CS 2003 – FA2018
Lab 09 – Due 8:00 pm, Friday, 10/19/18.

This lab is a desktop exercise (no python code required) related to Project 03**.**

Suppose you are an art thief (not a good start) who has broken into an art gallery. All you have to haul out your stolen art is your briefcase which holds only W pounds of art and for every piece of art, you know its weight and its value.

Dataset 2 from Project 03 is as follows:

Items 1, 2, 3, 4, and 5 have weights 1, 2, 5, 6, 7 and value 1, 6, 18, 22, and 28, respectively. Let W = 11.

For this lab, submit a word document or, alternately, a .pdf scan of a handwritten document of the completion of the following array. The array builds a solution for Dataset 2 using W = 11 as the weight limit. Your lab submission should contains a clear representation of your work that completes the array. (i.e. at least show your work for those key computations that result in "improvement changes") .

Dataset 2 from Project 03:
Items 1, 2, 3, 4, and 5 have weights 1, 2, 5, 6, 7 and value 1, 6, 18, 22, and 28, respectively. Let W = 11.

			Weight Limit of Briefcase											
			0	1	2	3	4	5	6	7	8	9	10	11
Items in Briefcase	∅		0	0	0	0	0	0	0	0	0	0	0	0
	{ 1 }		0	1	1	1	1	1	1	1	1	1	1	1
	{ 1, 2 }		0	1	6	7	7	7	7	7	7	7	7	7
	{ 1, 2, 3 }		0	1	6	7	7	18	19	24				
	{ 1, 2, 3, 4 }													
	{ 1, 2, 3, 4, 5 }													

Here is the strategy for completing the array:

The entries in the two-dimensional array contain the best possible value when considering the weight limit given by the entry in the corresponding column heading and the subset of items given by the entry in the corresponding row entry.

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All entries in the "∅" row contain 0 since if I consider only "no items", I will have total value 0 regardless of the weight limit.

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The 0 entry in the "{ 1 }" row contains 0 since if I consider the subset of items given by { 1 } and a weight limit of 0, the best possible value is 0. The subsequent entries in the "{ 1 }" row contain 1 since if I consider the subset of items given by { 1 } and any weight limit of 1 through 11, the best possible value is 1.

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etc, etc etc ..... fill each row from left to right.

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The entry in the "{1, 2, 3}" row and the w = 7 column is the best value I could achieve if I consider the subset of items given by {1, 2, 3} and a weight limit of 7. It is computed as follows:

It is the **better of the following two**:

the best value I could achieve if I consider the subset of items given by {1, 2} and a weight limit of 7

This has already been computed to be **7**.

and

the value I could achieve by adding the value of item { 3 } to the best value achievable with the subset {1, 2} and a weight limit given by 7 decreased by the weight of { 3 }. This can be computed to be:

18 + (the best possible value achievable with the subset {1, 2} and a weight limit of 7 – 5 = 2) =
18 + 6 =
24

Hence the entry in the {1, 2, 3} row and the w = 7 column is 24.