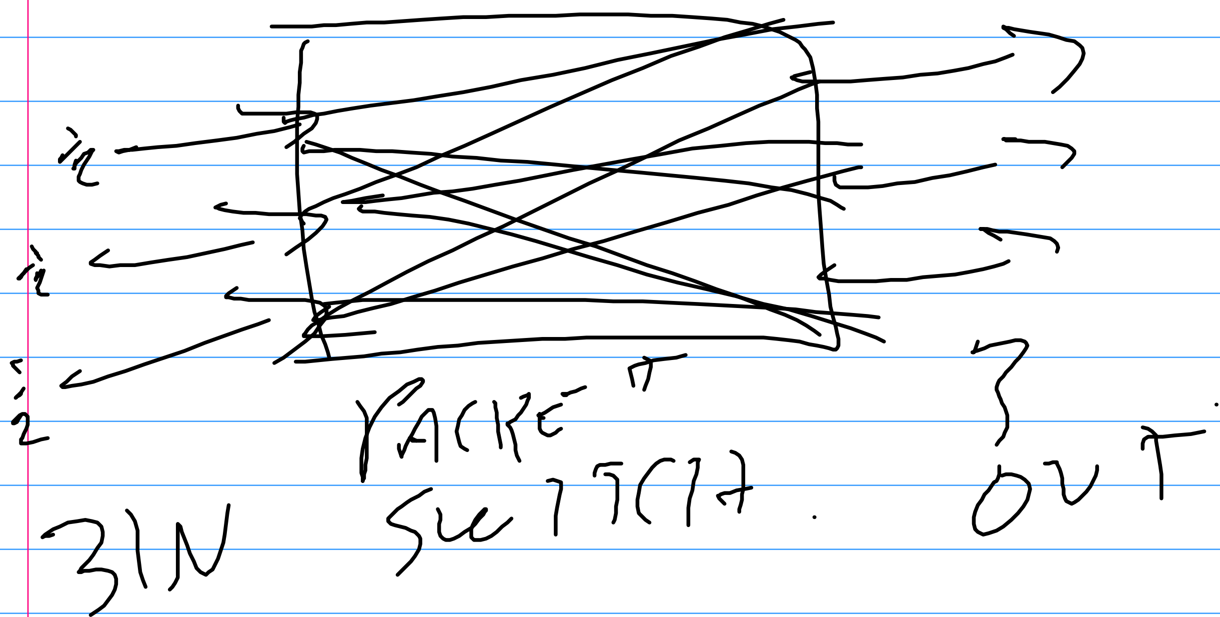
4/16/18 p1

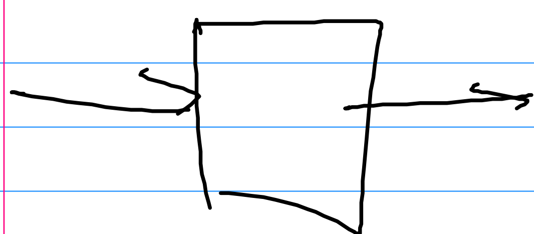
EXAMPLE 6.1



Xi = # packets on output i

Simplified version of Ex 6.5.

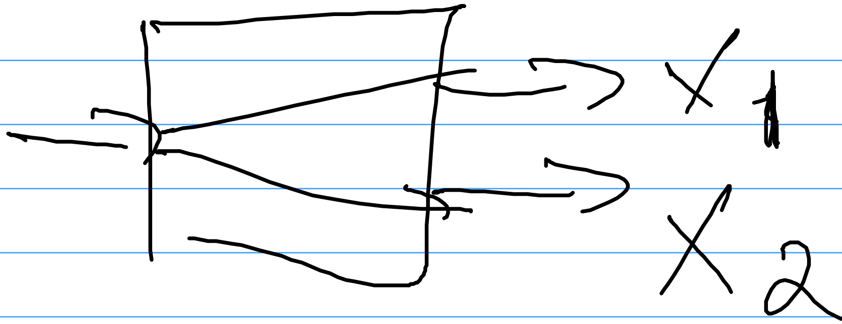
1 input line, 1 output line. P[packet on input line] = .5



X_1 = # PACK. ON THAT LINE.

$p(0) = p(1) = \frac{1}{2}$

1 INPUT, 2 OUT

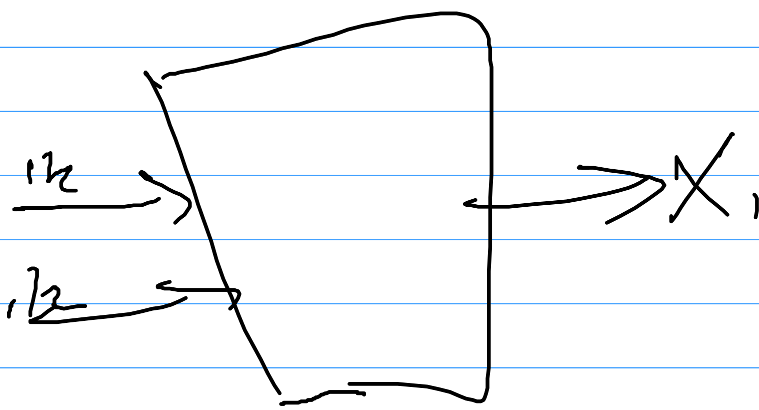


f(0,0) = 1/2

f(1,1) = 0

f(0,1) = f(1,0) = 1/4

$$\sum_{i=0}^{1}\sum_{j=0}^{1} f(i,j) = 1$$

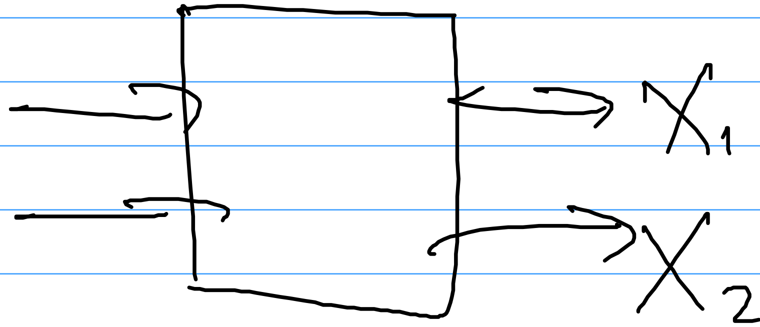


2 input, 1 output line

f_X(0) = 1/4

f(1) = 1/2
f(2) = 1/4
f(3) = 0

2 input lines and 2 output lines



pdf for # packets in switch: same as tossing 2 fair coins

for # packets, $f(n) = \binom{2}{n} \frac{1}{4}$

$f(0) = \frac{1}{4} = f(2)$ $\quad f(1) = \frac{1}{2}$

Now want # output packets on lines 1 and 2 given n total packets.

$$f(i, j \| n) = \frac{n!}{i!\, j!} \frac{1}{2^n}$$

$$i + j = n$$

f(0,0|n=0) = 1
f(0,1|n=1) = 1/2 = f(1,0|n=1)
f(0,2|n=2) = 1/4 = f(2,0|2)
f(1,1|2) = 1/2

Now we can find unconditional probs for output packets

p(0,0) = p(0,0|0) p(0) = 1 * 1/4 = 1/4

p(0,1) = 1/2 * 1/2 = 1/4 = p(1,0)

p(1,1) = p(1,1|2) p(2) = 1/2 * 1/4 = 1/8

p(0,2) = p(0,2|2) p(2) = 1/4 * 1/4 = 1/16 = p(2,0)

sum = 1