Problem 1: The Matrix: Evaluations

A component of any modern office suite is the spreadsheet. A basic spreadsheet consists of a two-dimensional grid of cells, with each cell containing either:

- an integer in the 0–1000 range,
- a reference to another cell, or
- a sum of multiple cell references.

An example spreadsheet is as follows:

	А	В	С	D	Е	•••
1	C3	1	2	3	4	• • •
2	7	8	9	10	11	•••
3	0	1	166	42	15	•••
4	0	B1+C1	24	234	5	•••
•	:	•	•	•	• • •	•••

Individual spreadsheet cells are referenced first by their column (A–Z) followed by their row (1-100). For example, the fourth column in the third row is referenced as D3, which in the example spreadsheet above has value 42. A spreadsheet's main task is to compute the actual values for all cells in that spreadsheet; this may involve a (possibly recursive) series of lookups and/or additions.

Write a program which, given a spreadsheet containing cell-references and/or sums of cell-references, computes and outputs the actual values associated with all cells in that spreadsheet. Each input file consists of a header line specifying the number of rows followed by the number of columns of the spreadsheet (separated by a whitespace). Every line there-after corresponds to a row in the spreadsheet, each one containing the cell values (separated by whitespace). You may assume that all input files are formatted correctly and that all spreadsheets will be computable (*i.e.*, contain no cell-reference cycles).

Sample input #1 (available as file "test1a.dat"):

3 3 1 2 3 4 5 6 7 8 B1+A3

Sample output #1:

Sample input #2 (available as file "test1b.dat"):

3 3 1 A1+A1 B1+A1 C1+A1 A2+A1 B2+A1 C2+A1 A3+A1 B3+A1

Sample output #2:

Sample input #3 (available as file "test1c.dat"):

4 3 1 C1 A2+C3 A1 5 6 7 8 A2 C2 C2 C2

Sample output #3: