords: *LAN, ESL, EFL, Lclasses, LAN efficiency, computer networks, local networks.*

Компьютеры локальной сети (LAN), используемые в письменной форме в США в течение более десяти лет, в настоящее время внедряются в