Problem 3: Recurrences

1. We know that when since this case, we apply the bubble sort with at most 4 elements.

Otherwise,

Because in each recurrence, it recursively call itself with array length

1. we can draw a recursion tree.

地图的截图

描述已自动生成

therefore, the total running time is

1. By Master Theorem, we have a = 3, b = 5/3, k = 0.

And the case here satisfied should be

Therefore, the running time should be

1. Example: {4, 3, 5, 2, 1}

The first recursive call turns it into {3, 4, 5, 2, 1}

The second recursive call turns it into {3, 4, 1, 2, 5}

The last recursive call turns it into {1, 3, 4, 2, 5} which is not a sorted array.