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Falling Glass

a) Optimal Substructure:

Two scenarios are possible if we drop a glass sheet:

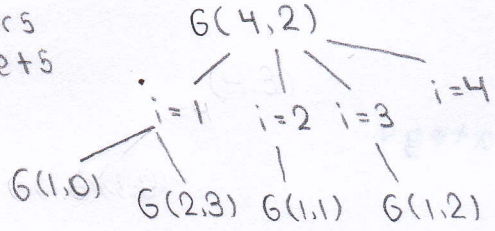
① The glass sheet breaks

② The glass sheet doesn't break

- If the sheet breaks after being dropped from a certain floor, then it would break if dropped from a higher floor too so we should only consider the lower floors (floors-1) with the sheets we have left.
- If the glass sheet survives a fall, then we can consider higher floors as well

In order to determine the minimum number of trials, we must take the maximum of the two cases.

b) 4 floors
2 sheets



d) The number of distinct subproblems with given 4 floors and 2 sheets is 8.

f) In order to avoid overlapping subproblems, memoization can be implemented. Create an array that will store values outside of the recursive function. Modify the recursive function by adding a validation check that determines whether or not a computed value is already in the array. If a value has not yet been computed, then it will be stored in order to avoid repeating the same recursive calls.