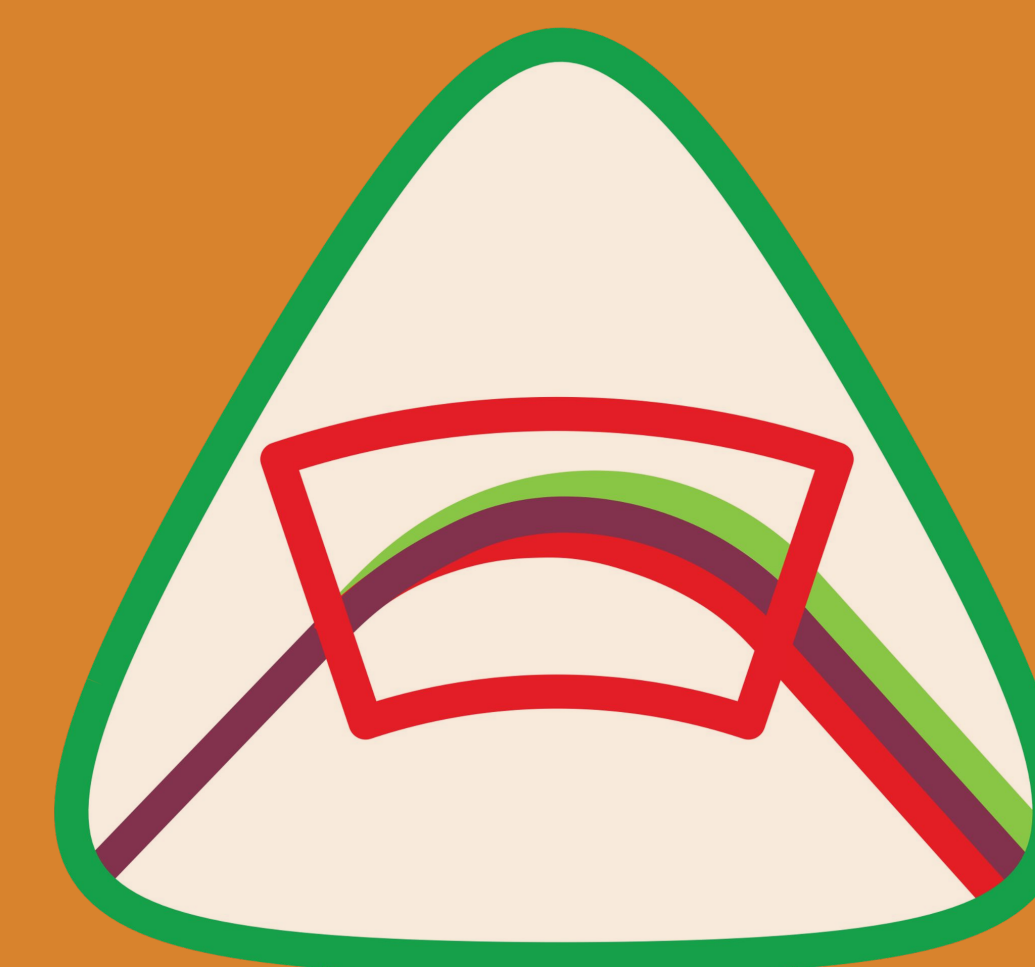


# Tripoli Test Cases: Designing Integration Tests to Ensure Proper Functionality

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## Abstract

Tripoli imports raw mass spectrometer data and creates reports based on the calculated results from the given analysis. Test cases ensure software quality systematically within Tripoli. When the Report Builder function was added, there were no current test cases that verified that each component functioned as expected when creating a report. This research depicts the process of designing an integration test case for the generation of reports in Tripoli. The original data files used were duplicated into Tripoli's test environment resources. Reports were manually generated based on each data file, verified for accuracy, and then stored in Tripoli's test environment to use as oracles. Integration tests were designed to create a report from each of a set of data files and compare it to our established oracles. The test cases will verify that each component of Tripoli functions as expected when improvements or modifications are made in the future.

## Background

Tripoli imports raw mass spectrometer data files and supports interactive review and archiving of isotopic data. Tripoli facilitates visualization of temporal trends and scatter during measurement, statistically rigorous filtering of data, and calculation of statistical parameters. To ensure software quality and integrity Tripoli uses Unit and Integration tests throughout the program. These tests reliably tell the developers if a change that was made in development would cause an error in production. Whenever a new component is added to Tripoli, a unit test is developed alongside. When enough components are added, an integration test is developed to test the relationship between the components and make sure that they run accurately. The newest component that was added, the Research Builder, required the need for a new integration test to be made.

## Research Questions

- How can I generate a report from the test environment?
- How can I design a test function that can be used for every data file?

## Conclusion

Robustly designed test integration test cases that successfully check results against verified results from 45 different data files.

## Materials and Methods

The data used to create the reports was a folder full of results from a Mass Spectrometer. It consisted of different file types and sizes, but would result in the same report structure.

Study How the Runtime Generates a Report



Replicate the Generation in the Test Environment



Create Oracles (Expected Results) for every Data File



Design Test Functions for Full, Redux, and Short Reports



Verify that Functions Work



## Links



Tripoli Github



CIRDLES Website



Tripoli Website

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