In-Class Problems Week 13, Fri.

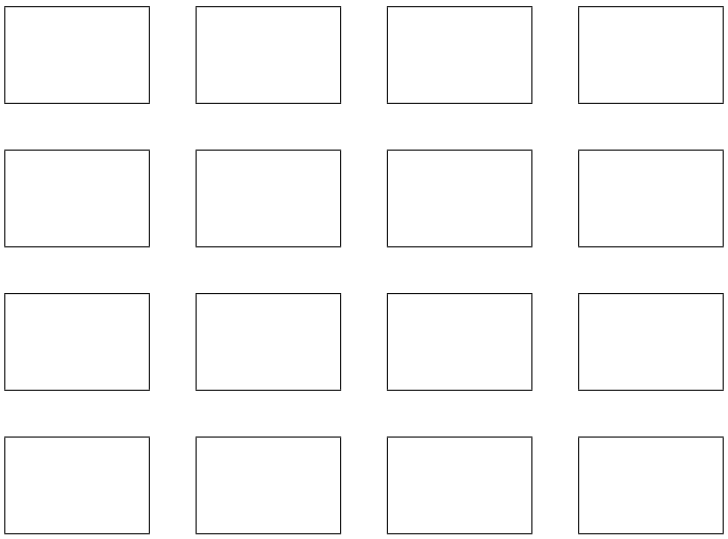
Problem 1. A couple decides to have children until they have both a boy and a girl. What is the expected number of children that they'll end up with? Assume that each child is equally likely to be a boy or a girl and genders are mutually independent.

Problem 2. There is a nice formula for the expected value of a random variable R that takes on only nonnegative integer values:

$$\mathrm{E}[R] = \sum_{k=0}^{\infty} \Pr\{R > k\}$$

Suppose we roll 6 fair, independent dice. Let R be the *largest* number that comes up. Use the formula above to compute $\mathrm{E}[R]$.

Problem 3. A classroom has sixteen desks arranged as shown below.



If there is a girl in front, behind, to the left, or to the right of a boy, then the two of them *flirt*. One student may be in multiple flirting couples; for example, a student in a corner of the classroom can flirt with up to two others, while a student in the center can flirt with as many as four others. Suppose that desks are occupied by boys and girls with equal probability and mutually independently. What is the expected number of flirting couples?