

Assignment 2

Task 1

Task 1 has a time complexity of $O(NP)$ where P is the price limit and N is the total number of products. It has a space complexity of $O(N + P)$. This task was completed referencing the week 4 lecture slide 20, The bottom up solution to the knapsack problem.

The time complexity derives from the 2 “for” loops that iterates for the duration of the length of price limit and length of products. At every iteration of the price loop. The best product fit is found and stored in a list that contains every element of every price limit. Solved by referencing previous results from Memo by subtracting the price of the new product with the price limit, using this integer as an index to find the best group of products for the index of the Memo

Task 2

Task 2 has a time complexity of task 1 times an extra item loop which means the time complexity is $O(NP \cdot \text{Item})$ where item is the item limit.

Similarly done to task 1 instead you take into consideration of the item limit and find the best combinations by storing the best product combination with highest profit into the list that holds all product combination for item limit and price limit