Lab IIB Report

Unit Testing on the Prime Number Generator Method:

* Used to check the individual components of the code for defects and bugs.
* Helps maintain code and ensures easier debugging.
* Ensures unit code reusability in other developments.
* Helps combat code defects earlier which might have been costlier to fix at a higher level.
* Ensures code reliability
* Tested that all possible code input, desired or not was accounted for.
* Tested that all possible code input produced output or error message.

When a test fails, only the last test case needs to be fixed. This saves test costs at a later, higher level stage. Possible Prime Number Generator input (X) impacts how the overall code behaves.

Test Data was split into Possible input values for X, among which the following was accounted for:

* Positive Integers greater than 1
* 0 and 1
* Negative Integers
* Floats
* Boolean
* Complex Numbers
* Data Structures (Lists and Arrays)

PrimeGenerator.py was our initial code. We then wrote test cases to expose defects before fixing them in the test\_PrimeGenerator.py which made the test suite more comprehensive and encouraged careful consideration of test cases.

The test cases, defined in def test() and AlternativeTests class in the test\_PrimeGenerator.py file are solely independent of each other. Code performance was accounted for using the time module, which calculated the running time of the code, it set and ensured limits to exec time are not exceeded.

Integration Testing:

* No interface, so no interface integration testing needed.
* Needed to ensure that individual unit codes can be combined and executed together when unit tests are passed.
* Performed on the integration of PrimeNumbers() and PrimeNumberCheck() methods.
* Check involve checking for successful package integration and importation.
* Essentially checks if the two methods PrimeNumbers() and PrimeNumberCheck() work together without creating new bugs or bugs which have already been fixed.
* The PrimeNumberCheck returns either a true or a false and does not take any parameters.
* It is used to verify whether a number is Prime or not before adding it to the Prime list.
* It does is no way alter the PrimeNumbers() input and is used to make the code more reliable in its output.
* The entire program runs efficiently with the two methods implemented.
* Hence the two methods are well integrated, and no further integration testing is required.

System Testing:

* Verifies that the integrated system meets the specified requirements.
* The system returns as output the prime number list along with its length for all valid input X.
* The system returns as output an error message for every contingent input.