Test Case Generation Using Mindmaps
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Need for Quicker Test Case Generation

One of the significant challenges faced in the software testing industry today is that test cases are not generated quickly enough as compared to development builds being deployed. Prior to identifying a faster test case generation process, let us gather insights into why companies have frequent releases.

Organizations continuously upgrade their applications and innovate to stay competitive, deliver quickly, and seamlessly enhance the customer experience. Business demands vary across geographies and seasons. For example, a retail application might have a new feature added to aid faster checkout/showcase promotions during the holiday season. Similarly, a telecom service provider would highlight the daily special offers as adverts or pop-ups in their mobile app by modifying the user interface of their application. These types of requirements push organizations to have frequent releases to their applications. With agile development endorsed more than ever, organizations request their developers to get their code released in small, safe, and incremental steps without affecting the overall quality. Current technical trends in development suggest version control, continuous integration, and automated trunk-based development. In addition to this, technology coupled with latest enhancements has simplified the code deployment process further. Thus there is a definite need to enhance the rate of test case development. Hence, the typical challenge lies in the fact that the surge in the test case development rate should not compromise quality in this process.

Considering the diverse solutions currently available in the market, we believe that leveraging Mindmaps as a source for test case creation can enhance the quality and speed of test case generation as well.

What are Mindmaps?

Mindmaps are schematic diagrams offering a holistic visual representation that is easily understandable across various stakeholders. Mindmaps are incredibly adaptable, easy to create/update, visually driven, and depict a free flow of ideas. Mindmaps usually do not follow a set pattern, standards, or rules. Hence, the user can go about utilizing the Mindmaps in any manner which he or she deems beneficial. This solution finds minimal resistance from various user groups to start leveraging Mindmaps in their daily routine.

Utilizing Mindmaps as a Test Case Generation Utility

Mindmaps can also be effectively used to create test cases. User-defined configurable keywords can be used within Mindmap nodes to represent test cases. The nodes are then linked/related with each other to depict their dependent entities such as test data and expected results.

Some sample critical items required to create a test case Mindmap are the requirements, test scenario description, test case description, test data description, test step description, and expected step result. Using Mindmaps, we can effectively establish a clear relation of each test case with its scenarios/requirements and easily track any updates. This approach is more beneficial in comparison to techniques such as creating scenario matrix and Critical to Quality (CTQ) high-level scenario documents. The methods mentioned earlier does not come close to giving an overall representation like Mindmaps.
Let us consider an example of a retail shopping site utilizing Mindmaps as a test case generation utility. The map was created using the FreeMind Mindmap tool. We cover two use cases, successful and failed login in the below Mindmap. The various steps to perform the scenario, the testing prerequisites and test data are facilitated logically in the Mindmap. This scenario is a typical use case for testing.

Similarly, there could be many more use cases that could be added to this Mindmap to cover various other functionalities. These scenarios are formed quickly in a Mindmap. However, using a conventional utility like a Microsoft Excel sheet could seem tedious especially, when there are modifications required in an existing use case flow. Going by the world the way is embracing the Agile model of development, we should brace ourselves for lots of such scenarios. Thus Mindmaps could prove to be extremely handy in such situations.

Converting Mindmaps to Test Cases

We have many open-source software solutions that aid in the creation of Mindmaps namely, XMind and FreeMind; most of the software follow a similar approach towards Mindmap development. Having understood how a use case is depicted using a Mindmap, let us look at means of converting them automatically into a test case in a standard template.

Mindmaps are a highly efficient approach to test case development. However, there could be challenges when we fit the test cases across different workstreams in a project ecosystem. An approach/utility to convert the Mindmap to test cases is thus an essential commodity.

Mindmaps must be converted into a universal format. The below diagram highlights the process involved in the Mindmap conversion to test cases.
The content in the Mindmap should be read by a conversion processing engine, segregated into various entities and generated as an output in accordance with details in a test case template. There should also be provisioning to facilitate test data externalization through test data management streams and also parameterization of the test case using data sources. The configuration based on which the Mindmap to test case processing is performed should also be made customizable through an intuitive user interface. This feature would enhance the utilization of this concept across various domains/projects. Post test case generation and Mindmaps processing, the user should also have the flexibility of exporting the generated test cases to a local system. There should also be provision to export the generated test cases to a 3rd party test management tools, preferably using product exposed APIs for better coverage. Additionally, the utility should also possess capabilities to establish a Requirement Traceability Matrix (RTM) between the test cases generated from the Mindmap with the requirements/user stories in agile tools such as JIRA.

We could also look at possibilities where pre-developed Mindmaps covering key business processes/functions across various domains is readied in advance to assist in getting a head start to the test creation process. By utilizing this feature, a complete or rather a more detailed Mindmap can be generated by just making minimal updates to the base domain-specific Mindmap.

The key benefits of leveraging Mindmaps for test case generation are summarized below.

- Facilitates quick development of test cases from Mindmaps
- Auto-establish RTM with data loaded in key test management tools to ensure proper test coverage
- Reduce test case maintenance effort as it is easier to modify diagrams rather than test cases

Considering the above points, we believe, Mindmaps are of great help to efficiently aid rapid test case creation while meeting required standards across projects and domains.

**References**

Using Mind Mapping to Design Test Cases - W. Eric Wong, Department of Computer Science, The University of Texas at Dallas
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