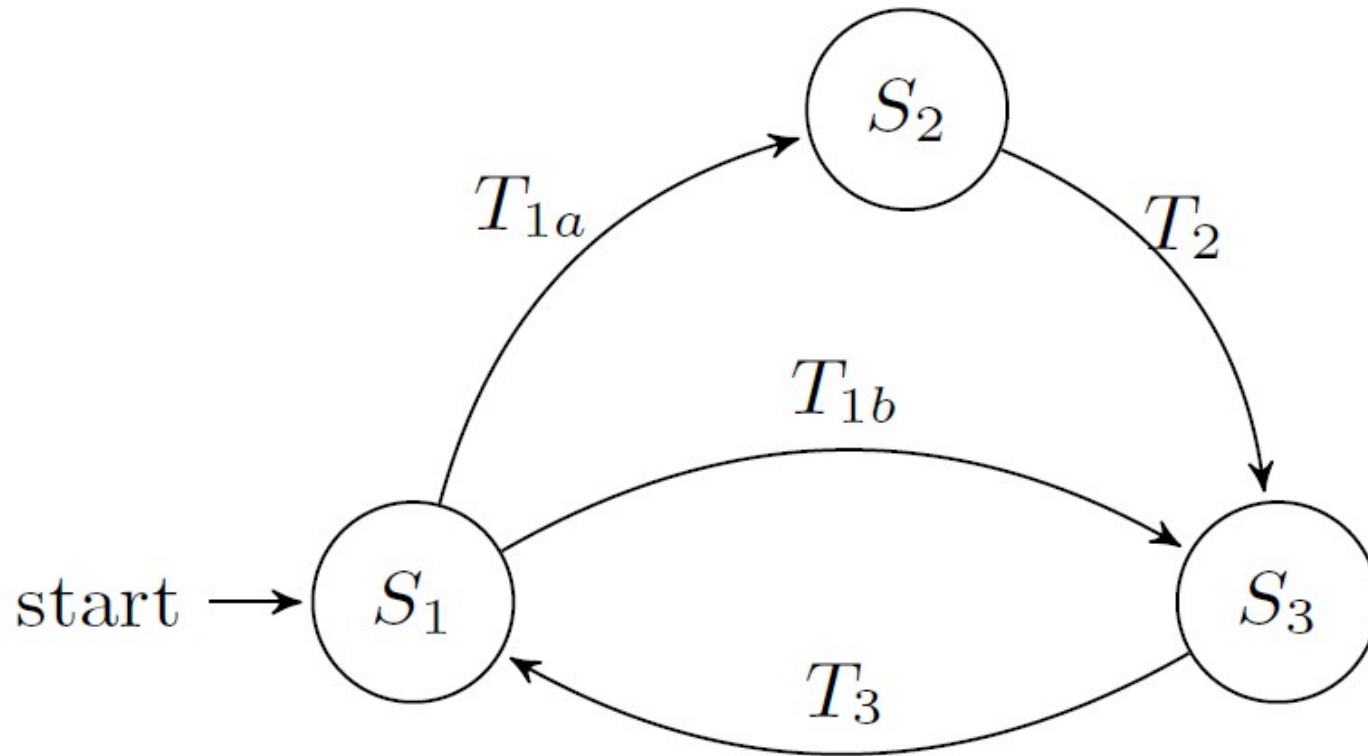
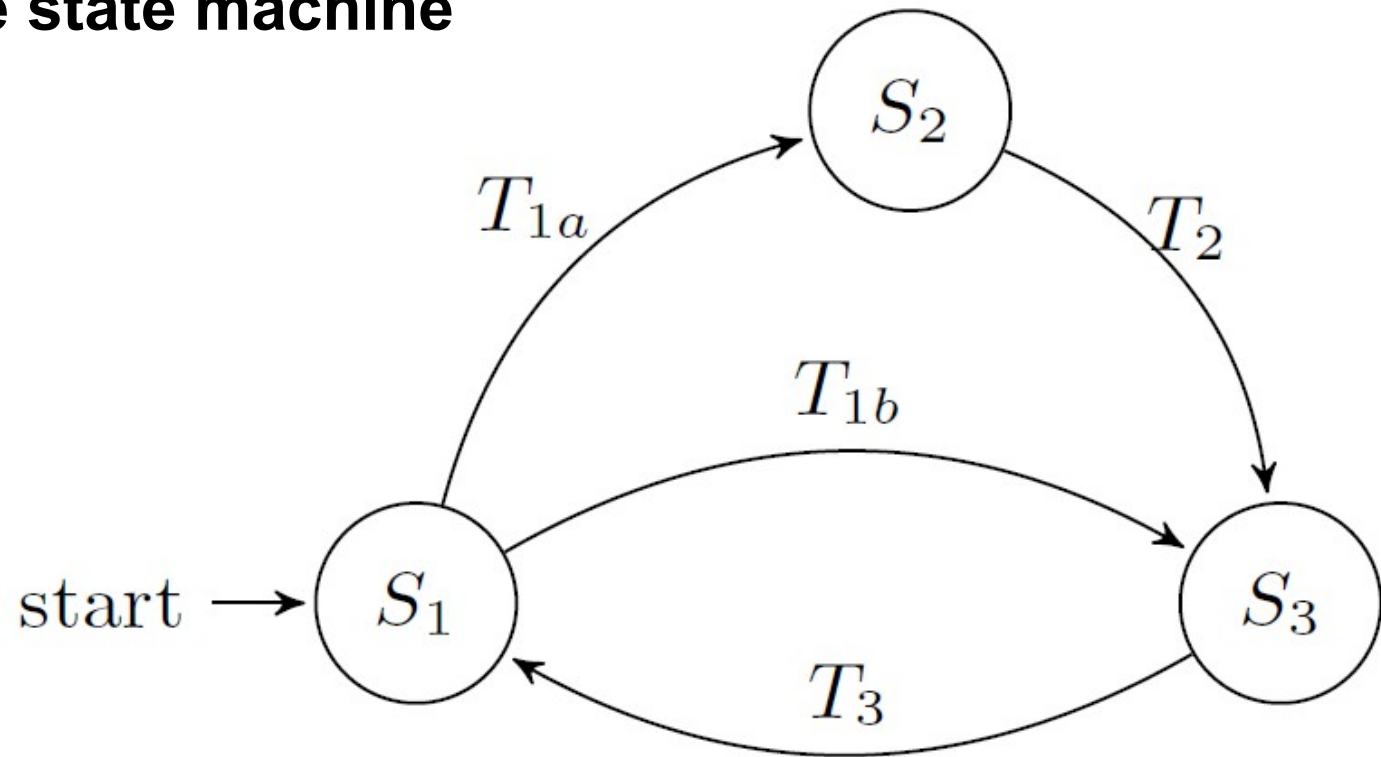


Stavový automat



Stavový automat

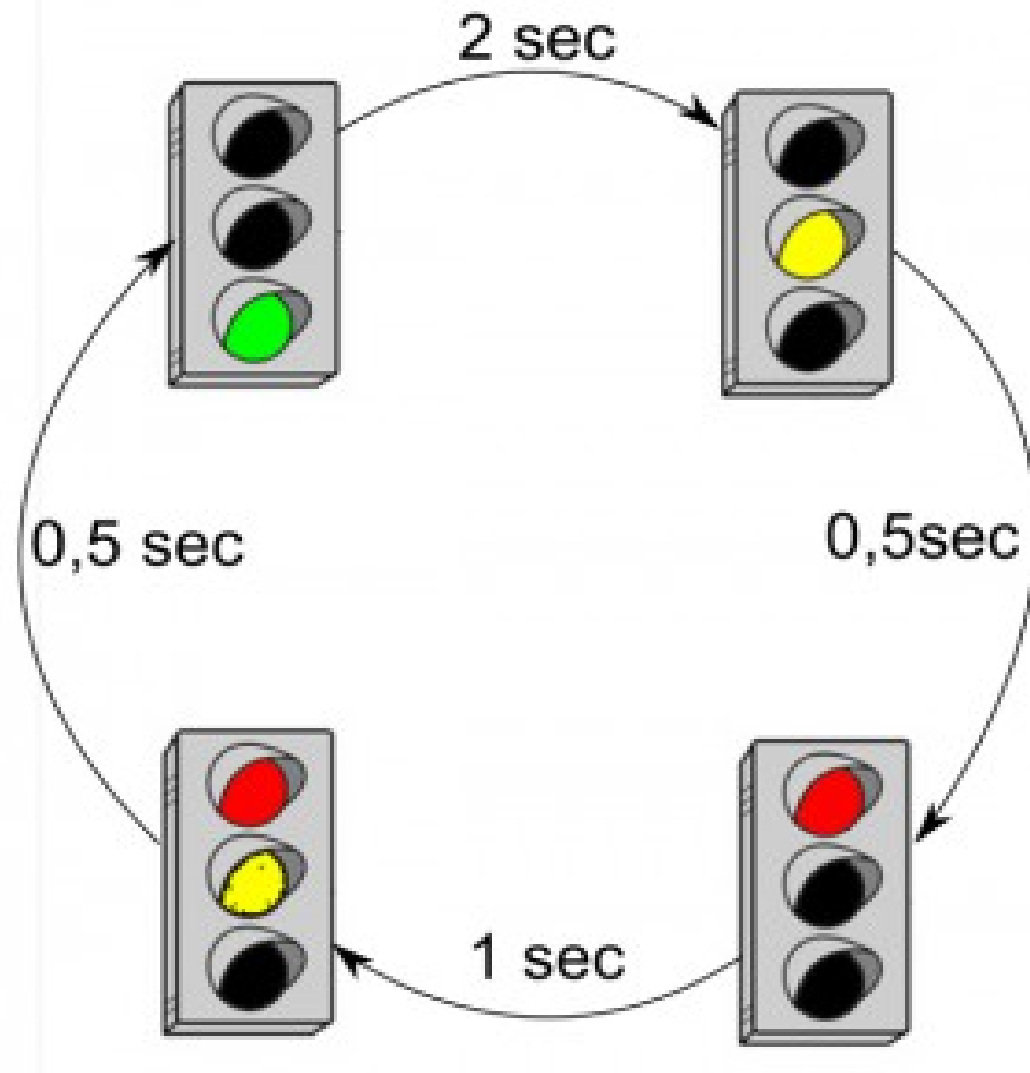
FSM – Finite state machine



Formal definition: A FSM is a five-tuple $\mathcal{A} = (S, \Sigma, \delta, s_0, F)$, where:

- S is a finite, non-empty set of states,
- Σ is the input alphabet (a finite, non-empty set of symbols),
- δ is the transition function: $\delta : S \times \Sigma \rightarrow S$,
- s_0 is the initial state, $s_0 \in S$ and
- F is the final state set, $F \subseteq S$.

Stavový automat – příklad



Stavový automat – příklad

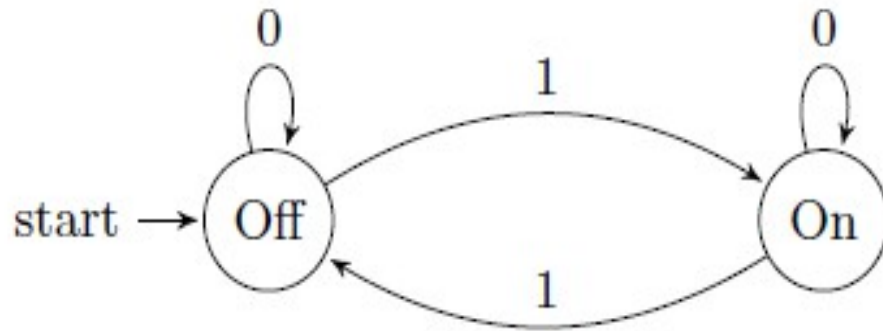


Fig. 4. FSM diagram for on/off switch.

Stavový automat

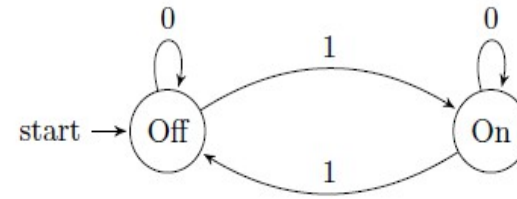


Fig. 4. FSM diagram for on/off switch.

```
on start
  set Time to 0
  set State to 0

forever
  if (State = 0 and button A is pressed)
    then set State to 1
  else if (State = 1 and button B is pressed)
    then set State to 0

  if (State = 0)
    then show number State
  if (State = 1)
    then show number State
```

Stavový automat

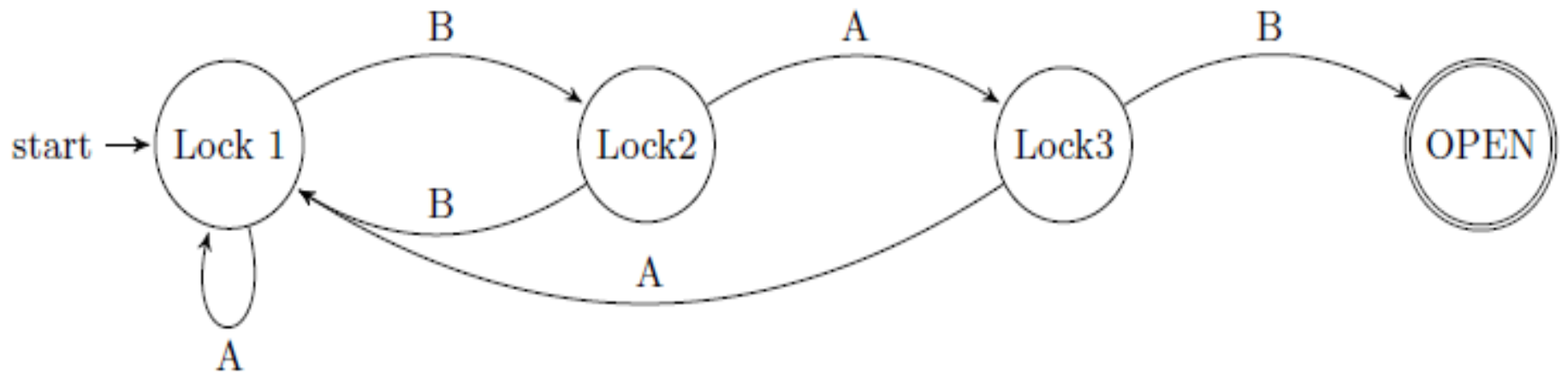
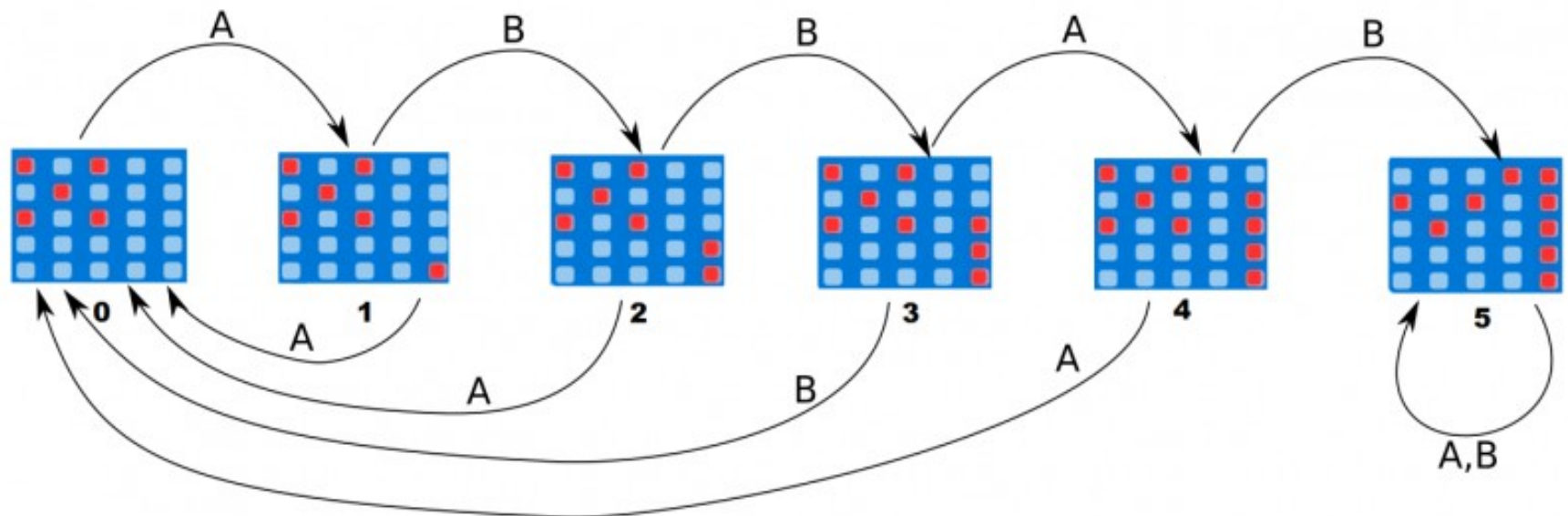


Fig. 5. FSM diagram for simple code lock. Opening sequence is B-A-B.



on start

```
set State to 1
set Timer to 0
```

run in background

```
while true
do
  pause (ms) 100
  change Timer by 100
```

Initialization

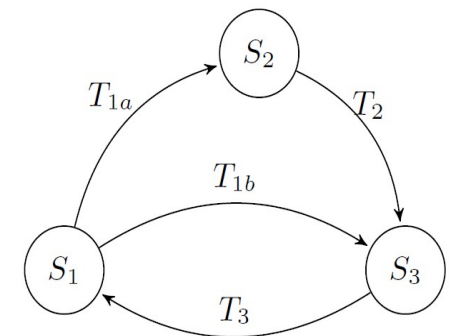
forever

```
if (State = 1 and Transition_Condition_T1a)
then set State to 2
else if (State = 1 and Transition_Condition_T1b)
then set State to 3
else if (State = 2 and Transition_Condition_T2)
then set State to 3
else if (State = 3 and Transition_Condition_T3 and Timer > 1000)
then set State to 1

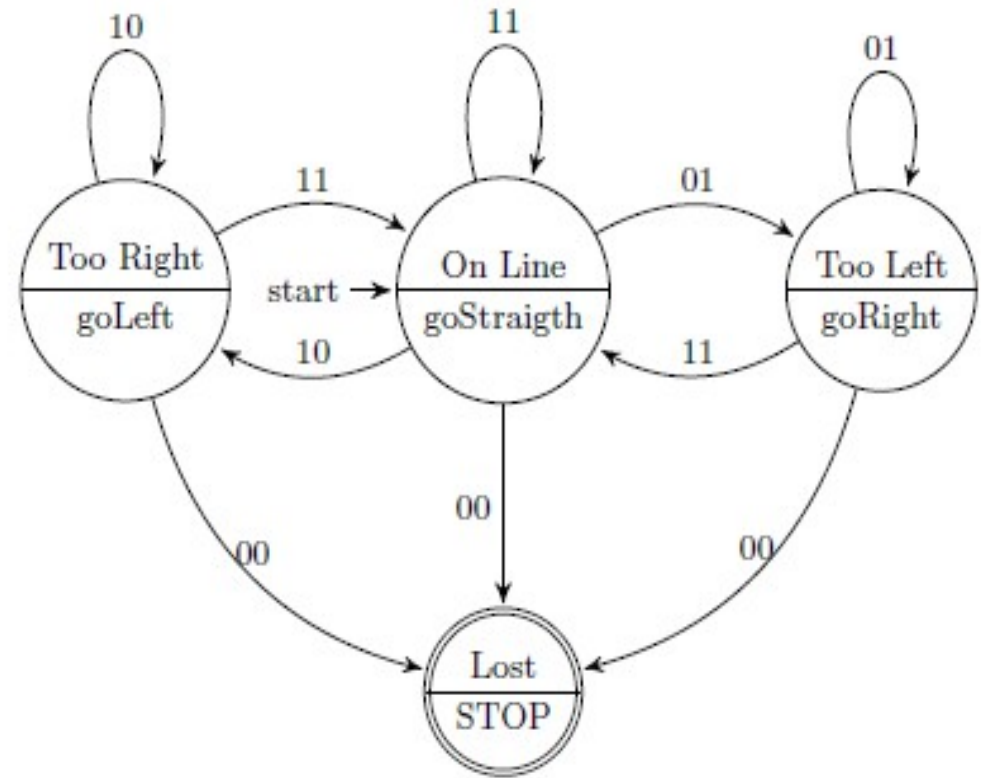
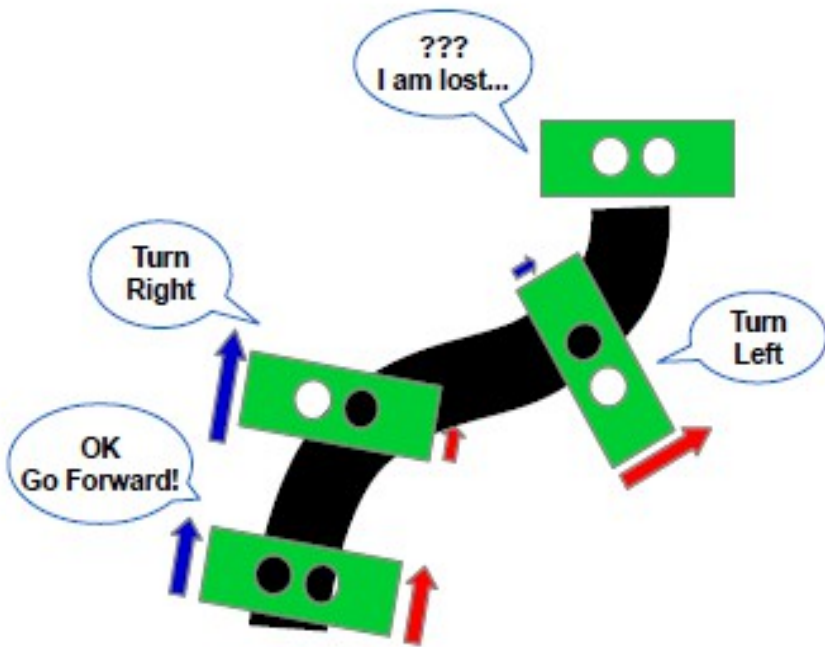
if (State = 1)
then call function SetOutputs_1
if (State = 2)
then call function SetOutputs_2
if (State = 3)
then call function SetOutputs_3
```

State machine

Outputs



Stavový automat



Stavový automat

State machine implementation (part only)

```
forever
  call function readSensors
  if (State == "OnLine")
  then
    if (Sensors == "00")
    then set State to "Lost"
    else if (Sensors == "01")
    then set State to "TooRight"
    else if (Sensors == "10")
    then set State to "TooLeft"
    else if (Sensors == "11")
    then set State to "OnLine"
  else if (State == "TooLeft")
  then
    if (Sensors == "00")
    then set State to "Lost"
    else if (Sensors == "01")
    then set State to "TooLeft"
    else if (Sensors == "11")
    then set State to "OnLine"
```

Execution part – setting outputs

```
if (State == "OnLine")
then
  move left motor forward at 75 %
  move right motor forward at 75 %
  pause (ms) 50
else if (State == "TooRight")
then
  move left motor forward at 75 %
  move right motor forward at 25 %
  pause (ms) 50
else if (State == "TooLeft")
then
  move left motor forward at 25 %
  move right motor forward at 75 %
  pause (ms) 50
else if (State == "Lost")
then
  turn motors OFF
else
  turn motors OFF
```