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Strategies and techniques of Automated Software Testing

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Abstract : *This Paper deals with a significant and vital issue of Software Testing. Testing can be conducted manually as well as Automated. The Objective of this paper is to perform Automation Testing using Software Testing Tool "Selenium". With this web testing tool, test cases are automatically recorded in background while tester is entering the data in a web application screen. Testing is a very important activity in Software Development Process. It is to examine & modify source code. Effective Testing produces high quality software. These Techniques have their own advantages & disadvantages.*

Keywords: *Debugging, Software Testing Goals, Software Testing principles, Software Testing strategies, Software Testing Techniques*

I. INTRODUCTION

Automation testing has become a key a part of software system development method in most organizations across the world these days. There are a unit many blessings of automation testing and it's experiencing speedy advancements in technology with each passing day. Today, there are a unit many new age check automation tools that have created it simple for organizations to implement automation testing with effective results. In fact, it's quick replacement manual testing because the most generally used technique of software system testing. Moreover, there area unit many action situations that area unit doable solely with the assistance of automation. Here we have a tendency to shall have an outline of automation testing and within the ulterior blogs within the Automation Testing series, we have a tendency to shall be specializing in every of its key aspects. So, let's start.[1]

II. CHOOSE AUTOMATION TESTING

2.1 Automation testing refers to testing a software system

Application with the assistance of tools, scripts and software system rather than humans testing them manually. Automation testing compares the results of testing with the expected results. it's most popular over manual testing as automation will be accustomed execute repetitive tasks with ease similarly as extra action executions. There area unit many edges of automation testing that have contributed to its quality and a couple of of them area unit given below: 1. Brings a few substantial increase in testing potency 2. Performs check steps exactly whenever with no scope for errors 3. Executes a lot of range of checks for a specific software system to enhance the test coverage. 4. Saves time and prices to contribute towards a better ROI 5. Offers unmatched volume and timing 6. Makes it doable to observe bugs throughout the first stages of the software system life cycle However, it should be noted that in spite of the various edges that automation testing offers over manual testing, there area unit still action situations wherever manual testing may be a necessity.[13]

2.2 Automation Testing Process

The automation testing method includes many steps, like process the scope of automation, selecting the proper automation tool, writing & developing the check scripts, and execution of check cases, among others. Give below is that the graphical illustration of the method.[11]

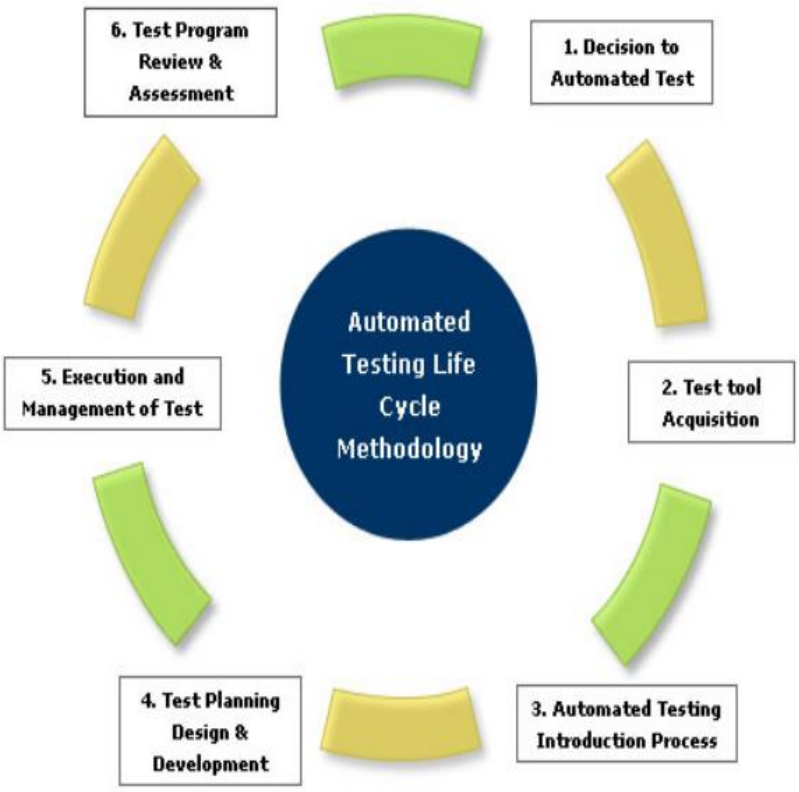

Fig.1 automated testing life cycle methodology [11]

2.3 Benefits of automation testing

Software testing has several advantages, that is why SaaS businesses across the world ar utilizing automation technology. Here are a number of the largest advantages of victimization automation testing for computer code development[15]

2.3.1 Detailed coverage capabilities

Automation take a look acting uses well-crafted test cases for varied situations. These scripted sequences is implausibly in-depth, and supply careful reports that merely wouldn't be potential once done by an individual's. to not mention providing them during a shorter quantity of your time.[15]

2.3.2 Improved bug sight

One in every of the most reasons to check a product is to detect bugs and different defects. Automation testing makes this method a neater one. It's conjointly able to analyse a wider take a look at coverage than humans could also be able to. [13]

2.3.3 Speeds up the testing method

Machines and automatic technology work quicker than humans. beside improved accuracy, this is often why we tend to use them. In turn, this shortens your computer code development cycles.[13]

III. TECHNIQUES FOR AUTOMATED TESTING

3.1 Choose the most effective Automation

The on the market Resources selecting the most effective take a look at automation tool can enhance the credibleness of the general testing cycle. If the app to be tested is additionally developed in C# and also the on the market resources area unit conversant in C#, then there's pointless to choose out the tool that doesn't provide C# to put in writing scripts. The information of explicit language may be a time taking procedure. Avoiding this learning curve by procuring a tool that demands a bottom learning is that the higher choice. [2]

3.2 Know the merchandise Being Tested

The choice of tool majorly depends on the technologies utilized in your application. Knowing |the actual app within out before beginning the take a look at automation method is incredibly necessary part for the testers. If it's a desktop app, tester ought to perceive that language is in-built. If just in case it's an internet app, attempt to acknowledge the browsers it'll support. establish the technologies being employed in it. this can support them to create the tool choice and automation procedure easier. [5]

IV. SELENIUM WITH PYTHON

4.1 Selenium

Selenium is Associate in Nursing ASCII text file testing tool, which implies it may be downloaded from the web while not outlay something. atomic number 34 may be a useful testing tool and conjointly compatible with non-functional testing tools additionally[10]

4.2 Python

Python supports the Object-Oriented Programming approach to determine the applications. it's easy and straightforward to find out and provides ample high-level knowledge structures. it's AN ASCII text file language. it's a high-level and interpreter scripting artificial language. Python makes the event and debugging fastbecause there's no compilation step enclosed in Python development.[15]

4.3 Python useful for automation testing

Python is extremely helpful for automation testing as a result of it supports multiple programming patterns. Python has several inherent testing frameworks like Pytest and mechanism, that covers the debugging and quicker work flow. it's AN taken language suggests that the interpreter implements the code line by line at a time that is makes debugging straightforward. Python is Cross-platform Language; that is why it will run on completely different platforms like Windows, Linux, UNIX, and Macintosh, Python may be simply enforced with alternative programming languages like C, C++, JAVA, etc.[12]

4.4 Selenium's Python

Selenium's Python Module is made to perform automatic testing with Python. Selenium in Python works with parts. part will be a tag, property, or something, it's Associate in Nursing instance of sophistication Selenium.webdriver.remote.webelement.WebElement. when you discover part on screen victimisation Selenium, you may wish to click it or notice sub-elements, etc. Se provides strategies around this WebElement of Selenium. during this article, we've mentioned varied strategies that one will use to perform multiple tasks with Selenium and its WebElement.[15]

V. PLANNING FOR YOUR TEST AUTOMATION

5.1 Solution for Executing Test Cases

We find the most effective resolution for these challenges is automation. take a look at automation, with right coming up with and right set of tools, eventually relieves the manual testers from repetitive long tasks like smoke/regression tests, permitting them consider testing new/modified options and to assume and canopy the corner cases.[10]

5.2 Steps and Phases in Test Automation Planning

Once we have a tendency to decide we have a tendency to area unit getting to use automation, we have a tendency to work on a solid strategy that wherever we have a tendency to outline the scope, prefer the tools/technology to use, layout the beginning date, framework, resources and budget.[10]

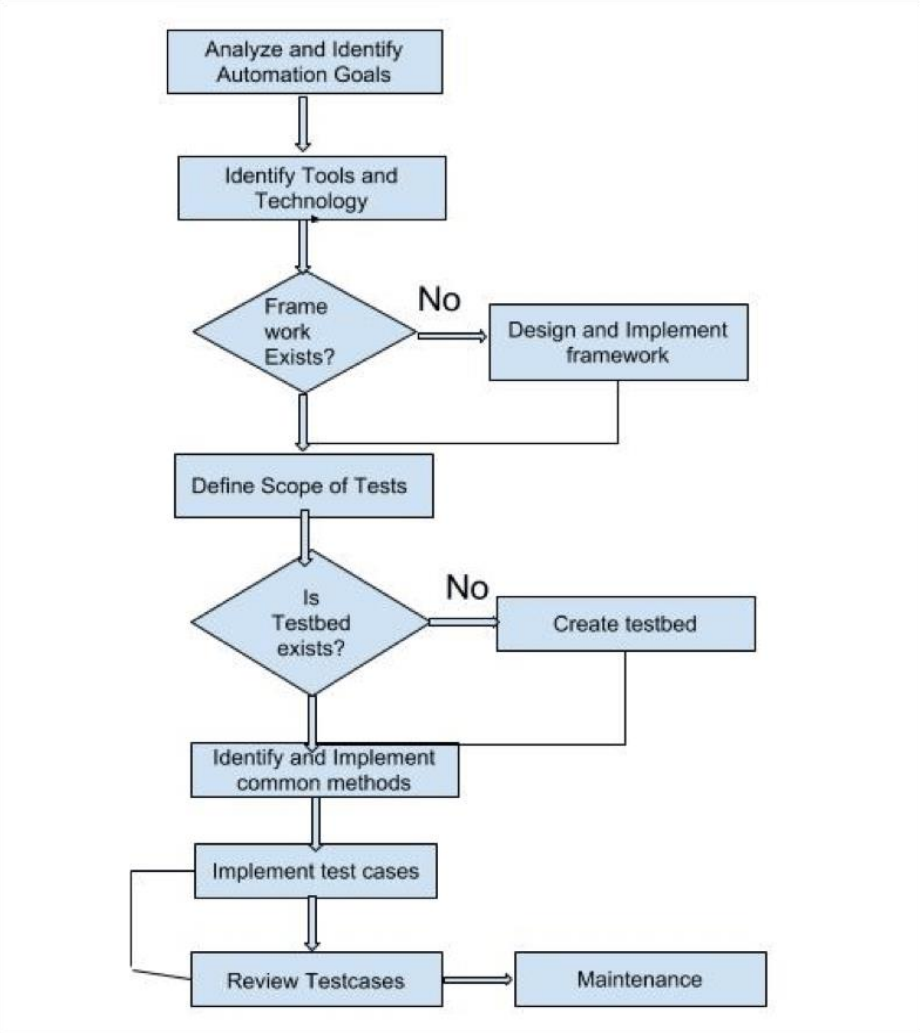

Fig.2 perfect planning for your test automation[11]

VI. METHODOLOGY

6.1 Functional Testing

Functional testing involves testing the applying against the business needs. It incorporates all check varieties designed to ensure every a part of a chunk of code behaves of course by victimization uses cases provided by the look team or business analyst. These testing strategies area unit typically conducted so as and embrace [6]

6.2 Non-functional Testing-Non

Functional checking strategies incorporate all test varieties targeted on the operational aspects of a chunk of code. These embrace[4]

6.3 Unit Testing

Unit testing is that the initial level of testing and is commonly performed by the developers themselves. it's the method of guaranteeing individual parts of a chunk of code at the code level area unit practical and work as they were designed to. Developers in a very check-driven setting can generally write and run the tests before the code or feature being skipped over to the test team. Unit testing may be conducted manually, however automating the method can speed up delivery cycles and expand check coverage. Unit testing also will build debugging easier as a result of finding problems earlier suggests that they take less time to mend than if they were discovered late within the testing method. check Left could be a tool that permits advanced checkers and developers to shift left with the quickest test automation tool embedded in any IDE.[8]

6.4 System Testing

System testing could be a recorder testing technique accustomed value the finished and integrated system, as a whole, to make sure it meets given needs. The practicality of the code is tested from end-to-end and is usually conducted by a separate testing team than the event team before the merchandise is pushed into production. [2]

6.5 Performance Testing

Performance testing could be a non-functional testing technique accustomed confirm however associate degree application can behave beneath varied conditions. The goal is to check its responsiveness and stability in real user things.

VII. SOLUTION APPROACH

7.1 Automation tool

Select the automation tool that is acquainted to your resources If your resources square measure aware of C# and your application to be tested is additionally developed in C#, then there's no purpose choosing the tool that doesn't supply C# to jot down scripts. learning could be a time taking method. Avoid this learning curve by shopping for a tool that offers a least learning curve. [5]

7.2 Good Automation

Smart manual test suit Nicely save United States from automating those check cases that square measure straightforward to alter however weak find defects. Here is that the quote from the book Lessons Learned in computer code Testing:" Automating while not smart check style could end in heaps of activity, however very little worth." it's continuously sensible to initial write the test suit in manual type. establish all stipulations and check knowledge. Write steps in a very clear manner and write expected ends up in front of every step. the target of 1 test suit ought to be clear and it ought to be less obsessed on the opposite check cases. Automation engineers ought to run this test suit manually a minimum of once to obviously decide what objects got to be known and what is going to be the flow of navigation. raise queries with manual testers. This activity generally helps to spot bugs even before the automation script is written. specialists say that the bulk of bugs is known within the check automation development section instead of within the actual execution section. [9]

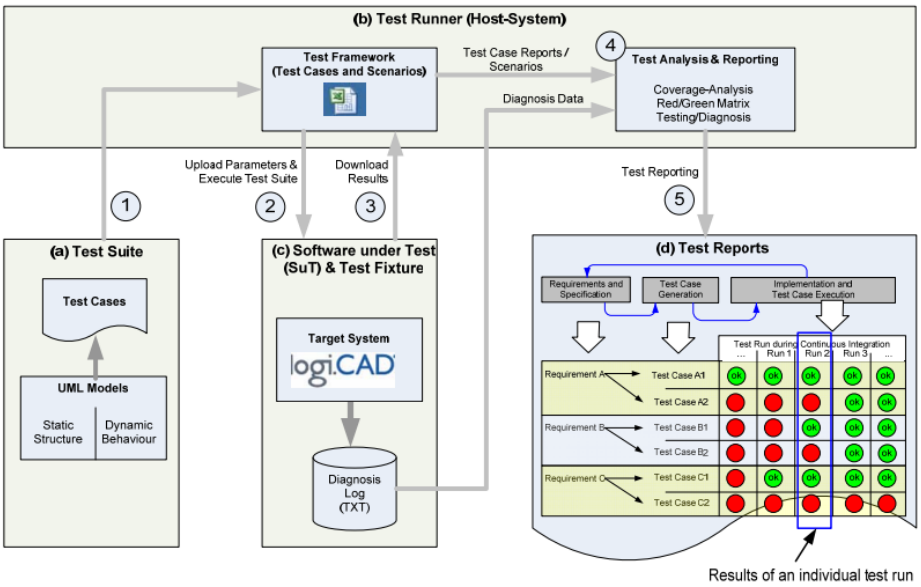

Fig. 3 framework for automated testing in automation systems development.[9]

VIII. CONCLUSION

Testing is that the most important a part of the package development Lifecycle, because it are a few things upon that the ultimate delivery of the merchandise relies. it's time overwhelming associated an intensive

method, therefore, increased techniques and innovative methodologies ar requisite. This makes automatic Testing and other varied check Metrics implementation before and through the testing method. It will enhance the present testing strategies, both for time effectiveness yet as for economical and reliable final product that not solely meets the required necessities however also provides with most operational potency.

Automated code testing is that the best thanks to increase the effectiveness, potency and coverage of code testing and Se could be a framework contains of the many tools used for testing internet applications. With the assistance of the case study, we analyze and notice the testing of we have a tendency tolan internet an online application mistreatment automation testing tool "Selenium IDE". Using this approach, take a look at cases square measure mechanically recorded in background whereas tester is getting into the information in a very internet application screen and these take a look at cases square measure reusable and best suited within the Regression Testing setting.

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