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Project: Integration Testing

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Integration Testing

Introduction

The form of testing I will be doing is Integration testing which is a type of software testing. I will be discussing how this testing is implemented, where it would be used and the pros and cons of using this form of testing. It is when individual programming components have been all tested, they then are integrated to create a partial or complete system. The process also involves building the system and then testing it. The difficulty that comes with this form of testing is the localising errors that are discovered in the process. The best way to approach system integration and testing is to always use an incremental approach. There are two main approaches used in integration testing, which are the Top-Down Approach (TDA) and the Bottom-Up Approach (BUA). Each of these methods both have pros and cons to them. There are also other methods as well such as Object Integration testing and it involves use case testing and thread testing. Then there is the Big Bang approach as well which integrates all the modules in one go instead of doing it one by one. The people who perform this form of testing are the developers themselves and/or independent testers.

Implementation

Using one of the two main approaches to implement the Integration test that I will be using is the Top Down Approach. Top down integration is a testing technique used to stimulate of lower level modules that have not been integrated yet. The approach also uses stubs which are the modules that act as temporary replacement for an actual module while also giving the same output as the actual product. Basically, the approach takes place starting from the top then going down following the control flow or architectural structure of the software. The stubs are also used when a software needs to interact with any external system. In terms of a company using this approach to keep in mind is that the main decisions are made at the executive management level and delivered to staff making it easy for quick decision making. The other approach method which is called the Bottom up approach is gaining more popularity due to projects in industries tending to have new challenges that need innovative solutions. In this approach the objectives of the project are determined by the leadership of the organisation, however the team members who will be working on the project can provide input on the project and how each goal can be met. Lists for tasks and timelines for the projects are not finished until after the team members have weighed in. This usually results to more schedules that are realistic and reduces the risk of surprises along the course of the project. Much like stubs that are temporary modules in the Top Down approach, in the Bottom Up approach they use Drivers as temporary modules for testing.

Situations where it would be used

The situation where the top down approach which is the more traditional method of the two approaches mentioned before. This strategy requires all important decisions to be made by a project manager or by senior leaders within an organization. When the project is managed from the top down, the project manager alone completes the project plan and the work breakdown structure. Then team members are assigned tasks that they will be complete and when tasks are due. This approach is very common and is suited to projects in which there are a few unfamiliar tasks and few challenges that are unique to be met. A problem that many organisations have with the top down approach is that it leaves team members demoralized and demotivated due to them having little control over what and how they are expected to do. On the other hand, the Bottom Up Approach is becoming more popular compared to the Top Down approach. This is due to employees being more engaged in projects with the Bottom Up method but as a drawback the initial phases of a project take longer. This is also due to the project manager needing to incorporate the employees’ input. The Bottom Up testing approach takes place as it is called, from the bottom and making its way up.

Advantages and disadvantages of Integration

Pros:

* Provides a systematic technique for assembling software while carrying out tests for errors in the interfacing.
* Doesn’t need to wait until all modules of a system are codded and unit tested. Instead as soon as the relevant modules are available it can begin.
* System Testing includes several techniques such as Top-Down, Bottom-Up, Big Bang and Sandwich approaches.
* Incremental and integration testing is important to verify if the software modules function in unity.
* The app is tested so that it meets the client’s standards set by them and at the same time reassuring the development team that any assumptions they had during testing are correct.

Cons

* Fault localization is very difficult.
* Testing can only start after all modules are designed, testing teams will have less time when executing in the testing phase.
* There are many interfaces that to be tested in this approach, so some tests for interface links can be missed.
* A disadvantage for Top Down Approach is that the basic functionality is tested at the end of the cycle.
* All modules are tested at once, modules that are a high risk critical are not isolated instead they are tested on priority. Modules called peripheral modules that deal with user interfaces are not isolated and are a priority for testing.

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