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2. Attempting to insert the Coord calls map’s member function find() that uses “p->m\_key != key” to compare two Coord items. This comparison causes a compilation error because the Coord class does not define the binary operator “!=”.

3.b. The second parameter is required in order to implement the function with recursion because each recursive function needs to know the previous string in order to output all the previous base class strings and add the name of the current class to that string output.

4.a.

int i = 0 initialized 1 time

i < N compared N times

i++ incremented N times

numIntermediaries [i][i] = -1 set N times

int j = 0 initialized N times

j < N compared N^2 times

j++ incremented N^2 times

i == j compared N^2 times

numIntermediaries[i][j] = 0 set (N^2)-N times

int k = 0 initialized (N^2)-N times

k < N compared (N^3)-(N^2) times

k++ incremented (N^3)-(N^2) times

k == i compared (N^3)-(N^2) times

k == j compared (N^3)-(N^2) times

hasCommunicatedWith[i][k] checked (N^3)-(N^2)-N times

hasCommunicatedWith[k][j] checked (N^3)-(N^2)-N times

numIntermediaries [i][j]++ incremented < (N^3)-(N^2)-N times

answer: O(N^3)

4.b. The complexity remains O(N^3) because the maximum times that the second loop runs is N-1 times. We can round that to N times. That means we can estimate that the second loop runs about N^2 times just like the original one. The complexity remains the same.

5. The for loop runs N times. The get function and insert function of the result map both call the find function. The find function runs N times and the maximum number of linked list nodes visited each time the function is called is N times. The time complexity is therefore O(N^3).