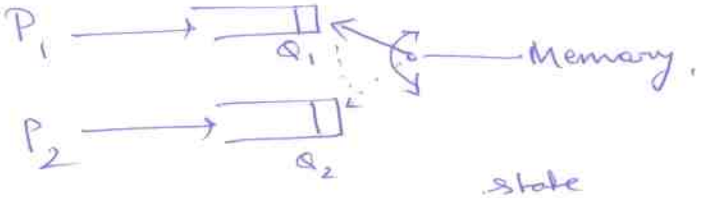
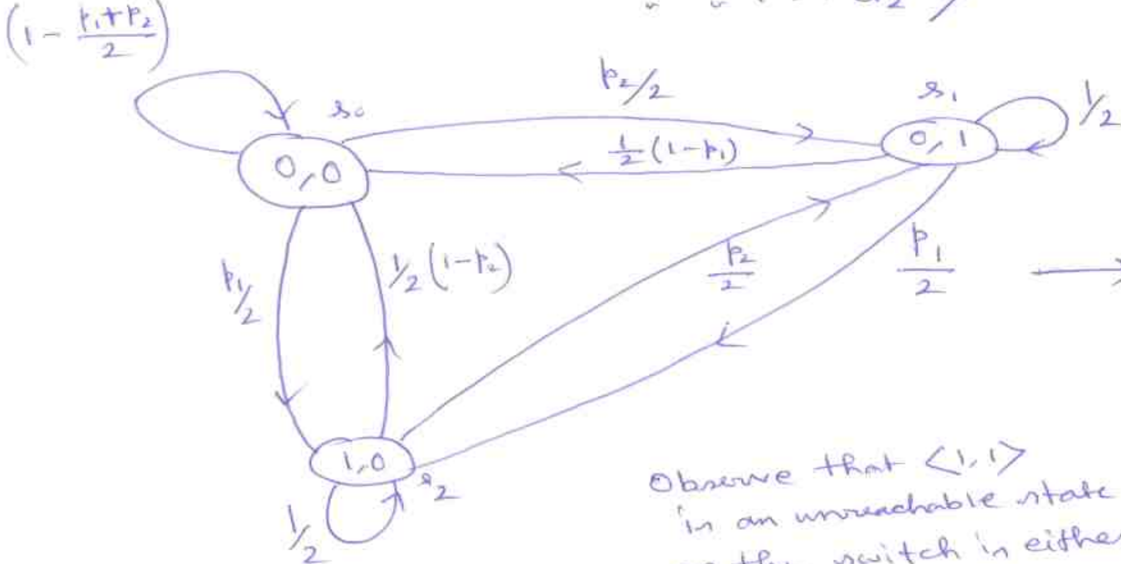
1. Each queue Q_i shall contain at most 1 pending req. $(i=1,2)$



States = $\langle 0,0\rangle$
$\langle 0,1\rangle$
$\langle 1,0\rangle$
$\langle 1,1\rangle \rightarrow$ we shall find this infeasible.

state = < no. of req in Q_1,
" " . . . Q_2 >



we missed the transitions $\delta(s_1,s_2)$ & $\delta(s_2,s_1)$ in class. This is a correction

Observe that $\langle 1,1\rangle$ is an unreachable state as the switch is either at Q_1 or Q_2. It processes at most one req. instantaneously.

$\delta(s_0,s_1)$ = P(switch at position 1 & req generated by P_2) $= \frac{p_2}{2}$
$\delta(s_0,s_2)$ = P(. . . . . . 2 . . . . P_1) $= \frac{P_1}{2}$
$\delta(s_1,s_0)$ = P(. . . . . . 2 & . not . . . . P_1) $= \frac{1-p_1}{2}$
$\delta(s_1,s_2)$ = P(. . . . . . 2 & req generated by P_1) $= \frac{p_1}{2}$
$\delta(s_2,s_0)$ = P(. . . . . . 1 & . . not . . . . P_2) $= \frac{1-p_2}{2}$
$\delta(s_2,s_1)$ = P(. . . . . . 1 & req generated by P_2) $= \frac{p_2}{2}$
$\delta(s_1,s_1)$ = P(. . . . . . 1) $= \frac{1}{2}$
$\delta(s_2,s_2)$ = P(. . . . . . 2) $= \frac{1}{2}$
$\delta(s_0,s_0)$ = P(switch at position 1 & no req gen. by P_2) +
P(. . . . . . 2 & . . . . . . P_1)
$= \frac{1}{2}(1-p_2) + \frac{1}{2}(1-p_1) = 1 - \frac{p_1+p_2}{2}$

Computing steady state probabilities is straight forward.

[Alternate answers with sufficient ~~motivatedn~~ motivation shall be graded accordingly.]

Points to remember $\rightarrow$ The question places the following restrictions.
a) processor may generate req only when queue is empty.
b) [illegible]