Algorithm Analysis Homework 3

Due by 5/18(Wed.)

You are to write a program to solve a 0-1 knapsack problem with following approach.

a. Brute force
b. Greedy
c. Dynamic Programming
d. Branch and bound

As you know, Greedy approach does not provide 0-1 knapsack problem solution. Thus assume it is fractional knapsack problem when you use greedy approach.

Generate benefit value and weight – that are all integer - using random number generator function. The range of benefit value is between $1 and $500 and that of weight is between 1 and 100. And maximum capacity W is

W = (number of items) X 25.

If CPU time exceeds 20 minutes for specific input size, stop running the program. Thus you should check if the running time is over 20 minutes occasionally and go to next case if time is over.

For an output, build a table as follows.

Number of Items	Processing time in seconds / Maximum benefit value			
	Brute force	Greedy	D. P.	B. & B.
10	.23 / 230			
20				
30				
40				
50				
100				
500				
1000				
5000				
10000				

Note

1) Write program in C, not C++ nor Java.
2) If the program does not compile, you will get no point. Make sure that your program runs in visual studio express 2013.
3) Submit one program only, not multiple programs.
4) Output your result on file named 'output.txt'.
5) Follow the output format suggested above.
6) Total running time of program should be within approximately one hour (no more than 75 minutes). If your program does not produce any output in time, you will get no point.