Homework 4

**Problem 2]** when a Coord class is used in the Map, Map checks for the ordering of Coord class using the comparison operator (> or <). Since there is no such definition defined for the Coord class, it gives a compilation error.

**Problem 3 e]** the case 3 fails in this case because inside the iterator loop, we are pushing back 5 elements

for (int i = 0; i < 5; i++)

v2.push\_back(MAGIC);

after executing this code when we return to the iterator loop, it gives an error as the iterator p which was earlier pointing to an element of the original list now loses its reference/gets invalidated as new elements have been added to that location in the list. thus after this for loop, p takes a garbage value and gives a read access error.

**Problem 4 b]** void listAll(string path, const Class\* c)

Every class in this problem only have information about its children class and nothing about their parent class. Since we are supposed to print the entire class hierarchy, we need a string parameter to correctly display that hierarchy.

**Problem 5 a]** The time complexity is O(N3) as there are three nested for loops running from 0 to N each. N\*N\*N = N3

**Problem 5 b]** The time complexity is O(N3) as there are three nested for loops running from 0 to N each. In this case the second one goes from 0 to i where i’s max value is N so it also contributes N times to the complexity. N\*N\*N = N3

**Problem 6 a]** m.empty() is O(1), the first m.get() function is O(1) because it only checks the 0th element only. For loop goes through N terms which has a m.get() which also goes through n terms. It also has an .insert() function which is also on O(N). So the complexity of this for loop = O(N\*(N+N)) = O(N2). The last insert is O(N). So the time complexity for this problem is O(N2+N) = O(N2).

**Problem 6 b]** The time complexity of this function is O(N) because of a for loop. This is better than 6 a] as the time complexity is O(N) which is less than that of 6 a] ie O(N2).