

# CSE 321 Discrete Structures

March 1<sup>st</sup>, 2010

Lecture 21: Probability Theory

# Annoucement

Makeup class:

- Wednesday, 3/3, 4:30pm in CSE 403

Homework posted, due Friday

# In Class

- Monty Hall three door puzzle (Rosen 6.1)
- The birthday paradox (Rosen 6.2)

# Expectation

The expected value of random variable  $X(s)$  on sample space  $S$  is:

$$E(X) = \sum_{x \in S} p(s)X(s)$$

Examples (in class):

- Expected value when rolling a die
- Expected sum when rolling two dice
- Expected number of successes in  $n$  independent Bernoulli trials
- Expected value of random variable with geometric distribution

# Linearity of Expectation

$$E(X + Y) = E(X) + E(Y)$$

Application:

Expected number of successes in  $n$  independent Bernoulli trials

# Product of Independent Random Variables

If  $X, Y$  are independent then:  $E(X * Y) = E(X) * E(Y)$