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Homework 4

2. Sequence<Complex>::insert() inserts the new item such that the list is sorted, using the comparison operator. However, the class Complex does not overload the comparison operator, thus insert() has no way of comparing between Complex objects, resulting in an error.

3b. This is because there is no way for a menu item to know its location in the file system, as all it stores is its own name, but not the path leading to it.

4a. O(N^3), as it has 3 nested for loops, which takes O(N) time each.

4b. O(N^3), as the maximum number of operations of the new for loop is (N-1), so the time complexity is N\*(N-1)\*N = N^3.

5a. O(N), as each for loop will run for a maximum of N times each, and each iteration of the loop will only access the ItemType in the Node twice.

5b. O(N), as each for loop will run for a maximum of N times each. The implementation is same when comparing number of access to ItemType objects. However, when comparing the actual time complexities of the functions, 5b is better, as 5a has an time complexity of O(N^2), due to the get() function inside the for loop having a time complexity of O(N).