HW0 Writeup

Problem 2

Four tests were implemented.

Test1s test whether the matrix object initialization and element accessing operations are correctly implemented. It is expected that all entries will be initialized to zero values when a triangular matrix object is instantiated. It is also tested whether accessing upper diagonal entries will return value of zero.

Test2 tests whether modification operation of entries are correctly implemented. The lower diagonal entries are modified after the matrix object is instantiated. It is then checked whether the correct values are stored by accessing the entries one by one again.

Test3 tests whether the method to compute l_0 norm is correctly implemented. A lower diagonal matrix object is first instantiated. Then the l_0 norm is computed which should have the expected value of zero. After that, two elements of the matrix are modified to non-zero values. The l_0 norm is computed again which should have the value of two this time.

Test4 tests whether the two error exceptions are thrown correctly. They are respectively error checking of whether the matrix is instantiated to have zero size and whether elements not in the matrix are accessed.

The code passed all the tests.

Problem 3

In this problem, smart pointer can be used to help append different kinds of matrices to the same std::vector. If smart pointers are not used, derived part of object will be lost due to casting operation performed to put the object into the container.

Problem 4

There are 19 points in the range [lb, ub] = [2, 10] out of 1000 points.