Homework 10 Programming
(Maximum 25 points)
Due 11:59 pm Wednesday April 21, 2021

Submit your Java codes in one file via Blackboard. Refer to the grading guidelines posted on Blackboard to understand how the submitted exercises will be graded.

1. (25) [Knapsack: programming with bookkeeping] Write Java code implementing the knapsack algorithm discussed in class, and run it against a set of items (i's) with values (vi's) and weights (wi's) and a total weight limit (W) given in an input text file. An input text file has the following format:

```
W
1    v1       w1
2    v2       w2
3    v3       w3
…
```

Your program code should output the content of the memoization table $M[0..n][0..W]$ each time a row is filled. Initialize the memorization table with all -1's before filling in. Additionally, at the end, the program should output the maximum total value of the items selected and the optimal set of items selected. Use the "bookkeeping" approach to retrieve the resulting optimal set of items – see the lecture slide on "Knapsack: Finding a Solution" to see what the bookkeeping approach means and implement the backtracking mechanism. See the provided sample input and sample output files for the output format expected of your program code. Your program code will be tested with other test input files as well as this sample input file.

Submit via Blackboard the program source code in one file. Your program should work correctly. In addition, your program code should be neatly organized and well commented.

Last modified: April 8, 2021