EECS 70 Discrete Mathematics and Probability Theory
Fall 2014 Anant Sahai

# Discussion 8W

**1. Simple probability**

Out of 1000 sophomore EECS students, 400 are taking CS70 (and may concurrently take CS61C), 500 are taking CS61C (and may concurrently take CS70), and 50 are taking both CS70 and CS61C.

(a) Suppose we choose a student uniformly at random. Let $C$ be the event that the student takes CS70 and $P$ the event that the student takes CS61C. Draw a picture of the sample space $\Omega$ and the events $C$ and $P$.

(b) What is the probability that the student takes CS70?

(c) What is the probability that the student takes CS61C?

(d) What is the probability that the student takes CS70 AND CS61C?

(e) What is the probability that the student takes CS70 OR CS61C?

**2. Flippin' Coins**

Suppose I have a biased coin, with outcomes $H$ and $T$, with the probability of heads $\mathbb{P}[H] = \frac{3}{4}$ and the probability of tails $\mathbb{P}[T] = \frac{1}{4}$. Suppose I perform an experiment in which I toss the coin 3 times–an outcome of this experiment is $(X_1, X_2, X_3)$, where $X_i \in \{H, T\}$.

(a) What is the *sample space* for my experiment?

(b) Which of the following are examples of *events*? Select all that apply.

(i) $\{(H,H,T),(H,H),(T)\}$

(ii) $\{(T,H,H),(H,T,H),(H,H,T),(H,H,H)\}$

(iii) $\{(T,T,T)\}$

(iv) $\{(T,T,T),(H,H,H)\}$

(v) $\{(T,H,T),(H,H,T)\}$

(c) What is the probability of the outcome $H,H,T$?

(d) What is the probability of the event that my outcome has exactly two heads?

**3. Mondays**

What is the probability of getting five Mondays in a 31-day month?

**4. Shooting Range**

You and your friend are at a shooting range. You ran out of bullets. Your friend still has two bullets left but magically lost his gun. Somehow you both agree to put the two bullets into your six-chambered revolver in successive order, spin the revolver, and then take turn shooting. Your first shot was a blank. You want your friend to shoot a blank too, should you spin the revolver again before you hand it to your friend?