

Script generated by TTT

Title: Petter: Virtual Machines (30.04.2019)

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Duration: 86:24 min

Pages: 4

Remark

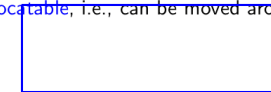
- The jump table could be placed directly after the code for the Macro check. This would save a few unconditional jumps. However, it may require to search the switch-statement twice.
- If the table starts with u instead of 0, we have to decrease the R-value of e by u before using it as an index.
- If all potential values of e are definitely in the interval $[0, k]$, the macro check is not needed.

For ease of comprehension, we use [symbolic jump targets](#). They will later be replaced by absolute addresses.

Instead of absolute code addresses, one could generate [relative](#) addresses, i.e., relative to the actual PC.

Advantages

- [smaller addresses](#) suffice most of the time;
- the code becomes [relocatable](#), i.e., can be moved around in memory.



```
code_L e1[e2] ρ = code_R e1 ρ
                  code_R e2 ρ
                  load |t|
                  mul
                  add
```

Remark

- In C, an array is a [pointer](#). A declared array a is a [pointer-constant](#), whose R-value is the start address of the array.
- Formally, we define for an array e : $\text{code}_R e \rho = \text{code}_L e \rho$
- In C, the following are equivalent (as L-values):

$2[a]$ $a[2]$ $*(a + 2)$

Normalization: Array names and expressions evaluating to arrays occur in front of index brackets, index expressions inside the index brackets.

5.2 Structures

In **Modula** and **Pascal**, structures are called **Records**.

Approach

We manage a separate environment ρ_{st} for each structure type st .

Be **struct** $st\ x;$ part of a declaration list where

struct $st\ \{\ \mathbf{int}\ a;\ \mathbf{int}\ b;\ \};$

- x has as relative address the address of the first cell allocated for the structure.
- The components have addresses **relative** to the start address of the structure st .
In the example, these are given by $\rho_{st} = \{a \mapsto 0, b \mapsto 1\}$.