

META ALGORITHM MEMOIZING: turn a recursive algorithm into a memoizing algorithm.

Review the existing recursive algorithm definition

Review: What are the arguments to the recursive function? These will be the indexes into the cache.

Review: What is the return type of the function? This will be the type that is stored in the cache.

Think: Are all the arguments integers or are they of mixed type? If mixed, maybe a dictionary or hash table may be best. Will all possible solutions be generated, or only a few specific problems? If all, then an array may be best, if only a few, then maybe a dictionary or hash table should be used.

Write the declaration of the cache data structure. This will be defined once, outside of the recursive function:

Review: The bases cases, these will be unchanged.

Write: immediately after the base cases, add code that checks whether the specific problem has already been solved. Here just index into the cache using the function arguments. If so, then lookup the solution in the cache and return it.

Review: the code that computes the solution from the sub solutions

Write: replace the return statement with an assignment statement that saves the solution computed in the cache indexed by the function arguments.

Write: a final return statement that returns the solution stored in the cache