Script generated by TTT

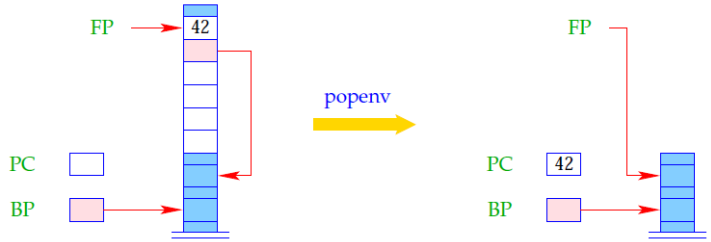
Title: Seidl: Virtual_Machines (10.07.2012)

Date: Tue Jul 10 15:19:33 CEST 2012

Duration: 12:22 min

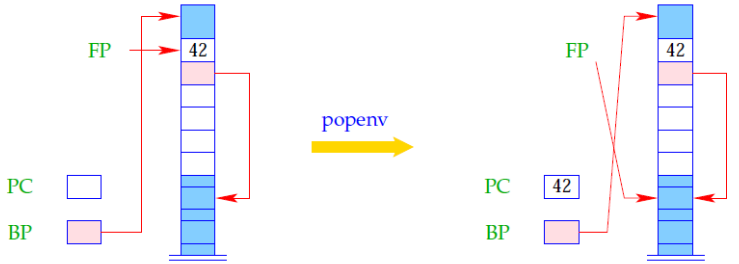
Pages: 9

The instruction popenv restores the registers FP and PC and possibly pops the stack frame:




```
if (FP > BP) SP = FP - 6;
PC = posCont;
FP = FPold;
```

Warning: popenv may fail to de-allocate the frame !!!




```
if (FP > BP) SP = FP - 6;
PC = posCont;
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```

If popping the stack frame fails, new data are allocated on top of the stack. When returning to the frame, the locals still can be accessed through the FP :-))

33 Queries and Programs

The translation of a program: $p \equiv rr_1 \ldots rr_h ? g$
consists of:

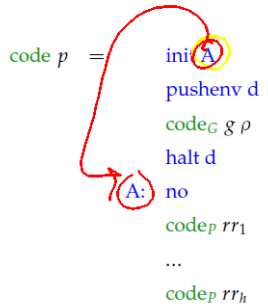
- an instruction no for failure;
- code for evaluating the query g;
- code for the predicate definitions rr_i.

Preceding query evaluation:

$\Longrightarrow$ initialization of registers
$\Longrightarrow$ allocation of space for the globals

Succeeding query evaluation:

$\Longrightarrow$ returning the values of globals

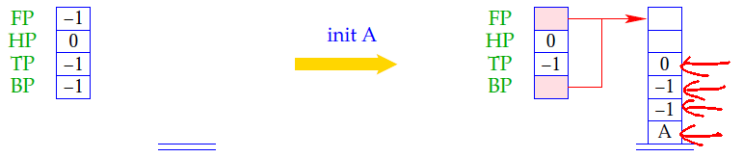


where $free(g) = \{X_1, \ldots, X_d\}$ and ρ is given by $\rho\ X_i = i$.

The instruction halt d ...

- ... terminates the program execution;
- ... returns the bindings of the d globals;
- ... causes backtracking — if demanded by the user :-)

The instruction init A is defined by:




```
BP = FP = SP = 5;
S[0] = A;
S[1] = S[2] = -1;
S[3] = 0;
BP = FP;
```

At address "A" for a failing goal we have placed the instruction no for printing no to the standard output and halt :-)

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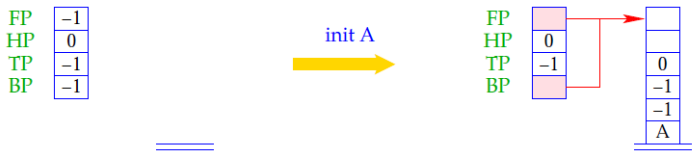


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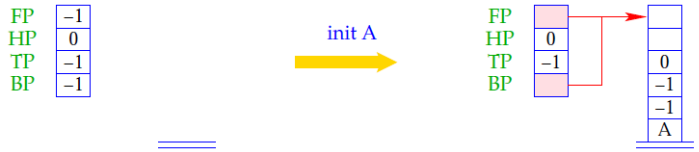

BP = FP = SP = 5;
S[0] = A;
S[1] = S[2] = -1;
S[3] = 0;
BP = FP;

At address "A" for a failing goal we have placed the instruction no for printing no to the standard output and halt :-)

The Final Example:

$t(X) \leftarrow \bar{X} = b$ $\quad$ $q(X) \leftarrow s(\bar{X})$ $\quad$ $s(X) \leftarrow \bar{X} = a$

$p \leftarrow q(X), t(\bar{X})$ $\quad$ $s(X) \leftarrow t(\bar{X})$ $\quad$? p

The translation yields:

```
        init N          popenv      q/1:  pushenv 1   E:  pushenv 1
        pushenv 0  p/0: pushenv 1         mark D          mark G
        mark A          mark B            putref 1        putref 1
        call p/0        putvar 1          call s/1        call t/1
A:      halt 0          call q/1    D:    popenv      G:  popenv
N:      no         B:   mark C      s/1:  setbtp      F:  pushenv 1
t/1:    pushenv 1       putref 1          try E           putref 1
        putref 1        call t/1          delbtp          uatom a
        uatom b    C:   popenv            jump F          popenv
```