Announcements

- Homework #9 due Friday
- Exam #2 is in two weeks (during lecture)
Recall: Choosing $r$ elements from $n$ elements

<table>
<thead>
<tr>
<th>Repetition Allowed</th>
<th>Order Matters</th>
<th>Order Doesn’t Matter (like a “set”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$n \times \cdots \times n = n^r$</td>
<td>$\begin{pmatrix} n + r - 1 \end{pmatrix}$</td>
<td>$\begin{pmatrix} n \end{pmatrix} = \frac{n!}{(n - r)! r!}$</td>
</tr>
<tr>
<td>$P(n, r) = \frac{n!}{(n - r)!}$</td>
<td>$\begin{pmatrix} n \end{pmatrix}$</td>
<td>$\begin{pmatrix} n \end{pmatrix}$</td>
</tr>
</tbody>
</table>
More Probability Questions…

How many people are in this class? (133)

How many are Sophomores? (46)

1. How many ways are there to make a human pyramid that looks like this using students in this class?

Suppose we construct one randomly…

2. What is the probability that it is all Sophomores?

3. What is the probability that you and your friend will be in the pyramid side-by-side?
More Probability Questions…

Your bag of skittles contains:

- 10 red
- 5 yellow
- 7 green
- 6 purple
- 4 orange

1. How many ways are there to reach in and grab 4 skittles? Are all of these outcomes equally likely?
2. Can you construct a sample space with equally likely outcomes?
3. What is the probability that you get four greens?
4. What is the probability that you get two green and two yellow?
More Probability Questions…

How many strings of length 8 can be formed using the 26 letters of the alphabet?

Let’s assume that a string of length 8 is formed randomly.
1. What is the probability that it contains only consonants (we will consider Y a consonant).
2. According to some website I found, there are 5454 four-letter words. What is the probability that the string is comprised of two four-letter words concatenated together?
3. What is the probability that the string either starts with a four-letter word or ends with a four-letter word? (Be careful not to count things twice!)
More Probability Questions…

How many people do you need to have in a room so that it is more than 50% likely that some pair of people in the room have the same birthday?
More Probability Questions…

How many 5-card poker hands are possible?

If you are dealt a random hand, what is the probability of:

– Straight flush
– Four of a Kind
– Full House
– Flush
– Straight
– Three of a Kind
– Two Pairs
– Pair