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JG|U

# Technische Informatik: Abgabe 11

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## Exercise 11.1 (Johnny Simulator)

**a)** Program Listing:

| Adr | Asm | Op |
|-----|------|-----|
| 000 | TAKE | 020 |
| 001 | SUB  | 021 |
| 002 | SAVE | 020 |
| 003 | INC  | 022 |
| 004 | TST  | 020 |
| 005 | JMP  | 001 |
| 006 | HLT  | 000 |

Puts $c = \lceil \frac{a}{b} \rceil$ (Adr 20 divided by Adr 21) into Adr 22.

**b)** It takes $c$ times my loop (5 commands/cycles) plus 2 (TAKE and HLT) cycles.

## Exercise 11.2 (Johnny Macro)

The DBL macro would be a TAKE adr, ADD adr, SAVE adr combo.
The CLR macro would be a NULL adr, TAKE adr combo.

## Excercise 11.4 (Caches)

**a)** In a RAM with 32 addresses and a cache with 5 lines address 13 could be in cache line 3 in a direct mapped cache. And in any of the 5 cachelines in a fullassociative cache, depending on the used cache mapping algorithm.

**b)** 5 cache lines is an unusual amount for a 32 adress RAM because 32 cannot be distributed evenly. Powers of 2 are common cache sizes. But the number of cachelines should at least divide the number of addresses.