

## Tutorial VII

December 5

**Exercise 1** [*Simple calculator*] Write a very simple computer algebra program which processes commands reading line by line using `fgets` (see the manual page for details). This simple calculator is expected to process only positive integers and only operations with one or two operands are allowed, e.g. `2+3` or `5` are allowed, but `1+2+3` is not. The operators are expected to be binary always (for instance, cases like `+15` are not allowed). In principle, you are requested to allow only one operator: `+`, with obvious meaning.

Your program should be able to handle the following inputs:

- `exit` or `quit` should quit the program;
- `restart` or `reset` should initialize all the variables to 0;
- a *positive integer* number, e.g. `5`, should produce the expected output, i.e. printing out `5` to the screen;
- the operations with *positive integers* should also print out the result (e.g. given `1+3` as input, the output should be `4`);
- allowed variable names are `a`, `b`, ..., `z` (hint: use an array with 26 elements to store the values of the variables);
- `a` must print out the value associated with variable `a`;
- combinations like `a+1`, `3+b` or `a+b` should produce the corresponding output to the screen;
- `a=17` ought to assign to variable `a` the value `17`;
- `a=b` must assign *to* variable `a` the contents of variable `b`;
- `a=7+1`, `a=3+b` or `a=a+b` should assign *to* the variable `a` the result of the right hand side of the `=` symbol.

In case of a syntax error your program should complain, but be able to continue.

Two advices:

- It may be a good idea to remove all the spaces before analyzing the input.

**Important:** think carefully about the strategy/algorithm that you want to implement before you start coding. If you don't analyze the problem in advance, it will be much more difficult to succeed.

**Optional (★):** Extend your program such that the multiplication of two positive integer numbers is allowed.

**Optional (★★):** Modify your code to allow operations with non-integer positive numbers like `1.23`. Include the division operator `/`.

**Optional (★★★):** Add negative numbers to the game.