

MODELLING A QUEUE WITH A MARKOV CHAIN
STATES :: NUMBER OF PEOPLE IN THE QUEUE

MAX 3 PEOPLE IN THE QUEUE



- PEOPLE ARRIVE ACCORDING TO POISSON PROCESS WITH RATE $\frac{1}{3}$ PER MIN.
- SERVICE TIME IS EXponentially DISTRIB. RATE $\frac{1}{2}$ (EXPECTED SERVICE TIME: 2 MINS)

Q.T.:

	0	1	2	3
0	0 $\frac{1}{3}$	0	0	0
1	$\frac{1}{2}$	$\frac{1}{3}$	0	0
2	0	$\frac{1}{2}$	$\frac{1}{3}$	0
3	0	0	$\frac{1}{2}$	0

$Q_0 = \frac{1}{3}$
 $Q_1 = \frac{5}{6}$
 $Q_2 = \frac{5}{6}$
 $Q_3 = \frac{1}{2}$

$\tilde{P}:$

	0	1	2	3
0	0	1	0	0
1	$\frac{3}{5}$	0	$\frac{2}{5}$	0
2	0	$\frac{3}{5}$	0	$\frac{2}{5}$
3	0	0	1	0

$\tilde{P}_{10} = \frac{Q_{10}}{Q_1} = \frac{\frac{1}{2}}{\frac{5}{6}} = \frac{3}{5}$