

Exercise 4 - Performing Runtime Error Detection on Unit Tests

To perform runtime error detection during unit test execution:

1. Generate test cases using the built-in "Generate Unit Tests" Test Configuration.
 - a. In the project tree, select the **Sensor** project as the test scope.
 - b. Choose **Parasoft> Test Using> Builtin > Unit Testing > Generate Unit Tests**.
2. Create a 'Run Unit Tests with Memory Monitoring' Test Configuration as follows.
 - a. Open the Test Configurations dialog by choosing **Parasoft> Test Configurations**.
 - b. Right-click the **Built-in> Unit Testing> Run Unit Tests with Memory Monitoring** configuration, then choose **Duplicate** from the shortcut menu. The configuration will be copied to the **User-defined** category.
 - c. Rename configuration to "Run Unit Tests with Memory Monitoring (project scope)."
 - d. Click **Apply** to apply the changes made, then click **Close** to close the Test Configurations window.
3. Run the application with runtime error detection:
 - a. In the project tree, select **Sensor** project as the test scope.
 - b. Choose **Parasoft> Test Using> User-Defined> Run Unit Tests with Memory Monitoring (project scope)**.
4. Review the results in the **Test Progress** view and **Quality Tasks** view.

The screenshot displays the Parasoft Test Configuration interface. On the left, the 'Test Progress' view shows a completed test run with 11/29 tests succeeded and 18 failed. The 'Execution' section provides a detailed breakdown of test outcomes, including 29 executed test cases, 11 passed, 18 failed, and 0 skipped. It also lists 3 runtime exceptions, 0 execution problems, 0 assertion failures, and 19 runtime error detection violations. Coverage is reported as 83% for 35/42 executable lines. On the right, the 'Quality Tasks' view shows 41 test results with 0 code review. The tasks are categorized by memory-related errors: 'Do not access memory using null pointer (RUN-MEM-NULL-1)', 'Do not access memory using out of range pointer (RUN-MEM-RANGE-1)', and 'Do not use free on a null pointer (RUN-MEM-FREENULL-1)'. Specific violations are listed with their line numbers and file paths, such as '[Line 50] Reading array out of range [Index used: -1, Valid range: 0 thru 2 (inclusive)]' in 'Sensor/Sensor/Source Files/sensor.c(45)'.