

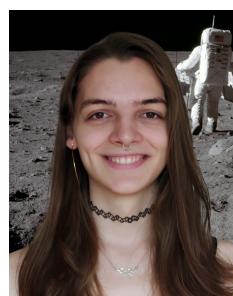
Assignment 1

The beginning of Yet Another introductory programming course

DTU Compute
Technical University of Denmark
02102 Introductory Programming
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Group 32

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Polly

As I am the only member of the group, all the work was done by me.

1 Remember

This program writes 3 lines, where the first and last are identical. I chose to use a local variable to store the repeated line, as to not repeat myself in code. This follows normal DRY practices. I didn't write any comments as the extremely simple and straight-forward nature of the program does not require it. The only potential pitfall in the program is the escape character '\'. The string `firstLine` contains many escaped characters and can be hard to read. As far as I can tell Java has no raw string literal as opposed to other languages like Rust¹, so I am unsure if you could improve this. This program has no input, so we simply run it once to check that it prints the correct output.

```
$ javac Remember.java && java Remember
Use "\\\" to obtain a 'backslash' character.
Remember:
Use "\\\" to obtain a 'backslash' character.
```

It prints what it should.

2 UltimateQuestion

We are restricted to modifying one line of code in order to make our program print 42. To solve this problem, we have to figure out what value x should have. We know that multiplication and division have a higher priority than addition, and that in cases of equal priority operations are executed left to right. This means that $a/b \cdot c = (a/b) \cdot c$. Additionally, integer division rounds towards zero. Using this knowledge we figure out what x should be.

$$\begin{aligned} 1 + 3 + x + x + x + x + x + 5/4 \cdot 2 &= 42 \\ 1 + 3 + x + x + x + x + x + 1 \cdot 2 &= 42 \\ 1 + 3 + x + x + x + x + x + 2 &= 42 \\ 5x + 6 &= 42 \\ 5x &= 36 \\ x &= \frac{36}{5} = 7.2 \end{aligned}$$

Since 7.2 is not a whole number, we must use a float. Luckily,² Java let's you mix integers and floating point numbers, however this results in our program printing 42.0 instead of 42. Solving this would require modifying line 6 which I feel goes against the spirit of the assignment so I settle 42.0. To check correctness, we simply run the program once as it has no input.

```
$ javac UltimateQuestion.java && java UltimateQuestion
42.0
```

It prints 42.0 as expected.

¹<https://doc.rust-lang.org/book/appendix-02-operators.html#non-operator-symbols>

²This is subjective.

LINES	Output
0	
1	+--
2	++--
3	++--
	++--

Table 1: Output of UsingClassConstant depending on the value of LINES.

3 UsingClassConstant

We must modify UsingClassConstant so that it prints a grid of plus and minus signs with width and height proportional to a constant, but using as few modifications as possible. To change the behavior of the program I moved the `println` call into the outer for loop. The structure of the result program is such that the inner loop handles the contents of the individual line, and the outer loop finishes of the line. This is a very typical way to structure 2 dimensional concepts such as the grid of + and -. To test the functionality of the program I modified the value of `LINES`, compiled the program and then ran it. We can see in table 1 the values I tested and their output.