Technische Universität München — *Summer 2011*
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Virtual Machines

Solutions to Sheet 2

Exercise 1: ***break*** *&* ***continue*** — *5 Points*

```
code_R break ρ = jump (ρ break)
code_R continue ρ = jump (ρ continue)

code (while (e) s) ρ =
  loop: code_R e ρ
        jumpz end
        code s (ρ ⊕ {break → loop, continue → end})
        jump loop
  end:

code (for (e1,e2,e3) s) ρ =
        code e1 ρ
  loop: code_R e2 ρ
        jumpz end
        code s (ρ ⊕ {break → loop, continue → cont})
  cont: code e3 ρ
        jump loop
  end:
```

Exercise 2: *Switch Statement* — *10 Points*

```
code (switch ...) ρ =
     code_R e ρ
     loadc (min(b))
     sub
     check 0 (max(b) - min(b) + 1) B
  B: jump C (σ(min(b)))
        ...
     jump C (σ(max(b) + 1)
  C_0 : code ss1 ρ'
        ...
  C_k : code ssk ρ'
  D:
```

where $\rho' = \rho \oplus \{\underline{break} \to \mathrm{D}\}$

Exercise 3: *The* **`do ... while`** *loop* *2 Points*

```
code (do s while (e)) ρ =
  loop: code s ρ
        code_R e ρ
        jumpz end
        jump loop
  end:
```

Exercise 4: *Expressions* *3 Points*

```
loada 5  /*x*/
loadc 4
add
storea 5 /*y*/
loada 6  /*z*/
mul
storea 4 /*x*/
```