

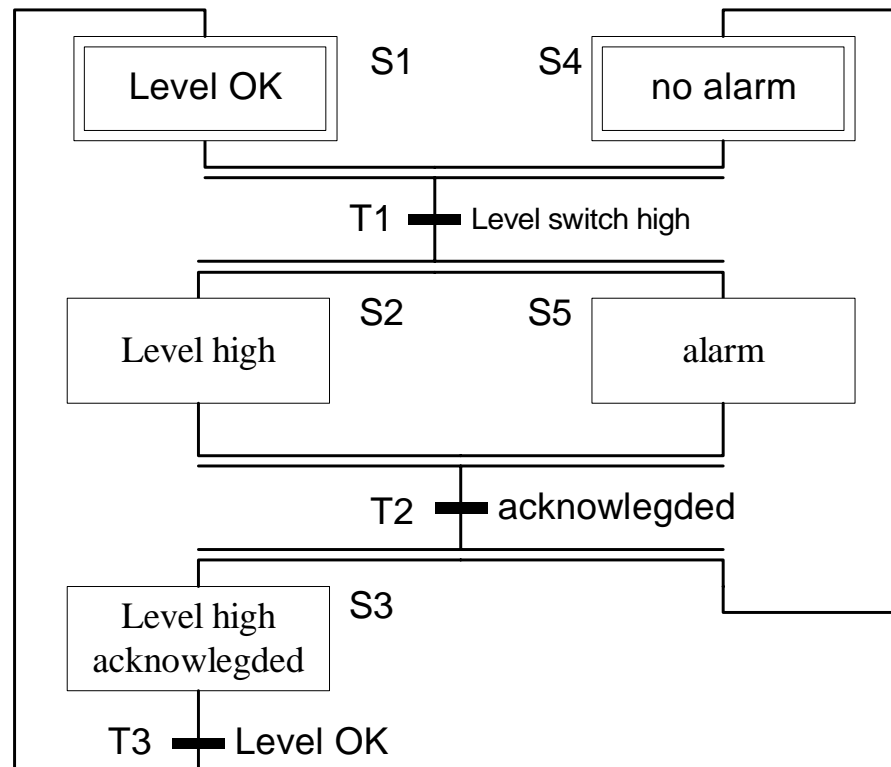


# Analysis of Sequential Function Charts

# Analysis of SFC

- ☑ Matrix representation
- ☑ Components
- ☑ Conflict situations
- ☑ Liveness, Dead-Lock
- ☑ Safe or bounded SFC

# Example: Alarm with reset

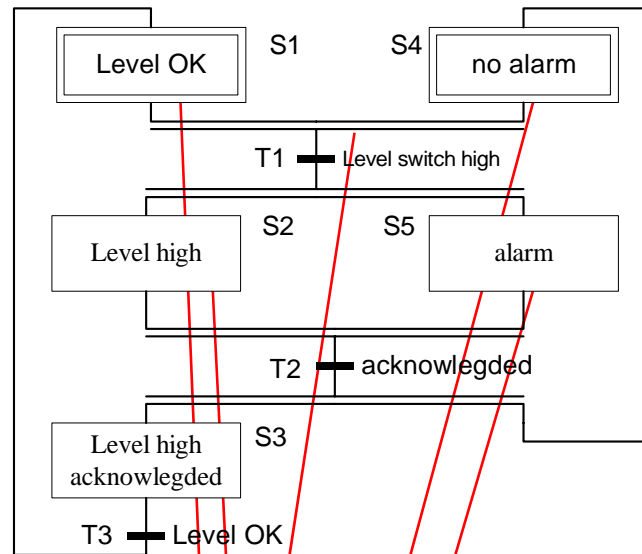


# How to create a matrix representation

- ☑ enumerate steps
- ☑ enumerate transitions
- ☑ create table with steps as rows and transitions as column labels

## Fill the table

- ☑ An element in the  $i$ -th row and the  $j$ -th column indicates the change in number of tokens in the  $i$ -th step, if the  $j$ -th transition is fired.



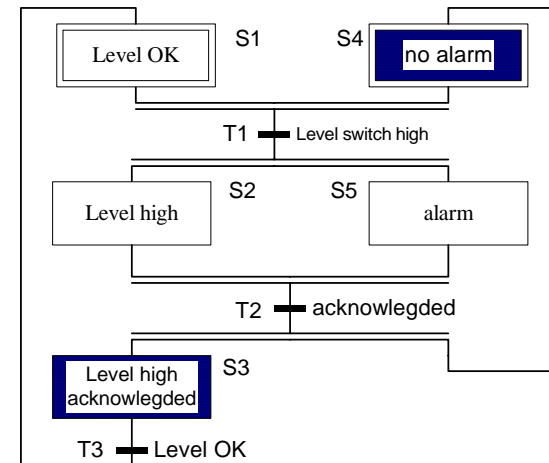
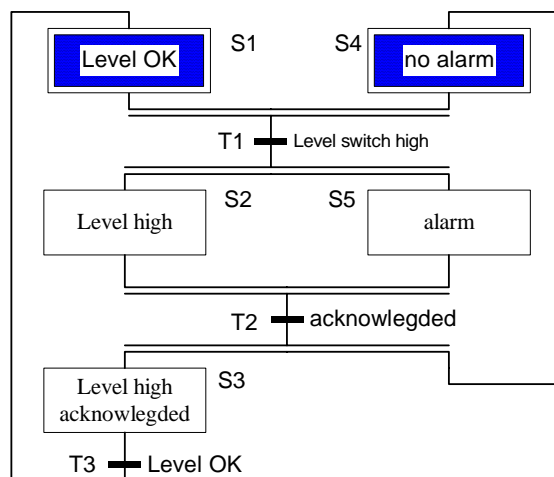
Step\Transition	T1	T2	T3
S1	-1	0	1
S2	1	-1	0
S3	0	1	-1
S4	-1	1	0
S5	1	-1	0

# Components

- ☑ How many tokens do appear in the SFC?
- ☑ How can an SFC split into components without concurrent actions (state machines)?
- ☑ Where do we have to place tokens for the initial marking?

# State of an SFC:

Pattern of tokens = marking of the SFC

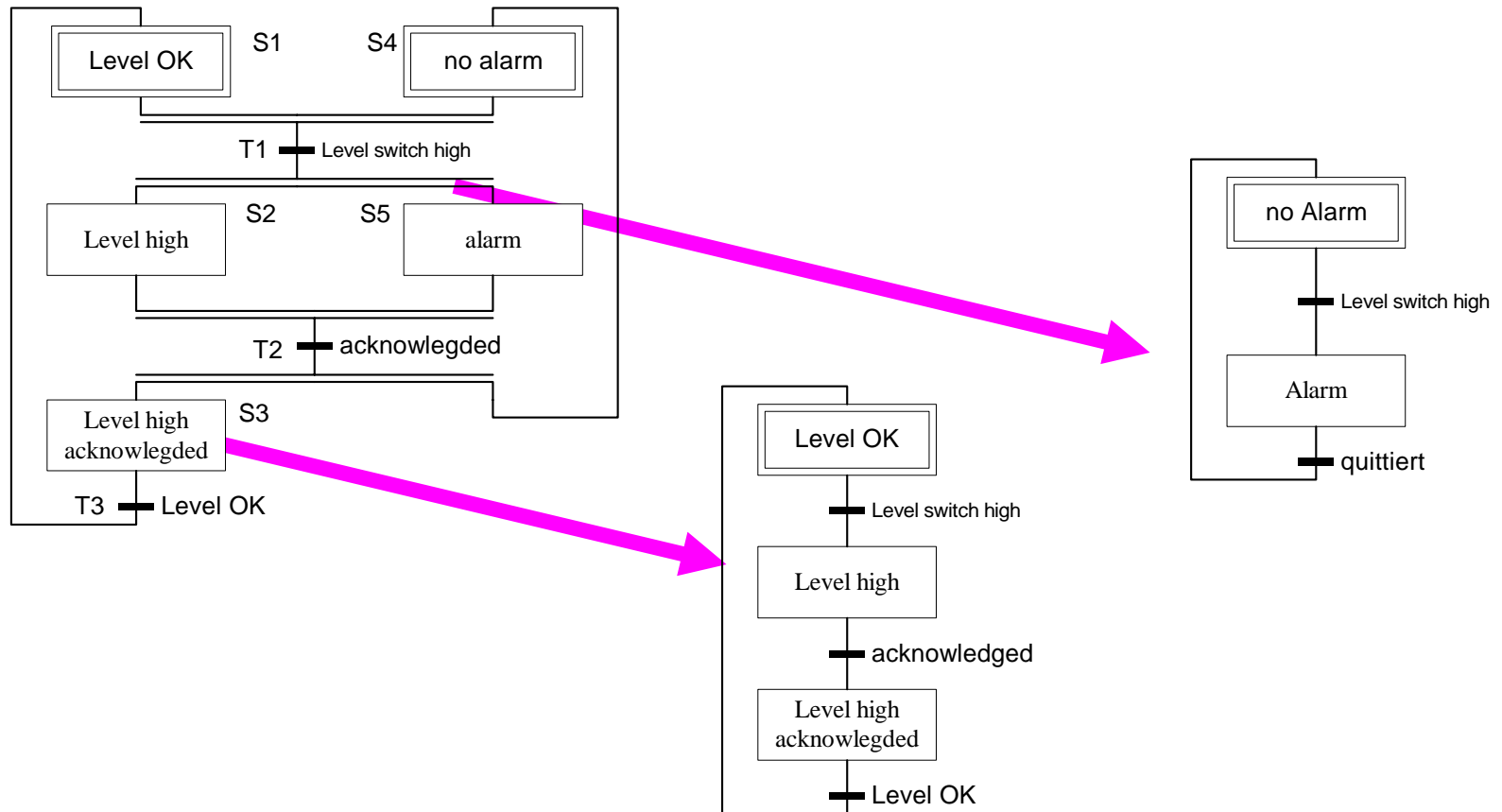




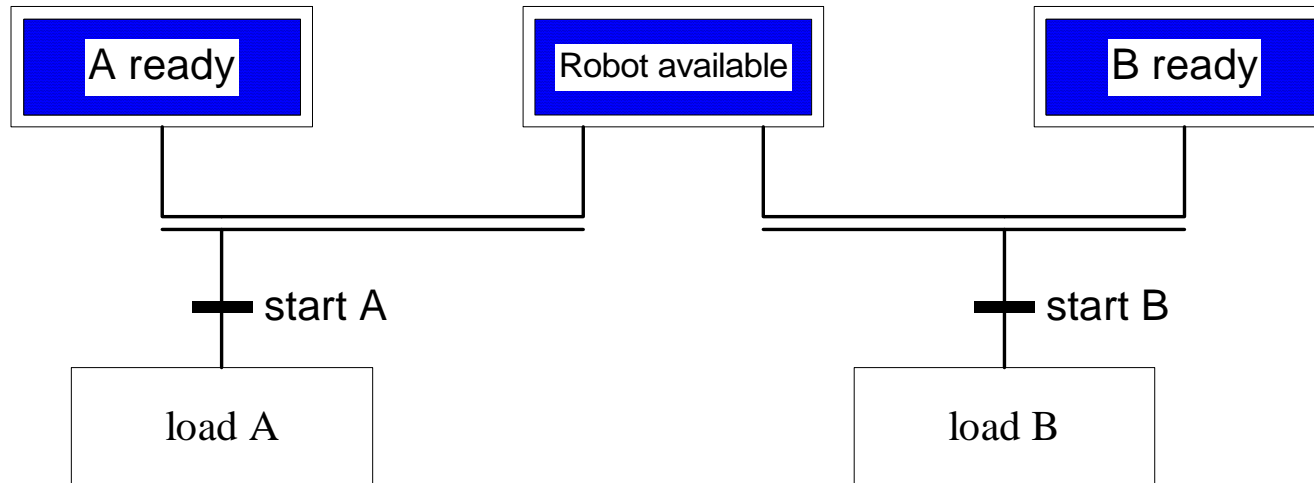
A SFC with only one token is  
a state machine

- ☑ The token indicates the state
- ☑ state name = step name

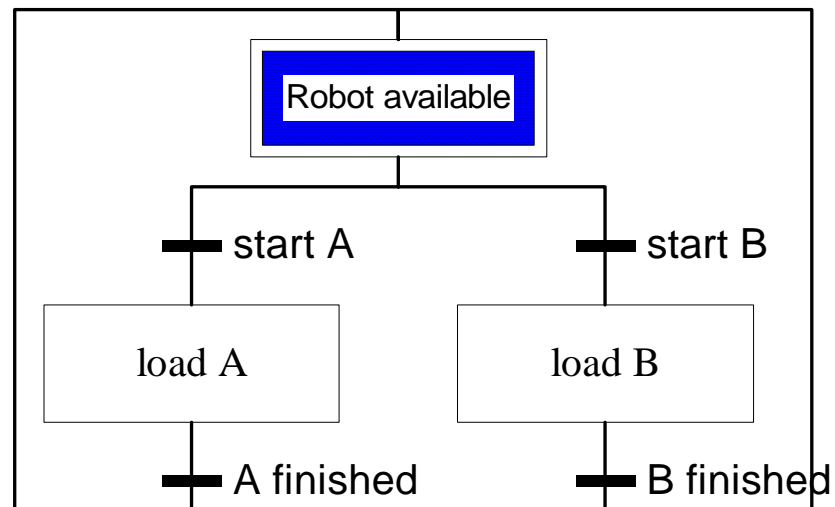
# Splitting of an SFC into components/state machines



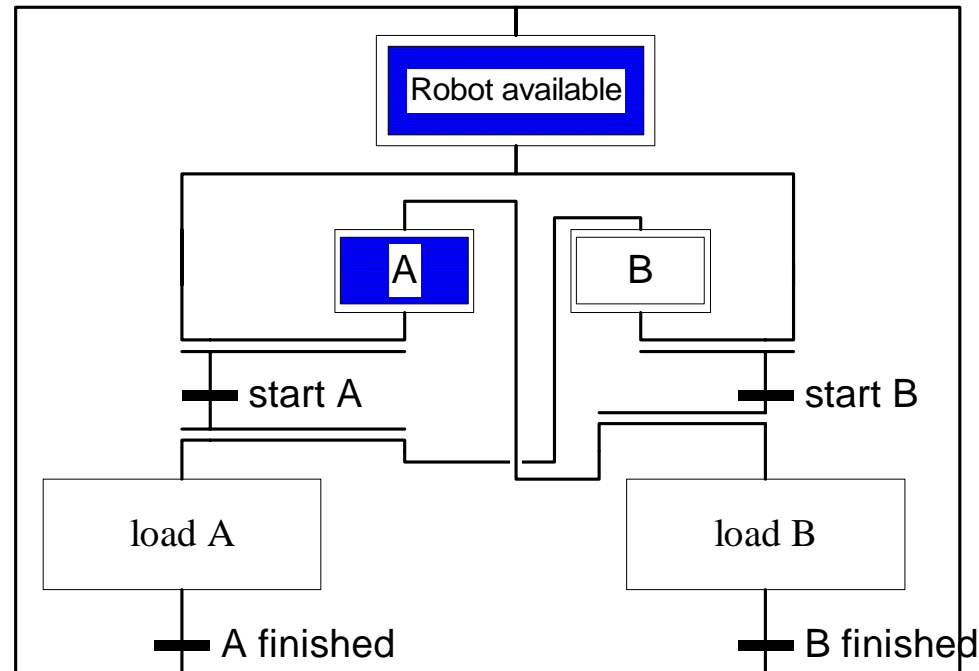
# Backward conflict



# Example



# Possible solution



# Forward conflict: Step C can have only 1 Token

