

Logic Simulation

Note Title

1/29/2009

discrete-event sim.

$t \leftarrow 0$

while ($t < t_{end}$ & queue not empty)

 remove event from queue

$t \leftarrow$ event time

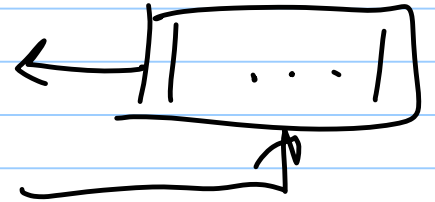
 process event

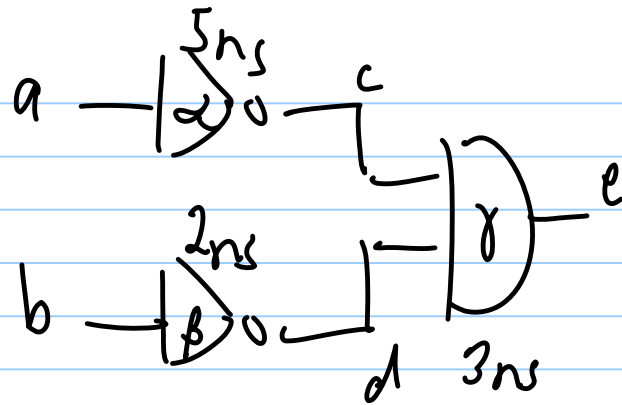
 if new event generated

 insert in queue

 endif

endwhile





| t | a | b | c | d | e |
|---|------|---|---|---|---|
| 0 | 1 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 |
| | eval | α | 2 | | |
| 2 | 0 | 0 | 0 | 0 | 0 |
| | eval | β | | | |
| 4 | 0 | 0 | 0 | 1 | 0 |
| | eval | γ | | | |

sequence
 [(t=1, a=0), (t=2, b=0)]
 [(t=2, b=0)],
 [(t=2, b=0), (t=6, c=1)]
 [(t=6, c=1)]
 [(t=4, d=1), (t=6, c=1)]
 [(t=6, c=1)]

b 0 0 1 1 0 []
level δ [(t=9, e=1)]
9 0 0 1 1 1 []

while (not done)

send start message for current time point
parallel (on each proc)

update sim time

recv state change msgs from other procs

perform evals for current time

send state change msgs to other proc.

send done msg (including next time info)

end parallel

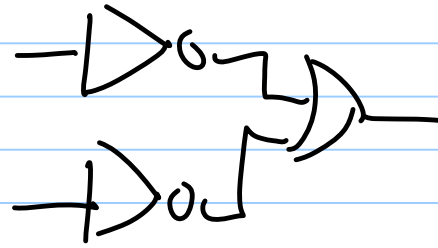
recv done msgs

update current time (min)

end while

| t | evaluate | msgs |
|-----|----------|---|
| 0 | | $in \rightarrow \alpha$ ($t=1, a=0$) |
| 1 | α | $in \rightarrow \beta$ ($t=2, b=0$) $\alpha \rightarrow \gamma$ ($t=3, c=1$) |
| 2 | β | $\beta \rightarrow \gamma$ ($t=4, d=1$) |
| 4 | γ | |
| 6 | γ | $\gamma \rightarrow out$ ($t=9, e=1$) |

local clock



msgs

$\alpha \rightarrow \beta$ ($t=1, a=0$)

$\alpha \rightarrow \beta$ ($t=2, b=0$)

eval α, β

$\alpha \rightarrow \gamma$ ($t=6, c=1$)

$\beta \rightarrow \gamma$ ($t=4, d=1$)

eval γ

$\gamma \rightarrow \text{out}$ ($t=7, e=1$)

local time
 α β γ

1

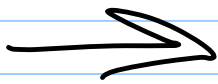
2

4

1

2

4



conservative local clock alg

msgs

| | | | | |
|----------------------------|----------------------|------------|---------|----------|
| | | local time | | |
| | | α | β | γ |
| $\alpha \rightarrow \beta$ | $(t=1, a=0)$ | 0 | 0 | 0 |
| $\beta \rightarrow \alpha$ | $(t=2, b=0)$ | 1 | 2 | |
| | eval α, β | | | |

| | | | | |
|-----------------------------|------------------------------|----------|----------|---|
| $\alpha \rightarrow \gamma$ | $(t=3, c=1)$ | | | |
| $\beta \rightarrow \gamma$ | $(t=4, d=1)$ | | | 4 |
| $\alpha \rightarrow \beta$ | $(t=\infty, a=0)$ | ∞ | | |
| $\beta \rightarrow \alpha$ | $(t=\infty, b=0)$ | | ∞ | |
| | eval α, β, γ | | | |

$\alpha \rightarrow \gamma \quad (t = \alpha, c = 1)$

$\beta \rightarrow \gamma \quad (t = \alpha, d = 1)$

eval γ

$\gamma \rightarrow \text{out} \quad (t = \beta, c = 1)$

eval γ

$\gamma \rightarrow \text{out} \quad (t = \infty, c = 1)$ α α α

b

∞

optimistic local clocks

| | local time | | |
|--------------------------------|------------|---------|----------|
| msgs | α | β | γ |
| | 0 | 0 | 0 |
| $\text{in} \rightarrow \alpha$ | 1 | | |
| $\text{in} \rightarrow \beta$ | | 2 | |
| eval α, β | | | |
| $\alpha \rightarrow \gamma$ | | | |
| $\beta \rightarrow \gamma$ | | | 4 |
| eval γ | | | 6 |
| eval δ | | | |
| ⋮ | | | |