Terry Christopher Johnson Jr

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SNHU-CS405

Module 4: Unit Testing Assignment

This assignment involved developing comprehensive unit tests for a C++ Collection class using the Google Test framework. The primary objective was to rigorously evaluate the robustness and correctness of the Collection’s functionality through a systematic approach incorporating both positive and negative test cases. Key aspects of the implementation included organizing tests through the use of Google Test fixtures (TEST\_F), along with leveraging SetUp and TearDown methods to establish consistent testing environments. Furthermore, various assertion macros such as ASSERT\_TRUE, EXPECT\_EQ, and EXPECT\_THROW were employed to enhance the reliability of the testing outcomes. The project emphasized the importance of C++ best practices, notably integrating dynamic memory management with std::unique\_ptr for the Collection objects used in the tests, as well as adopting clear and descriptive naming conventions for tests to enhance code readability and maintainability.

A substantial portion of the assignment was dedicated to troubleshooting persistent compilation and linking issues encountered with the Google Test framework within the Visual Studio development environment. Initial attempts to build the project resulted in a myriad of error messages related to 'std::tr1', reflecting deprecation warnings that were being interpreted as errors by the modern C++ compiler. This issue was rectified by explicitly adding warning number 4996 to the "Disable Specific Warnings" setting within the project's C/C++ advanced properties. Subsequent to this resolution, the project faced a critical linking error, specifically denoted as LINK: fatal error, stating the inability to open the file 'googletest\_v140.lib'. Further investigation revealed that the initially installed NuGet package, googletest version 1.8.3, was flawed, as it provided an incorrectly named library (googletest\_v141.lib) and failed to include the essential gtest\_main.lib.

The ultimate remediation of the linking error involved a multi-faceted approach, which comprised the complete uninstallation of the defective GoogleTest 1.8.3 package. This was succeeded by the installation of the Microsoft-maintained Microsoft.googletest.v140.windesktop.msvcstl.static.rt-dyn NuGet package, specifically engineered for optimal compatibility with Visual Studio's v140 toolset. Additionally, it was imperative to clear all previous manual entries in the project's Linker properties, specifically in the Additional Dependencies and Additional Library Directories sections, to facilitate the automatic configuration of the necessary paths and library names by the new NuGet package. Verifying that the C/C++ Runtime Library was set to Multi-threaded Debug DLL (/MDd) was also essential to ensure compatibility. These concerted efforts culminated in a successful build, resulting in the successful execution of all 15 unit tests within the Test Explorer..

A screenshot of a computer

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