

1. Ex. 1: Add to the INTEXP interpreter the integer numbers $(-1, -2, \dots)$ and the following operators:

- $-$ (subtraction), e.g., $(-7 - -2)$,
- $/$ (integer division), e.g., $(-9 / 3)$,
- mod (remainder of an integer division), e.g., $(-7 \text{ mod } -2)$

2. Ex. 2: Extend again the INTEXP interpreter to allow the use of identifiers (like you do in mathematical expressions). For instance,

$(a * (b + 5))$

is a mathematical expression with two identifiers a and b . We allow the user to employ all the identifiers in the set $\{a, b, \dots, z\}^+$, i.e., all the lowercase strings over the english alphabet.

A program in this new language consists of:

- a finite sequence of identifier initializations, e.g., $a = (5 + 4); b = 3; c = ((5 * a) + 5); \dots;$
- a single mathematical expression with identifiers.

For instance, the following is a valid program:

```
base = 5;
height = (base * 2);

(base * height)
```

We assume that all the used but non-initialized identifiers evaluate to 0. The output of the program is the value of the final expression.