# Knapsack Algorithm Assignment

### Enclosed you will find three files.

### File 1: The “knapsack-template.py” file is a Python script that will give you an answer to a given Knapsack Problem by using a simple value based ratio. It will complete large problems quickly, but will not be optimal (or near optimal, in some cases).

### File 2: The "enumerate-knapsack-template.py" file is a Python script that will do complete enumeration of all possible outcomes for the Knapsack Problem. It will find the optimal solution, but it may take a long time to execute.

### File 3: The “knapsack-data-sets.txt” file contains a number of data sets to test your algorithm in the same needed as the format as the template. Note, the first 10 data sets (Initial through Data Set 9) take less than a second to run on Dr. Wilck’s machine using the enumeration algorithm. However, Data Set 10 takes approximately 24 seconds using the enumeration algorithm.

### Your assignment is to create different knapsack algorithms to improve efficiency and not use complete enumeration, but being more systematic. That is, your results should aim to be between File 1 and File 2 in terms of speed versus optimality.

### Submit your final Python file with your preferred algorithm on Blackboard by the deadline – using the same data structure as provided to you in the data sets. It will be graded for accuracy and speed on Dr. Wilck’s machine, and compared against your peers (as defined in the rubric). Also submit your <1 page write-up explaining your approach (which may include figures) to Blackboard by the deadline.

See general rubric on Syllabus.

Assignment 1: Due March 27 by 11:59PM, Knapsack, Category C

What to submit to Blackboard (last submission posted by deadline will be graded):

Two files:

* Python Code
  + Do not use any special packages other than pandas or numpy, just create your own algorithm using lists, loops, functions, etc.
  + Do not change the format of the data, input, etc. I need these files to run without editing on my part when grading.
* Brief (no more than 1 page) description (write-up) of your approach, you may use a flowchart or some other graphic if the helps.