

Assignment 2: End-to-End Testing Strategy and Implementation

Objective:

Students will design and implement a comprehensive testing strategy that covers unit testing, integration testing, and validation. They will use the knowledge gained from the readings and videos to ensure their approach is robust, maintainable, and aligned with best practices.

Instructions:

1. Project

Develop a simple to-do list application where users can:

- **Add, update, delete, and mark tasks as completed.**
- **Categorize tasks into different lists.**
- **Set deadlines for tasks.**
- **Key Components for Testing:**

2. Test Strategy Design:

- Create a test strategy that includes unit tests, integration tests, and specification-based tests.
- Discuss how each type of test contributes to the overall quality of the software.

3. Implementation:

- Implement the test strategy using one of the frameworks (**NUnit, XUnit, MSTest**) Or Equivalent in your chosen language.
- Write a minimum of:
 - Five unit tests that answer the five key questions every unit test should answer.
 - Two integration tests to ensure different components interact correctly.
 - One specification-based test.

4. Use of Test Doubles:

- Incorporate test doubles where necessary, based on the principles discussed by Martin Fowler.
- Clearly explain why and how you used each type of test double.

5. Validation through Mutation Testing:

- Apply **mutation testing** to validate the effectiveness of your test suite.
- Provide a detailed analysis of the mutation testing results and how they informed your testing process.

6. Verification vs. Validation:

- Reflect on the distinction between verification and validation as outlined in the Plutora article.
- Ensure your tests address both aspects, and document how each is covered.

7. Software Quality Reflection:

- Read the article by Peter Morlion and evaluate your test strategy in the context of software quality.
- Reflect on how your testing approach could be improved to better ensure quality.

8. Discussion on Test Categories:

- Briefly discuss the test categories as outlined by Martin Fowler and classify the tests you have implemented accordingly.

Deliverables:

- A comprehensive test strategy document.
- The test suite code with annotations and explanations.
- 1 page reflection and discussion document.