Homework 4

2. The Coord class did not implement the < operator so when Set tries to compare Coord objects, it gives a runtime error. The Set will compare its items because it keeps the elements in sorted order.

3b. If we had only one parameter, it would only store the MenuItems below it in the hierarchy or the MenuItems before it in the hierarchy. To print all the paths, you need both of these.

4a. O(N^3) because there are 3 nested for loops that run almost fully. All operations in the loops run in constant time.

4b. O(N^3) because this only divides the number of operations required in half, which does not change the time complexity.

5a. O(N^2) because in the worst case (the loop), for every element in the second set, the get function will take N operations to find the value and the insert function will take N operations so it is a nested for loop.

5b. O(NlogN) because the sorting part takes NlogN. Inserting the values into the vector takes O(n) since there are 2N elements and push\_back is an O(1) function. Erasing N elements is O(N). InsertBefore is an O(1) function so that loop is only O(N). Overall, it is O(NlogN) worst case.

5c. O(N) because it iterates through the elements of the sets at most once.