

Mathematics for Computer Science
MIT 6.042J/18.062J

## Random Variables Uniform, Binomial



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nom-uniform



## Uniform Random Variables

## ...all values equally likely

"threshold" variable was uniform:

$$Pr[Z = 0] = \cdots = Pr[Z = 6]$$

$$= \frac{1}{7}$$

@ <u>0</u> <u>0</u> <u>0</u> <u>0</u> 0

Albert R Meyer



## Uniform Distribution

D ::= outcome of fair die roll Pr[D=1] = Pr[D=2] =···= Pr[D=6] = 1/6

S := 4-digit lottery number  $Pr[S = 0000] = Pr[S = 0001] = \cdots$ = Pr[S = 9999] = 1/10000

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binom-uniform.3

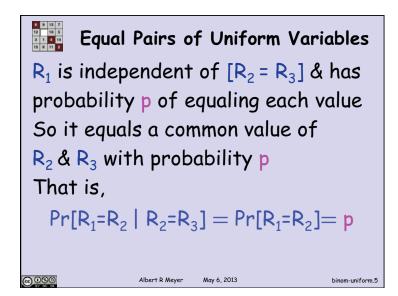
Equal Pairs of Uniform Variables Lemma. If  $R_1,R_2,R_3$  have the same range, are mutually independent, and  $R_1$  is uniform, then

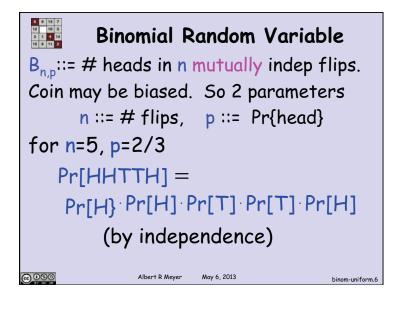
 $[R_1=R_2]$ ,  $[R_2=R_3]$ ,  $[R_1=R_3]$  are pairwise independent. Obviously NOT 3-way indep.

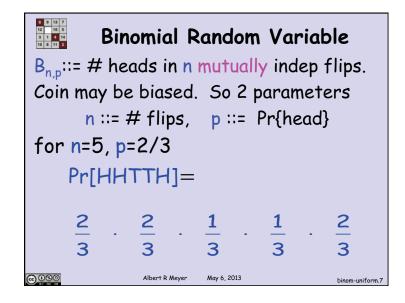
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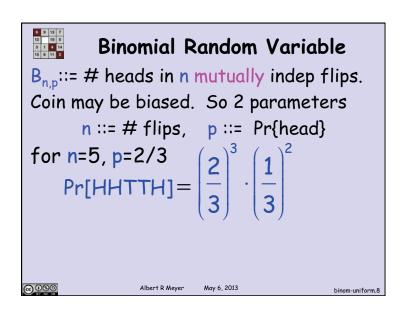
Meyer May 6

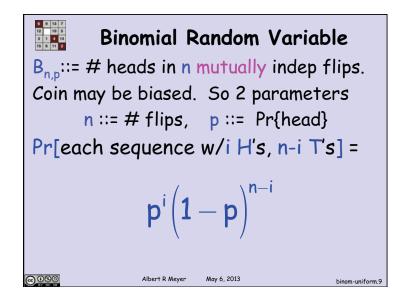
binom-uniform.4

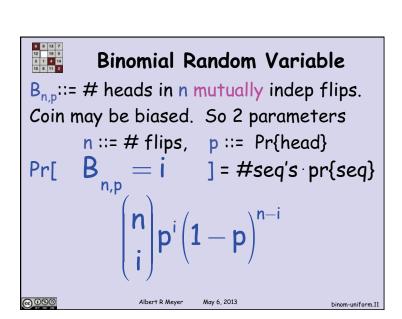


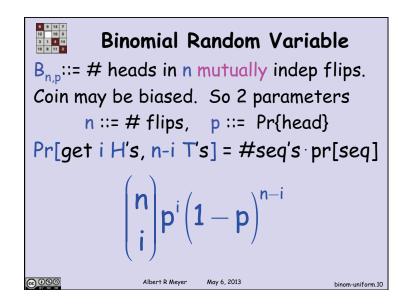


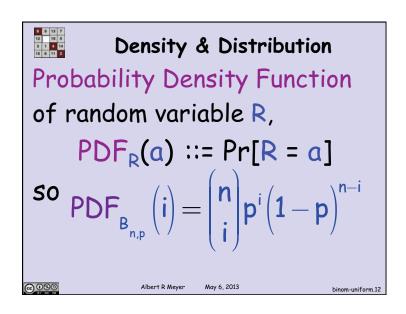


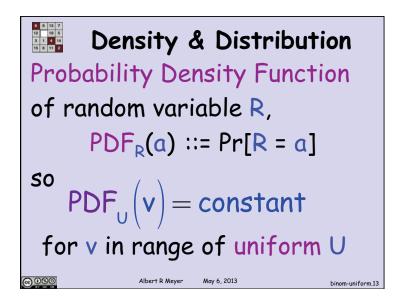


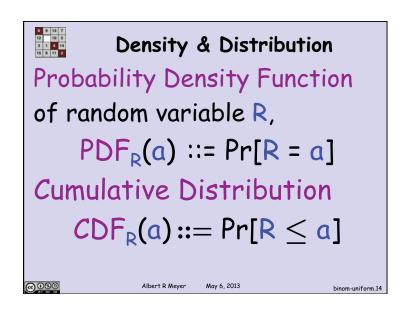


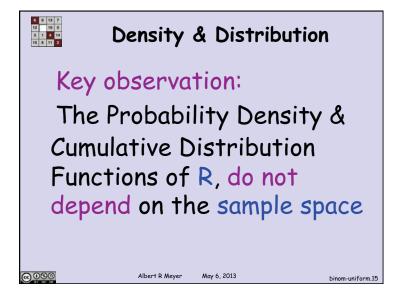












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