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Assignment 3.3

 Automation testing plays a crucial role in the development process. When developing software, one should consider the automation pyramid introduced by Mike Cohon (Francino, 2019). If testing is not done early and often the software, when an error does surface, it will likely be frustrating for the development staff and more challenging to debug.

The test automation pyramid shows how one should maximize automation starting with the unit test at the lowest level of the pyramid, service level testing in the middle and user interface testing is at the top of the pyramid (Francino, 2019). This is the*ideal testing pyramid* and is used in the modern agile approach. Unit testing is fast and reliable. The service layer allows testing of the business logic at the API level. At the top level, you have the slower more difficult to maintain UI testing. 

The foundation of the test automation pyramid is unit test automation. This is an essential part of writing excellent, high-quality code. A unit test validates the smallest pieces of an application and runs separately to the rest of the application (Bowles, 2017). In the unit tests, developers are testing the individual components of the system. Many different tools can be used for test automation. No matter what tool is used, developers should write a majority of the automation tests at the unit test level. These are fast to execute and should be done after every build. Developers can get immediate feedback, and they can troubleshoot when there is a failure. 

The middle layer of the pyramid is the service layer or automated API test layer. In this layer, testing of the business logic is tested without involving the user interface. Testing in this layer, developers can test the inputs and outputs of the API without any issues that the UI can introduce (Francino, 2019). The tests in this layer are slower are more complicated than the UI tests but are more reliable and provide fewer false positives when a test fails. 

The top of the pyramid is the user interface layer. Since the majority of the testing that been done in the bottom and middle layer, there is not much testing that needs to be done in the user interface layer. This allows developers to ensure that the user interface is working correctly. These tests run in the same manner that a user would use the system. The automation test will need to change whenever the user interface changes; however, developers will be able to focus on finding problems with the actual code and not troubleshooting.

 Often companies get into the habit of developing their software starting at the User Interface (UI) level at the end of the development process. This is the preferred testing method of the traditional waterfall approach. The unit tests are skipped in order to reach development milestones quicker, but in the long run, it actually will take more time to reach those milestones due to rework to fix bugs or issues with the code. Skipping the unit tests also turns the testing pyramid upside down and into an ice cream cone where the testing becomes overly dependent on user interface tests (Bowles, 2017). This is the *non-ideal testing pyramid*. This model is primarily used for finding bugs in the software. Testing is also done manually through the user interface (Sheth, 2019). This model is good to use where there is a low overall budget, the requirements are clear and defined, and there are not a lot of changes there are expected. 

By using the bottom-up approach or the automated test pyramid, developers can move through the development process with less risk, stable builds, and more confidence in the software or application.

References

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