بنام خدا

model checking - مرتضی علیزادی

*** ▷ 2.5**

+ Shared : $S \in \{0, 1\}$ ⟹ initial : $\underline{1}$

+ local : $y_i \in \{0, 1\}$ ⟹ initial : $\underline{0}$ $(i \in \{0, 1\})$

+ 2 processes : P_0 & P_1

a) program graph?

b) transition system for each process?

$l_1 \to$ loop forever do

begin

noncritical section

$(y_i, s) := (1, i)$; ⟶ action α

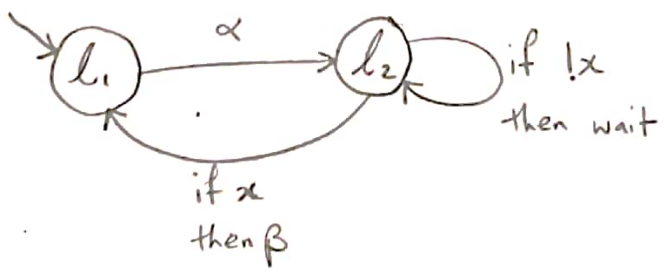
$l_2 \to$ wait until $\underbrace{((y_{1-i} = 0) \vee (s \neq i))}_{x}$; ⟶ if $!x$ wait; if x ↓

critical section

$y_i := 0$ ⟶ action β

end

a) PG :



critical section ? (?)

$P = (Loc, Act, Effect, \hookrightarrow, Loc_0, g_0)$

+ $Loc = \{l_1, l_2\}$

+ $Act = \{\alpha, \beta, wait\}$

+ Effects : $Effect(\alpha, [S=0, y_i=0]) = [S=i, y_i=1]$

⋮

Effect(α, [$s=0$, $y_i=1$]) = [$s=i$, $y_i=1$]

Effect(α, [$s=1$, $y_i=0$]) = [$s=i$, $y_i=1$]

Effect(α, [$s=1$, $y_i=1$]) = [$s=i$, $y_i=1$]

Effect(β, [$s=0$, $y_i=0$]) = [$s=0$, $y_i=0$]

Effect(β, [$s=0$, $y_i=1$]) = [$s=0$, $y_i=0$]

Effect(β, [$s=1$, $y_i=0$]) = [$s=1$, $y_i=0$]

Effect(β, [$s=1$, $y_i=1$]) = [$s=1$, $y_i=0$]

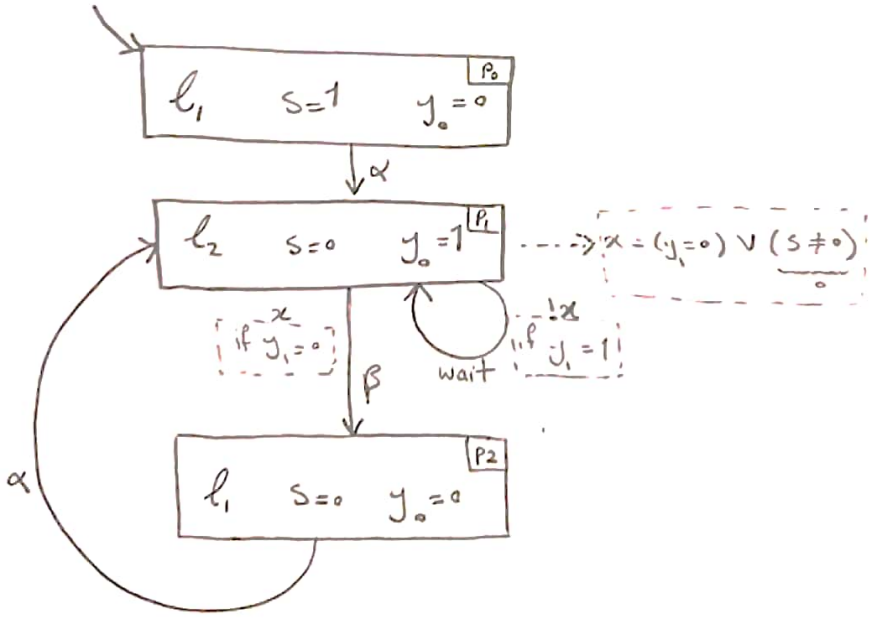
+ $\hookrightarrow = \{ l_1 \xrightarrow{-:\alpha} l_2 , l_2 \xrightarrow{!x:wait} l_2 , l_2 \xrightarrow{x:\beta} l_1 \}$

+ $Loc_0 = \{ l_1 \}$

+ $g_0 = [s=1 , y_i=0]$

b) TS :

⊕ process φ : P_0



$T_0 = (S, Act, \longrightarrow, S_0, AP, L)$

+ $S = \{ P_0, P_1, P_2 \}$

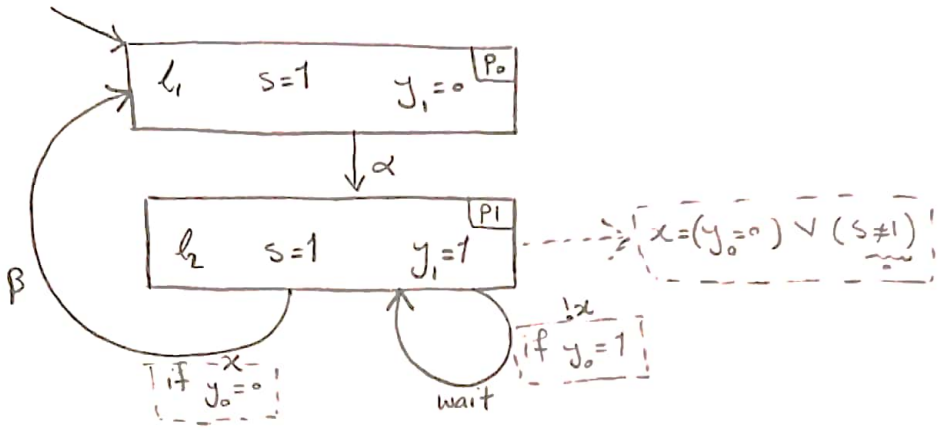
+ $Act = \{ \alpha, \beta, wait \}$

$+ \longrightarrow = \{ P_0 \xrightarrow{\alpha} P_1 \ , \ P_1 \xrightarrow{wait} P_1 \ , \ P_1 \xrightarrow{\beta} P_2 \ , \ P_2 \xrightarrow{\alpha} P_1 \}$

$+ S_0 = \{ P_0 \}$

+ AP , L ⇒ بستگی دارد که چه چیزی را بتوانیم model checking کنیم

⊕ process 1 : P1



$T_1 = (S, Act, \longrightarrow, S_0, AP, L)$

$+ S = \{ P_0 , P_1 \}$

$+ Act = \{ \alpha, \beta, wait \}$

$+ \longrightarrow = \{ P_0 \xrightarrow{\alpha} P_1 \ , \ P_1 \xrightarrow{wait} P_1 \ , \ P_1 \xrightarrow{\beta} P_0 \}$

$+ S_0 = \{ P_0 \}$

+ AP , L ⇒ بستگی به چه چیزی دارد model checking