Find_Files_Explanation

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0.1 Find Files Recursively

0.1.1 Design Considerations

This problem required one to search for files with a certain extensions and return all such file extensions path's in a list. Since it's impossible to know the depth of a folder which contains a file, recursion proved to be the best way to solve this particular problem. Whereby, the base case is when the innermost folder has been accessed.

0.1.2 Time and Space complexity

Since the recursion here happens inside a for loop, the time complexity of this problem is $O(2^n)$.

The space complexity depends on the depth of the innermost folder and since one recursive call has a decreasing list data strucuture of maximum number of elements as `n1`. For example in this case the innermost folder is at level 4 and each recursive call can be said to have at most 7 items. Hence the space complexity can be $O(7 * 4)$, hence it is a linear space complexity expressed as $O(m * n1) = O(n)$