

Coding Project I - Dynamic Programming

Knapsack - 10 Points

In this assignment you will use the provided code template to implement a dynamic programming solution to Knapsack. Your solver needs to follow the prescribed guidelines given in the code comments – it should implement a non-recursive dynamic programming solution to the knapsack problem, finding the maximum value possible for a given maximum weight and list of possible items. Note that this solution should not allow for multiple copies of the same item.

Restrictions

- You must complete this assignment on your own; do not share your code with anyone and do not copy code from the Internet.
- Template code is provided and must be used. *Note: the templates are refreshed each semester. Please be sure to use the current version.*
- Your code must be compatible with **python 3.10**.
- No additional libraries may be imported beyond what is provided in the assignment template.
- Do not modify the structure or program-flow of this assignment in any way – only add code where directed to do so by the code comments. Do not add functions, variables, or other code constructions except where told to do so – each individual component of your submission will be tested by the auto-grader when it is submitted.

A Base Case is provided for testing. The successful execution of your algorithm should print the following output to the console using the provided item list file (defaultItems.txt):

```
Results : The following items were chosen :
"banana" Wt : 27 Val : 60
"compass" Wt : 13 Val : 35
"glucose" Wt : 15 Val : 60
"map" Wt : 9 Val : 150
"note-case" Wt : 22 Val : 80
"sandwich" Wt : 50 Val : 160
"socks" Wt : 4 Val : 50
"sunglasses" Wt : 7 Val : 20
"suntan cream" Wt : 11 Val : 70
"water" Wt : 153 Val : 200
"waterproof overclothes" Wt : 43 Val : 75
"waterproof trousers" Wt : 42 Val : 70
For a total value of <1030> and a total weight of [396]
```

Please note that this Base Case is trivial and does not ensure the correctness of your algorithm against all possible input scenarios. Submissions will be assessed against three additional test cases, and individual program elements will also be tested for correctness.

Submission

Submit **ONLY** your code file (**knapsack.py**) to the Gradescope assignment on or before the posted due date. Do not submit a zip file, or any other files but knapsack.py.