

## Script generated by TTT

Title: Petter: Compiler Construction (02.07.2020)  
- 59: Function Definitions

Date: Fri Jul 03 14:12:19 CEST 2020

Duration: 09:57 min

Pages: 9

## Result of a Function

The global register set is also used to communicate the result value of a function:

$$\text{code}^i \text{ return } e \rho = \begin{array}{l} \text{code}_{\mathbb{R}}^i e \rho \\ \text{move } R_0 R_i \\ \text{return} \end{array}$$

alternative without result value:

$$\text{code}^i \text{ return } \rho = \boxed{\text{return}}$$

45/49

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45/49

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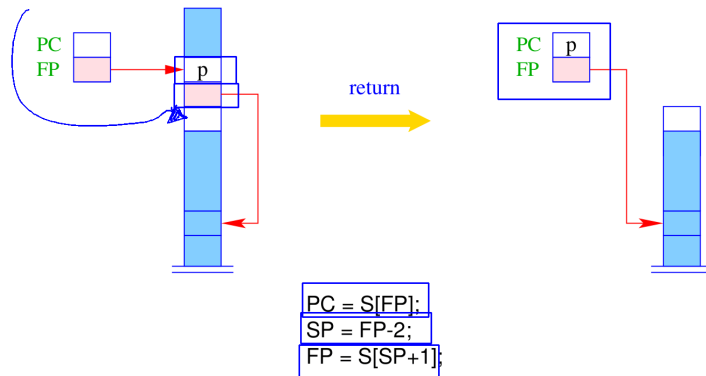
*global* registers are otherwise not used inside a function body:

- advantage: at any point in the body another function can be called without backing up *global* registers
- disadvantage: on entering a function, all *global* registers must be saved

45/49

## Return from a Function

The instruction `return` relinquishes control of the current stack frame, that is, it restores `PC` and `FP`.



46/49

## Translation of Functions

The translation of a function is thus defined as follows:

$$\text{code}^l \text{tr } f(\text{args})\{\text{decls } ss\} \rho = \begin{array}{l} \text{move } R_{l+1} \ R_{-1} \\ \vdots \\ \text{move } R_{l+n} \ R_{-n} \\ \text{code}^{l+n+1} \ ss \ \rho' \\ \text{return} \end{array}$$

Assumptions:

47/49

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47/49

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47/49

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- the parameters of the function are in  $R_{-1}, \dots, R_{-n}$
- $\rho'$  is obtained by extending  $\rho$  with the bindings in *decls* and the function parameters *args*
- **return** is not always necessary

47/49

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Are the **move** instructions always necessary?

47/49