COP3330 Programming Assignment 6

Treasure island

Objectives

1. Practice problem solving with recursion in C++

Project details

This is a programming contest type of problem-solving problem.

You arrive at an island full of treasures. It would have been nice to take all of them, but you can only carry so much weight. You will write a program to help select the treasures so that the total value of the selected treasures is maximized. The input of the problem is the weight that you can carry and a list of treasures, each represented by its weight and value. The input format is specified in the following; all numbers are integers. The output is the maximum value of the treasures that you can take away and the list of items that result in the maximum value. (Note: (1) each item can be either taken or not taken, but not chopped (or partially taken); (2) You should first write a program to compute the maximum value that can be taken away before enumerating each individual item.)

You can assume that the number of items is no more than 42.

Input:

weight\_that\_you\_can\_carry

number\_of\_items

weight value

weight value

weight value

weight value

...

Output:

maximum\_total\_value

weight value (item no.)

weight value (item no.)

....

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Sample input 1:

30

7

28 70

20 5

17 35

15 30

5 15

3 20

10 30

Sample output 1:

85

17 35 (item 2)

3 20 (item 5)

10 30 (item 6)

Sample input 2:

200

42

76 19

44 35

69 81

48 61

55 81

38 66

91 89

62 70

26 90

74 64

49 91

22 90

88 39

25 61

60 15

85 14

100 87

67 28

41 68

1 67

84 95

84 38

59 74

16 97

12 85

27 89

31 60

98 100

60 70

84 74

40 75

57 68

48 39

59 75

93 40

34 59

48 77

2 69

17 7

43 17

58 28

87 69

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Sample output 2:

774

38 66 (item 5)

26 90 (item 8)

22 90 (item 11)

25 61 (item 13)

1 67 (item 19)

16 97 (item 23)

12 85 (item 24)

27 89 (item 25)

31 60 (item 26)

2 69 (item 37)

Submission

The due time for this assignment is July 3 (Wendesday), 2013. 11:59pm.

Tar all of your files for this assignment, which should include your proj6.cpp file, name the tar file yourlastname\_firstinitial\_proj6.tar and submit the tar file in blackboard.

Grading policy

The program must work on linprog. O point for programs with any g++ compiler error on linprog.

* ‘g++ proj6.cpp’ has no compiler error (20 points)
* Program finds maximum value for one item cases (20 points)
* Program finds maximum value for two item cases (20 points)
* Program finds maximum value for all cases (20 points)
* Program finds the maximum value and the correct items (20 points)

Hints

1. Start the project as soon as possible.