

Script generated by TTT

Title: Petter: Compiler Construction (02.07.2020)  
-52: Arithmetic Expressions Example

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### Applying Translation Schema for Expressions

Suppose the following function is given:

```
void f(void) {
  int x, y, z;
  x = y+z*3;
}
```

- Let  $\rho = \{x \mapsto 1, y \mapsto 2, z \mapsto 3\}$  be the address environment.
- Let  $R_4$  be the first free register, that is,  $i = 4$ .

$$\text{code}^4 \ x=y+z*3 \ \rho = \text{code}_R^4 \ y+z*3 \ \rho$$

$$\text{move } R_1 \ R_4$$

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$$\text{code}_R^4 \ y+z*3 \ \rho = \text{move } R_4 \ R_2$$

$$\text{code}_R^5 \ z*3 \ \rho$$

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$$\text{code}_R^5 \ z*3 \ \rho = \text{move } R_5 \ R_3$$

$$\text{code}_R^6 \ 3 \ \rho$$

$$\text{mul } R_3 \ R_5 \ R_6$$

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 $\text{code}_R^6 \ 3 \ \rho = \text{mul } R_5 \ R_5 \ R_6$

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→ the assignment `x=y+z*3` is translated as

`move R4 R2; move R5 R3; loadc R6 3; mul R5 R5 R6; add R4 R4 R5; move R1 R4`