CPES FINAL EXAM SET-1

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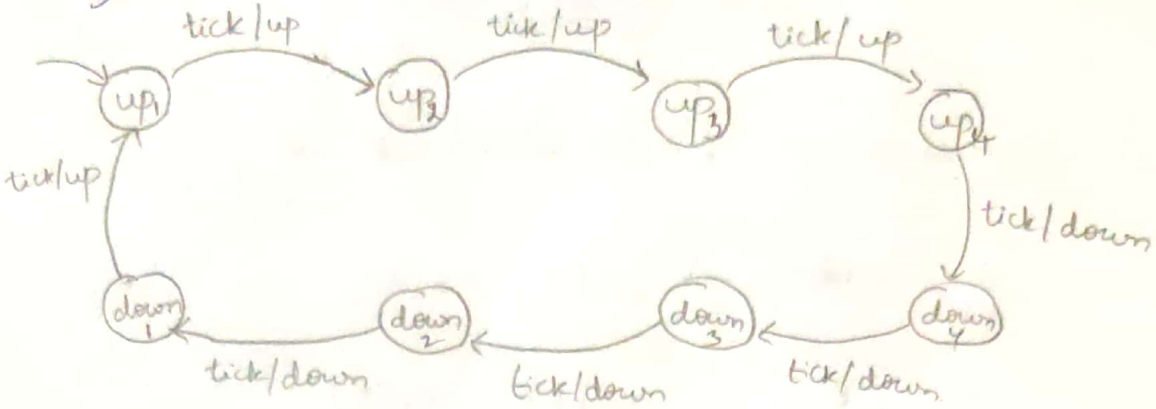
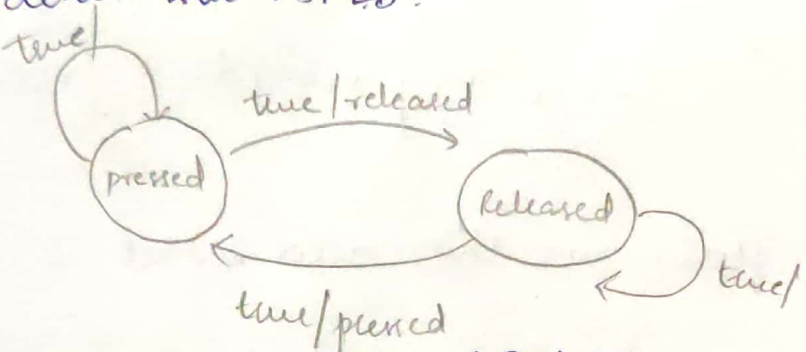
1.) Deterministic FSM:A :-



Non deterministic FSM:B :



For deterministic FSM:- (FSM_A)

states - {up, down, up_2, up_3, up_4, $down_2$, $down_3$, $down_4$}

Inputs - ({tick} → {present, absent})

outputs - ({up, down} → {present, absent})

initial state - up

update (s, i) = { (up, up) ⇒ if s = up ∧ i(tick) = ~~present~~ up
(down, down) ⇒ if s = down ∧ i(tick) = ~~present~~ down
(~~up~~ down, up) → if s = down ∧ i(tick) = ~~present~~ up
(up, down) → if s = up ∧ i(tick) = down

For Non deterministic FSM-B

states → { pressed, released }

Input → {tick} → {press, release}

output → { press, release} → { pressed, released }

Input state → {none}.

updates (s, i) →

1.) { released, released } if
s = pressed ∧ i = released

2.) { released, released }
if s = released ∧ i = released

3.) { pressed, pressed }.
if s = released ∧ i = press.

4.) { pressed, pressed }
if s = pressed, ∧ i = pressed.

3.) ~~b.) Formal model~~ ~~Actor model (General)~~:-

b.) Formal model (Actor model in next page)

$$y_1 = x_2 \Rightarrow y_1(t) = x_2(t)$$

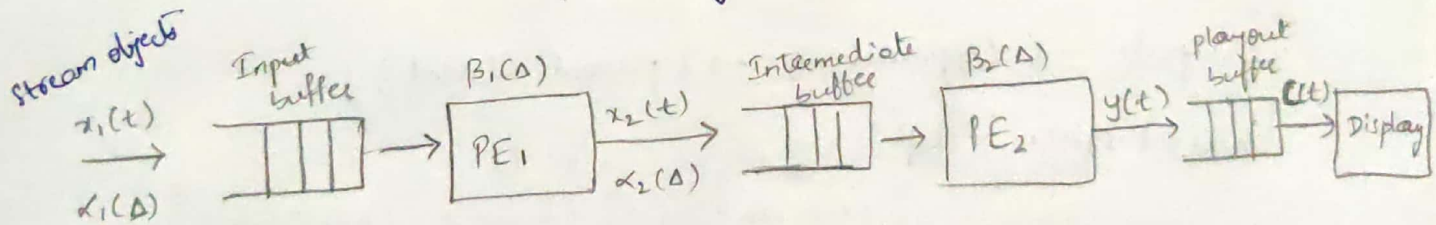
$$y_3 = x_3 \quad y_3(t) = x_3(t)$$

$$y_3(t) = i + \int_0^t x_1(\tau)\,d\tau + \int_0^t x_2(\tau)\,d\tau + \int_0^t x_3(\tau)\,d\tau$$

Data that flows in this actor model is synchronous.

a.) Model for question:-

processing is done in PE1



$$\beta_2(t) \geq \begin{cases} 0 & \text{if } t \leq d_1 \\ (c \otimes \alpha_2^l)(t,d) & \text{if } t > d_1 \end{cases}$$

with $d > d_1$.

states can be input, intermediate, display, playout buffer.

Input = {Stream obj}

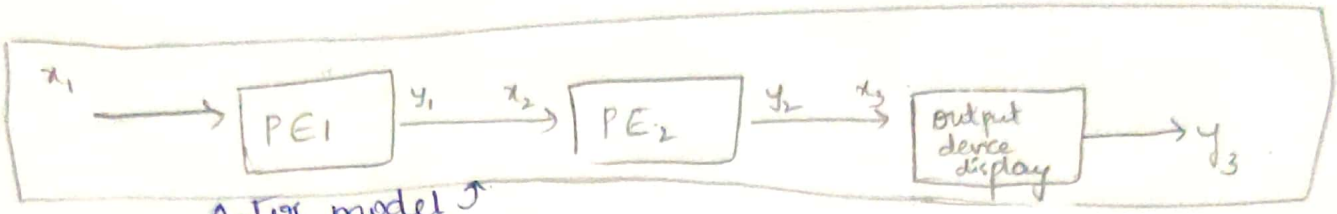
output = {processed obj}

initial states = {input buffer}

$\therefore \beta_1(t) \geq (\alpha_2^1 \otimes \alpha_1^1)(t), \forall t \geq 0.$

playout delay redistribution.

$$c(t,d) = \begin{cases} 0 & \text{if } t \leq d \\ c(t-d) & \text{if } t > d \end{cases}$$



Actor model

2°)

Register bank Read1 AR_2

Register bank Read2 AR_3 A

ALU AR_2 A

ALU AR_3

~~cycles~~