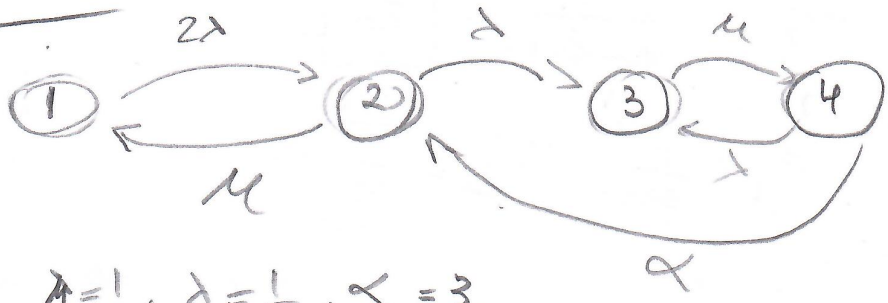
HOMEWORK 15 — JUAN PABLO KOYO SALES

15.1.A



1 = (0,0)
2 = (1,0)
3 = (1,1)
4 = (0,1)

$\mu = 1,\ \lambda = \frac{1}{4},\ \alpha = \frac{3}{4}$

$\pi_1 2\lambda = \pi_2 \mu \Rightarrow \pi_2 = \pi_1 \frac{1}{2}$

$\pi_2(\lambda+\mu) = \pi_4 \alpha \Rightarrow \pi_2 \frac{5}{4} = \pi_4 \frac{3}{4}$

$\pi_3 \mu = \pi_2 \lambda + \pi_4 \lambda \Rightarrow \pi_3 = \pi_2 \frac{1}{4} + \pi_4 \frac{1}{4}$

$\pi_3 = \pi_2 \frac{1}{4} + \pi_2 \frac{5}{12}$

$\pi_3 = \pi_2 \frac{2}{3}$

$\sum \pi_i = 1$

$\pi_2 2 = \pi_1$

$\pi_2 \frac{5}{3} = \pi_4$

$\pi_2 \frac{2}{3} = \pi_3$

$$\pi_2 = \frac{1}{1 + 2 + \frac{5}{3} + \frac{2}{3}} = \boxed{\frac{3}{16}}$$

$$\boxed{\pi_1 = \frac{3}{8},\ \pi_2 = \frac{3}{16},\ \pi_3 = \frac{1}{8},\ \pi_4 = \frac{5}{16}}$$

15.1.B

10 Mbps.

$$S_{1\,packet} = (\pi_1 + \pi_4)\frac{10}{} = \boxed{\frac{55}{8}}$$

15.2.A

$\pi_1 \frac{1}{8} = \pi_2$

$\pi_2 = \pi_4$

$\sum \pi_i$

$\pi_2 = \frac{1}{1+8+1} = \boxed{\frac{1}{10}}$

$\pi_1 = \boxed{\frac{1}{80}}$ $\pi_4 = \boxed{\frac{1}{10}}$

$\pi_3 = \boxed{\frac{63}{80}}$: NOT SURE ABOUT THIS

15.3

15.3.A

$R(t) = P(X > t) = 1 - P(X \leq t)$

$= \boxed{1 - e^{-\alpha t}}$

$\boxed{R(1\,\text{year}) = 1 - e^{-\alpha(1\,\text{year})}}$

15.3.B

$\boxed{R(t) = 1 - e^{-\alpha^2 t}}$