Our team is designing and building an automated testing framework by writing a script using Bash that will be called from the Linux terminal. The framework is going to test 5 methods from the open-source project STEM (Spatio-Temporal Epidemiological Modeler) written in Java. The 5 methods we are testing are: gcd, lcm, argMin, argMax, and approxEqual. They all come from the MathOps.java library in STEM. In total, we have developed 5 test cases for each method for a total of 25 test cases.

The first method we created test cases for was gcd (greatest common divisor). This method takes in 2 integers as arguments and calculates the greatest common divisor from the 2 integers. The inputs for the 5 test cases we have developed for the gcd method are: (30, 12), (20, 20), (0, 50), (2147483647, 5), and (-10, 17). These test cases were chosen by coming up with partitions for gcd and then creating a test case from each partition in order to test gcd as completely as possible. We then followed a similar process to come up with test cases for each of the other 4 methods we're testing.

We have also created a driver for each of the 5 methods we are testing as part of our automated testing framework. Our script references each test case file, determines the appropriate driver to use based on the driver specified in that file, then runs that driver with the arguments also specified in the file. After running each of the test cases using the appropriate driver and storing the results in a variable, the script generates a testing report organized using a table in the form of an HTML document displaying the results of the tests.

One problem we ran into was trying to create test cases for the sumLogs method. It's unclear exactly what the sumLogs method does so we had to switch from testing sumLogs to testing approxEqual. The only way we can tell what it's doing is by tracing the algorithm. There isn't any way to come up with test cases other than by looking at the algorithm to see how the method works. From our research, we could not find any similar established mathematical process that we could use to verify the correctness of sumLogs. For this reason, we have switched to using approxEqual.

HOW-TO

Step 1: Create test case(s) conforming to the test case template (testCaseTemplate.txt found on repo).
Step 2: Execute runAllTests.sh on Linux terminal.