Introduction

I investigated important elements of software implementation and testing during Week 5 of the Software Engineering course, including test-driven development (TDD), different testing techniques, and the principles of modeling and system requirements. Among the main points was the difference between several testing tiers including unit, integration, and system testing. I also discovered ways to use test-driven implementation concepts to improve code stability and maintainability. Moreover, we looked at test coverage ideas including statement and code coverage and their relevance to software quality assurance. From the modeling perspective, we talked about the idea of a system, the application of issue frameworks, and how to precisely define system objectives and needs. Approaching software development in a structured and test-oriented way has been strongly founded by these ideas.

Difficulties Faced

One issue I experienced was properly appreciating the intricacies between various testing approaches and knowing when to apply each successfully. For example, distinguishing between black-box and white-box testing techniques first created considerable misunderstanding. It was also difficult to know how to balance test coverage with efficient test case design, especially when attempting to guarantee that all logical paths were sufficiently examined. Interpreting problem frames for system modeling also called for more reading since I felt the abstract character of framing issues was less natural than the technical side of unit testing.

Activities Performed

This week's activities included engaging in a discussion post where I selected three essential test case design methods: equivalence partitioning, boundary value analysis, and statement coverage. These methods were explained with examples and justified for their effectiveness in unit testing, especially under time constraints (Pressman & Maxim, 2020). I also completed a programming assignment on the Classic Triangle Testing Problem, where I designed a comprehensive set of test cases to validate the classification of triangle types. The assignment applied both equivalence partitioning and boundary value analysis, further reinforcing those concepts in practice. Lastly, I took the self-quiz, which tested my understanding of test-driven development, types of testing, and system modeling principles.

Conclusion

This week has significantly deepened my understanding of how deliberate test planning improves software quality. The ability to classify and justify test cases based on expected input ranges and structural logic was particularly valuable. I now better appreciate how TDD promotes robust and maintainable code by embedding testing into the development process. These skills are directly transferable to real-world development, where quality assurance and system reliability are non-negotiable (Sommerville, 2016).

References:

Pressman, R. S., & Maxim, B. R. (2020). *Software Engineering: A Practitioner's Approach* (9th ed.). McGraw-Hill Education. https://www.mheducation.com/highered/product/Software-Engineering-A-Practitioners-Approach-Pressman.html

Sommerville, I. (2016). *Software Engineering* (10th ed.). Pearson Education. https://www.pearson.com/en-us/subject-catalog/p/software-engineering/P200000003258/9780137503148

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