Shabnam Bahmanyar

Part 2\_

When insert() is called for mpi, the compiler has to call doInsertOrUpdate() first; after that the first thing that happens is a call to find() function.

We get a compiler error because when find() function is called, inside that function we check to see if the two key values are equal to each other using “!=” symbol. Since “==” is not overridden for Coord class, the compiler doesn’t know how to compare two Coord objects.

Part 3b\_

Because it would be impossible for us to keep track of the path inside the recursive calls. In that case, each recursive call could print the name of the class it’s examining, but it wouldn’t be able to print the path that leads to that class.

Part 4a\_

O(N^3)

There are 3 nested for loops; the inner for loop has O(N). The one outside of that loop has O(N^2) because it goes through the inner loop for each of the N element. So the outer loop has O(N^3) with similar reasoning.

Part 4b\_

O(N^3)

The only difference that this makes is that it reduces the constant of proportionality to half of what it was before. But the nested loops themselves haven’t changed so the time complexity would be the same.

Part 5\_

O(N^2)

Inside the for loop the get() function is called, which calls the find() function, which traverses through the linked list to find the needed value, therefore is of order N (because each node is visited once). Since the for loop is repeated N times itself, then the total time complexity is O(N^2).