

## Chapter 5

For this deliverable we were instructed to inject 5 faults into the code that we are testing, which is functions.py.

- 1) In the div method, we commented out the first if statement that checks if the denominator is zero.
- 2) In the factorial method, we commented out the first if statement which checks if the number is less than zero.
- 3) In the factorial method, we inverted the if statement which checks if n is zero to check if it is not zero.
- 4) In the mod method, we inverted the if statement which checks if y is an integer to check if it is not an integer.
- 5) In the pow method, we changed the casting in the return method to cast to ints, rather than floats.

This resulted in the failure of 11 test cases:

- 1 in div
- 2 in pow
- 4 in factorial
- 4 in mod (1 in mod already fails)

We figured that commenting out the if statements would be the most straightforward means of injecting a fault into the code, so we did that where applicable. However, it is clear that in the case of the mod method, all of the tests that would normally pass would fail, since we inverted the only two return paths in the method. We were also having some issues with the natural log method, so we decided to not alter it. We were having some issues with typecasting as well, but we realized that we were unnecessarily typecasting within the driver so we removed it.

During this deliverable, we also made some improvements and recommended revisions to our code.

We changed the results html to display the requirements for each test case. We also changed the oracle of the last test case in mod so that it now fails, as that is the expected result. Their code throws the error “Can only calculate x modulo integer” when x is a string.

We also changed our drivers so that they no longer do the utility work. We removed all of the unnecessary code in our drivers to be done in runAllTests.py.

Finally, we changed the main driver to run each test driver individually and not load them into a list. At the moment we know we still need to change the file identification to ignore all files that are not the test case jsons, rather than ignoring just the template.