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Homework 4

2. Map<Coord, int> uses the Coord class as a key type when trying to compare two types of objects; Coord cannot be passed into the function because the Map template function compares two types of data, and class does not pass as a type of data. You cannot compare classes using the “!=” operator, leading to a compiling error.

3a. The complexity of the algorithm is O(N3). The outer loop (variable i) runs N times; the first inner loop (variable j) runs N times; the second inner loop (variable k) runs N times, for a total of N\*N\*N = N3.

3b. The complexity of the algorithm is O(N3). The outer loop (variable i) runs N times; the first inner loop (variable j) can be replaced by N (running (N-1)/2 times and rounding to N); the second inner loop (variable k) runs N times, for a total of N\*N\*N = N3.

4a. The complexity of the algorithm is O(N2). The “get()” function runs a max of N times and a minimum of 1 times, but Big-O uses worst-case-scenario so it is O(N); the loop function (variable i) runs N times; the rest of the functions called have a Big-O of O(1).

4b. The complexity of the algorithm is O(N). The loop runs a max of N times, looping in a circle until reaching the head pointer, meaning it loops though N items once. This function is more efficient than the original “reassign()” function because the original has a similar loop to reassign each of the values, but it also calls the “get()” function which can loop up to N times, giving the original function a Big-O of O(N2).