CSC301 HW8

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Question 1

The updated prgram is called "knapsack res" and there are three output files called "smallout.txt", "mediumout.txt", and "largeout.txt" which write the output in the format.

Question 2

Space In the file "knapsackCap"'s knapscakCap method, I created two constant dimension arrays "bag" and "m". Both of them are actaully $(W + 1) \times 2$ matrices. So the overall space complexity will be $O(2 * 2 * (W + 1)) = O(4W + 4)$. Since W is the leading term and 4 is a constant, the overall space complexity will be

$$O(W)$$

Time In "knapsackCap" method, first there is one loop for initialization, which takes $O(W)$. Further, there is a nested loop which the outer loop iterates n times, and inner loop iterates W times. The time complexity for this loop is $O(nW)$. Assume that assigning variables and comparision take constant time. The overall time complexity will be $O(W + nW)$, which is same as

$$O(nW)$$

Question 3