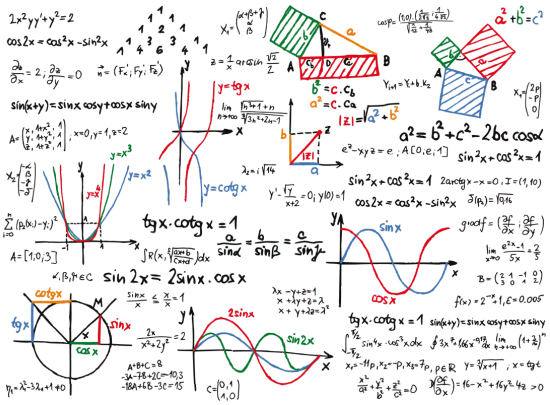
B5 - Mathematics

B-MAT-500

307multigrains

Multigrains and Dantzig's Simplex Method



307multigrains

binary name: 307multigrains
repository name: 307multigrains_*$ACADEMIC_YEAR*
repository rights: ramassage-tek
language: everything working on "the dump"
compilation: when necessary, via Makefile, including re, clean and fclean rules

- Your repository must contain the totality of your source files, but no useless files (binary, temp files, obj files,...).
- All the bonus files (including a potential specific Makefile) should be in a directory named *bonus*.
- Error messages have to be written on the error output, and the program should then exit with the 84 error code (0 if there is no error).

Jean-Eude grows grains: oat, wheat, corn, barley and soy. He uses four different types of fertilizers (F_1, F_2, F_3 et F_4), in the following quantities (per ton of fertilizer in order to produce one unit of grains):

	F_1	F_2	F_3	F_4
oat	1	1	2	0
wheat	0	2	1	0
corn	1	0	0	3
barley	0	1	1	1
soy	2	0	0	2

Keeping in mind that he has limited yearly quantities of each type of fertilizer, he would like to optimize his output according to the grains' prices.

With a smile, you're going to develop a program that will take his fertilizer resources and the prices of each type of grain as parameter. It will display the quantities to produce, as well as the total value of his output.

USAGE

```
Terminal
~/B-MAT-500> ./307multigrains -h
USAGE
    ./307multigrains n1 n2 n3 n4 po pw pc pb ps

DESCRIPTION
    n1      number of tons of fertilizer F1
    n2      number of tons of fertilizer F2
    n3      number of tons of fertilizer F3
    n4      number of tons of fertilizer F4
    po      price of one unit of oat
    pw      price of one unit of wheat
    pc      price of one unit of corn
    pb      price of one unit of barley
    ps      price of one unit of soy
```

SUGGESTED BONUSES

- Additional constraint on the maximum farmable surface
- A graph that simulates the importance of a variable for the grain output

EXAMPLES

```
Terminal
~/B-MAT-500> ./307multigrains 10 100 10 0 200 200 200 200 200
Resources: 10 F1, 100 F2, 10 F3, 0 F4

Oat: 0 units at $200/unit
Wheat: 10.00 units at $200/unit
Corn: 0 units at $200/unit
Barley: 0 units at $200/unit
Soy: 0 units at $200/unit

Total production value: $2000.00
```

```
Terminal
~/B-MAT-500> ./307multigrains 45 41 21 63 198 259 257 231 312
Resources: 45 F1, 41 F2, 21 F3, 63 F4

Oat: 0 units at $198/unit
Wheat: 20.00 units at $259/unit
Corn: 8.50 units at $257/unit
Barley: 1.00 units at $231/unit
Soy: 18.25 units at $312/unit

Total production value: $13289.50
```