Embedded Systems

Assignment 1

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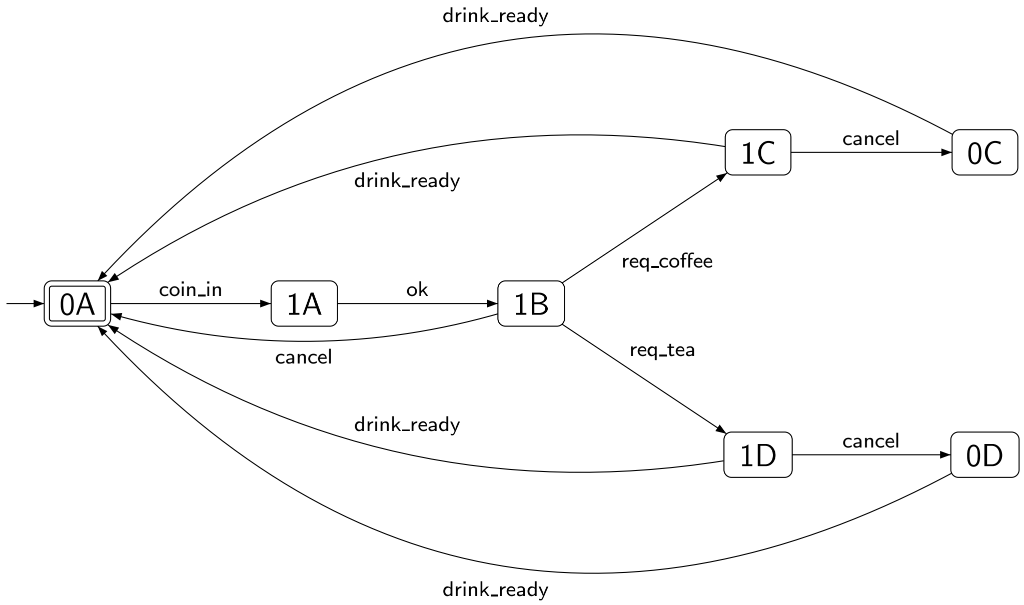
1.1 A Vending Machine

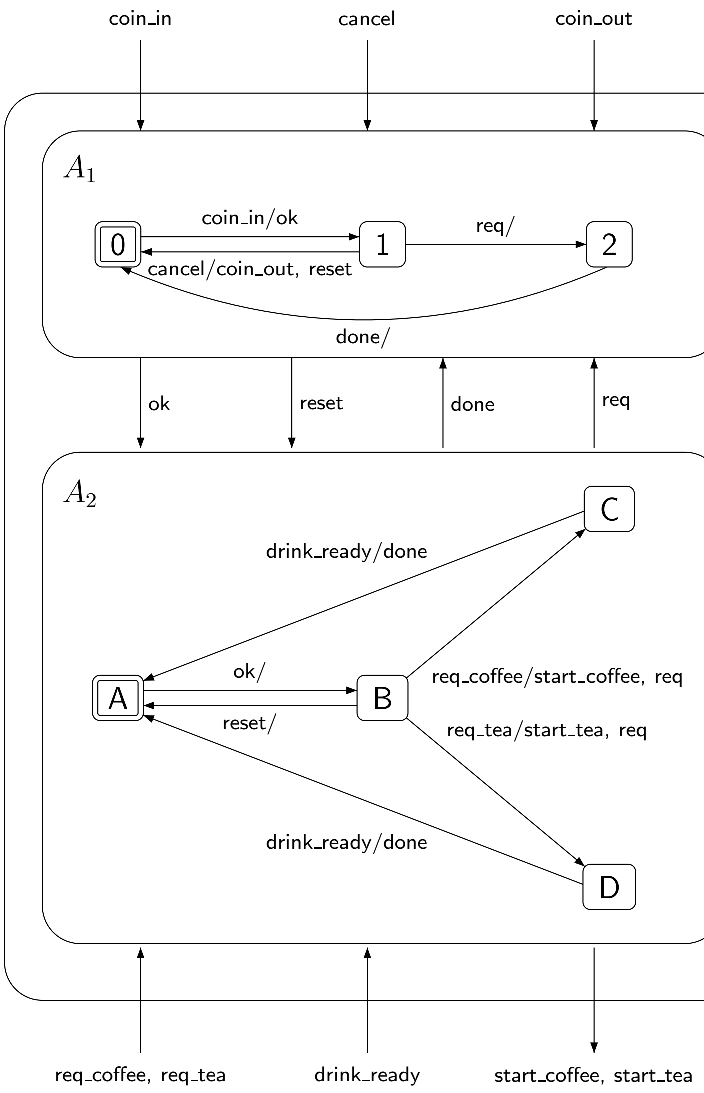
a.
- Initially, the automata are in states 0 and A.
- The user inserts a coin, the environment generates the event coin_in, A_1 moves to state 1 and the event ok is generated.
- A_2 consumes the event ok and moves to state B.
- The user requests a tea, the environment generates the event req_tea, A_2 moves to state D and the event start_tea is generated.
- The event drink_ready is generated by the environment, A_2 moves to state A and the event done is generated.
- A_1 consumes the event done and moves to state 0.

b. Imagine that the user presses the cancel-button while the coffee or tea is prepared, then the user can get the drink and the money out of the machine, because there is no lock on the cancel-button while the drink is being prepared.

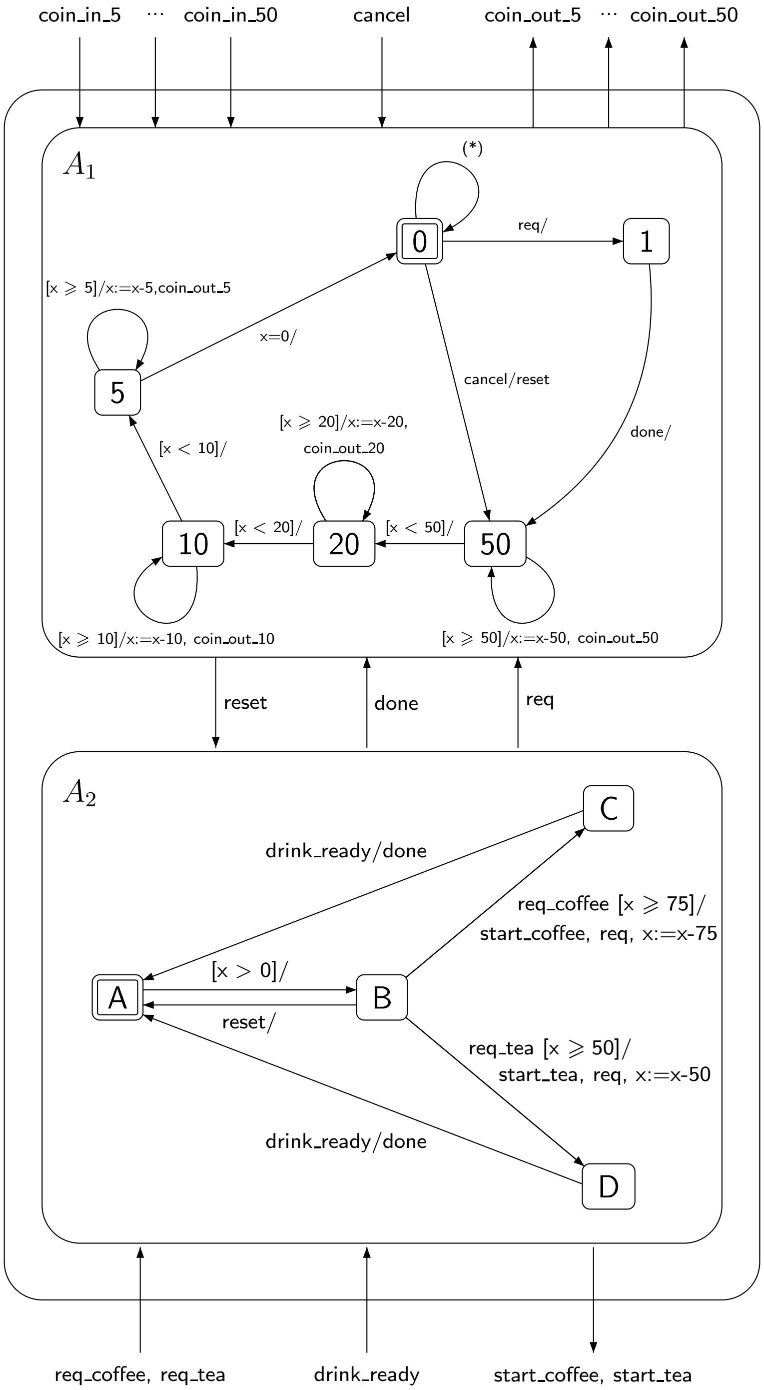
c.



d.


coin_in
cancel
coin_out
A_1
0
1
2
coin_in/ok
cancel/coin_out, reset
req/
done/
ok
reset
done
req
A_2
A
B
C
D
drink_ready/done
ok/
reset/
req_coffee/start_coffee, req
req_tea/start_tea, req
drink_ready/done
req_coffee, req_tea
drink_ready
start_coffee, start_tea

e.

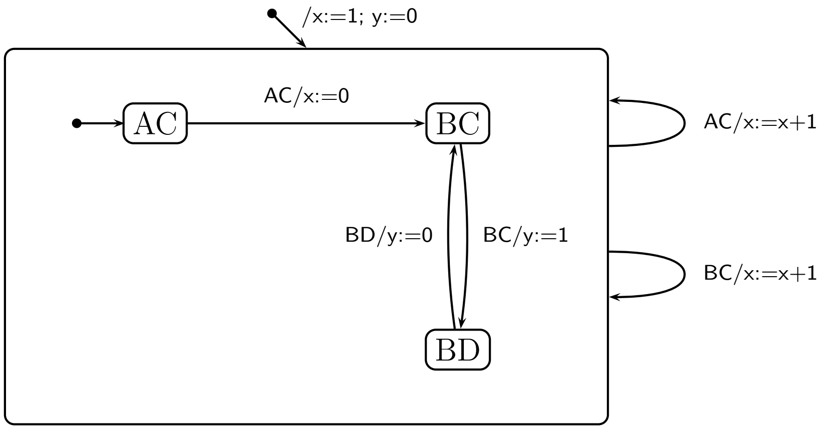


For the sake of readability, the loops – marked with (*) – for state 0 are left out. The loops are:

- coin_in_5/x:=x+5

- coin_in_10/x:=x+10
- coin_in_20/x:=x+20
- coin_in_50/x:=x+50

1.2 Statecharts



1.3 Statecharts