B2 - Stumpers

SandPile

Duo Stumper

SandPile

binary name:	sandpile
repository name:	CPE_duostumper_$STUMPERNUMBER_$ACADEMICYEAR
repository rights:	ramassage-tek
language:	C
compilation:	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,...).

- 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).

The $STUMPERNUMBER is always on one digit: 1, 2, …

For this project, the **only** authorized functions are those of the standard `libC`.

The goal of this project is to develop an hour-glass when looked from above.
Let's imagine a rectangular grid, with each square containing grains of sand.
When there are at least four grains of sand in the same square, it becomes unstable.
It will then distribute a grain of sand into each of the 4 neighboring squares, and its own number will decrease by 4.
One collapse can lead to another, which will create a chain reaction:

```
+---+     +---+     +---+     +---+     +---+
|010|     |010|     |021|     |021|     |131|
|222| >   |232| >   |320| >   |330| >   |111|
|233|     |233|     |311|     |311|     |031|
+---+     +---+     +---+     +---+     +---+
```

Your project will take three parameters: a path to the file containing the initial grid, a string containing the characters used to represent the number of grains of sand in a cell and a number of iterations to apply on the supplied grid.

The initial grid should be valid and in a stable configuration. If it's not the case, your program must consider it as an error!

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Your program will display the initial grid after n iterations of following sand (n>=0).

The grains of stand will always stay in the center of the grid (or as close as possible to the center, starting from the top-left corner).

```
~/B-CPE-210> cat -e map.txt
021$
320$
311$
~/B-CPE-210> ./sandpile map.txt "0123" 2
131
111
031
~/B-CPE-210> cat -e map2.txy
acb$
dca$
dbb$
~/B-CPE-210> ./sandpile map2.txt "0123" 2 &>/dev/null; echo $?
84
```