

4/4/19-1

$$F_x(x) = P[X \leq x]$$

UNIFORM $[0, 1]$ $F(x) = \begin{cases} 0 & x < 0 \\ x & 0 \leq x \leq 1 \\ 1 & 1 \leq x \end{cases}$

$$W = \text{MAX}(X, Y)$$

$$F_w(w) = P[W \leq w]$$

$$= P[\text{MAX}(X, Y) \leq w]$$

$$= P[X \leq w \text{ \& } Y \leq w]$$

$$= P[X \leq w] P[Y \leq w]$$

$$= F_x(w) F_y(w)$$

$$= w^2$$

$$f_w(w) = \frac{d}{dw} (F_w(w)) = 2w$$

$$E[W] = \int_0^1 w f_w(w) dw = \int_0^1 2w^2 dw = \frac{2w^3}{3} \Big|_0^1 = \frac{2}{3}$$

INDEP

BINOMIAL

Toss 2
fair
 $p = \frac{1}{2}$

$$P(k) = \binom{2}{k} \left(\frac{1}{2}\right)^k \left(\frac{1}{2}\right)^{2-k}$$

$$= \binom{2}{k} / 4$$

$$p = \frac{2}{2} = \frac{1}{2}$$

$k=1 : \binom{2}{1} = 2$

$k=0 : p = 1/4$

$k=1 : p = 1/2$

$k=2 : p = 1/4$

$$E = 0 + \frac{1}{2} + \frac{1}{2} = 1$$

$$P\{y=1 | x=1\} = \frac{P\{y=1 \text{ and } x=1\}}{P\{x=1\}} = \frac{1/4}{1/2}$$