

STEM Automated Testing Framework

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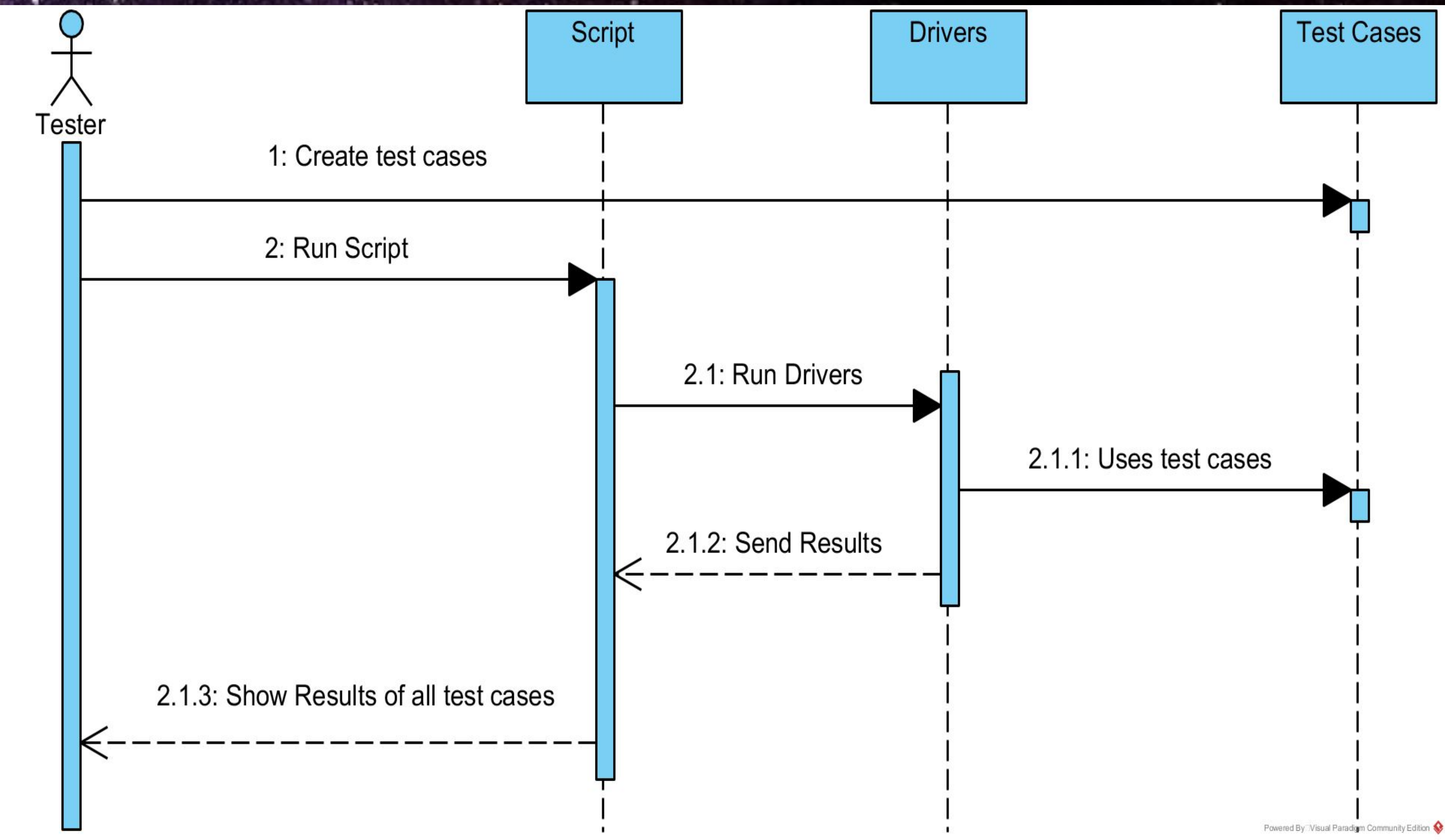
Summary

The purpose of this project was to create an automated testing framework that runs on Linux. Our framework utilizes a bash script that reads test cases and produces results using drivers. The test results are then automatically displayed in an HTML document

How to use the Framework

- Step 1:** Create test case(s) conforming to the test case template (refer to the testCaseTemplate.txt file in the docs directory).
- Step 2:** Execute runAllTests.sh on Linux terminal.
- Step 3:** Enjoy!

Architecture



What is STEM?

The Spatiotemporal Epidemiological Modeler simulates the spread of infectious diseases throughout populations. Scientists and public health officials use STEM to understand and potentially prevent the spread of such diseases.

Sample Test Case

```
1
2
3 1.1
4 The ability to calculate the greatest common divisor between two integers
5 MathOps
6 gcd
7 TestAutomation.testCaseExecutables.GCDDriver
8 30
9 12
10 6
11
```

TEST REPORT							
This report was generated on: Wed Nov 20 13:18:18 EST 2019							
Test Case	Requirement	Component	Method	Driver	Arguments	Oracle	Result PASS/FAIL
1.1	The ability to calculate the greatest common divisor between two integers	MathOps	gcd	TestAutomation.testCaseExecutables.GCDDriver	30, 12	6	6 PASS
1.2	The ability to calculate the greatest common divisor between two integers	MathOps	gcd	TestAutomation.testCaseExecutables.GCDDriver	20, 20	20	20 PASS
1.3	The ability to calculate the greatest common divisor between two integers	MathOps	gcd	TestAutomation.testCaseExecutables.GCDDriver	0, 50	50	50 PASS
1.4	The ability to calculate the greatest common divisor between two integers	MathOps	gcd	TestAutomation.testCaseExecutables.GCDDriver	2147483647, 5	1	1 PASS
1.5	The ability to calculate the greatest common divisor between two integers	MathOps	gcd	TestAutomation.testCaseExecutables.GCDDriver	-10, 17	1	1 PASS
2.1	the ability to find the index of the largest number among given indices of an array	MathOps	argMax	TestAutomation.testCaseExecutables.ArgMaxDriver	[1 2 3 4 5], [0 1 2 3 4]	4	4 PASS
2.2	the ability to find the index of the largest number among given indices of an array	MathOps	argMax	TestAutomation.testCaseExecutables.ArgMaxDriver	[500 4 3 2 1 0], [0 1 2 3 4 5]	0	0 PASS
2.3	the ability to find the index of the largest number among given indices of an array	MathOps	argMax	TestAutomation.testCaseExecutables.ArgMaxDriver	[3 4 1 100 0 -50 80], [6 3 4 1 2 0 5]	3	3 PASS
2.4	the ability to find the index of the largest number among given indices of an array	MathOps	argMax	TestAutomation.testCaseExecutables.ArgMaxDriver	[15 16 17 18 19], []	ERROR	ERROR PASS
2.5	the ability to find the index of the largest number among given indices of an array	MathOps	argMax	TestAutomation.testCaseExecutables.ArgMaxDriver	[-45 13 16 57 11], [4 0 1]	1	1 PASS
3.1	the ability to find the index of the smallest number among given indices of an array	MathOps	argMin	TestAutomation.testCaseExecutables.ArgMinDriver	[3 4 1 100 0 -50 80], [6 3 4 1 2 0 5]	5	5 PASS
3.2	the ability to find the index of the smallest number among given indices of an array	MathOps	argMin	TestAutomation.testCaseExecutables.ArgMinDriver	[-10000000 4 1 100 0 -50 80], [6 3 4 1 2 0 5]	0	0 PASS
3.3	the ability to find the index of the smallest number among given indices of an array	MathOps	argMin	TestAutomation.testCaseExecutables.ArgMinDriver	[-5 -4 -3 -2 -1], [0 1 2 3 4]	0	0 PASS
3.4	the ability to find the index of the smallest number among given indices of an array	MathOps	argMin	TestAutomation.testCaseExecutables.ArgMinDriver	[-1 -2 -3 -4 -5], [0 1 2 3 4]	4	4 PASS
3.5	the ability to find the index of the smallest number among given indices of an array	MathOps	argMin	TestAutomation.testCaseExecutables.ArgMinDriver	[3 4 1 100 0 -50 80], []	ERROR	ERROR PASS
4.1	The ability to calculate the least common multiple between two integers	MathOps	lcm	TestAutomation.testCaseExecutables.LCMDriver	30, 12	60	60 PASS
4.2	The ability to calculate the least common multiple between two integers	MathOps	lcm	TestAutomation.testCaseExecutables.LCMDriver	20, 20	20	20 PASS
4.3	The ability to calculate the least common multiple between two integers	MathOps	lcm	TestAutomation.testCaseExecutables.LCMDriver	0, 50	50	0 FAIL
4.4	The ability to calculate the least common multiple between two integers	MathOps	lcm	TestAutomation.testCaseExecutables.LCMDriver	2147483647, -2147483647	2147483647	0 FAIL
4.5	The ability to calculate the least common multiple between two integers	MathOps	lcm	TestAutomation.testCaseExecutables.LCMDriver	-10, -1000	1000	1000 PASS

Fault Injection

In order to evaluate our test cases, we injected 5 faults into the methods we tested. Before fault injection, 1 out of 25 test cases failed. After fault injection, 17 out of 25 test cases failed. This demonstrates that we covered a wide array of possibilities with our test cases.