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Virtual Machines

Exercise Sheet 5

Deadline: 21. June 2011, 14:00

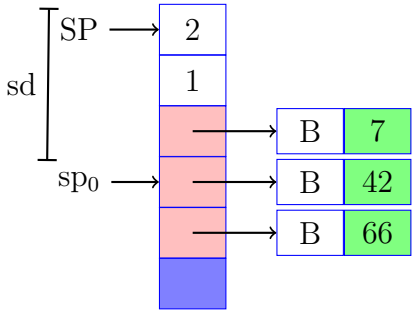
Exercise 1: *MaMa Code Generation* *6 Points*

Consider the expression $e \equiv$ `if y > x then x else 7 + y * x`, where `y` is the second formal parameter, and `x` the first local variable. Compute $\text{code}_V\ e\ \rho\ 3$. Annotate every instruction with the current stack distance like in the examples in the lecture.

Exercise 2: *Stack* *6 Points*

Write an expression e, so that during the execution of e the stack will have the following configuration.

Specify the point in e where this configuration happens.



Exercise 3: *Function application code* *8 Points*

Compute $\text{code}_V\ e\ \rho\ sd$ for the following values of e, with $\rho = \{\}$ and $sd = 0$. Annotate each instruction with the current stack distance.

1. Function application

```
let a = 4
in let f = fn x y -> x * y + a
   in f 2 3
```

2. Undersupply

```
let a = 50
in let f = fn x y -> x * y + a
   in let g = f 10
      in g 20
```

3. Oversupply

```
let a = 50
in let f = fn x -> (fn y -> x * y + a)
   in f 10 20
```