Non-computer Exercise 1

In many supermarkets, it is no longer the cashier who figures out how much change the customer should get back (in the rare cases where a customer actually pays in cash…). The cashier just puts the cash into a machine, which then spits out the correct change. Such a machine requires software to work, including some software to calculate the correct change.

Calculating the correct change is as such trivial; just subtract the due amount from the given cash. It is however not as trivial to figure out HOW to pay out the cash, in order to return as few bills and coins as possible to the customer. An example; the due amount is 352 kr, and the customer pays with a 500-kr bill. The change is thus 148 kr.. The best way to pay out this amount – using the current Danish coin and bill system – is to pay out:

- 1 100-kr bill
- 2 20-kr coins
- 1 5-kr coin
- 1 2-kr coin
- 1 1-kr coin

YOUR JOB is now to describe (and write down) this calculation logic in so much detail that each step becomes trivial to perform. In that way, it becomes a fairly easy job for a programmer to turn the logic into a working piece of software. You should consider the following points:

- What is the input to the calculation?
- What steps are involved in calculating the change? (this is the hardest problem…)
- What is the output of the calculation?

Solve the exercise in groups of two or three, and try out your logic on a couple of examples:

- Due amount is 66 kr., customer pays 200 kr.
- Due amount is 1284 kr., customer pays 2000 kr.

As a final test, you could swap you logic with another group, and see if you are capable of following the other groups logic, and end up with the correct result. If you are unable to reach the correct result, discuss the reason with the other group. Is logic wrong, or has it not been described in enough detail?