

Applications of Binomial Coefficients

Subsets

k-element subsets of an n-set

1-1 correspondence between such sets and n-bit sequence with k 1's

$$\# = \binom{n}{k}$$

Committees with Constraints

4 boys 3 girls

choose 2 boys and 2 girls

$$\binom{4}{2} \binom{3}{2} = 6 \cdot 3 = 18$$

Conflict Resolution

4 boys and 3 girls

John Mary cannot serve together

How many committees of 4

with John $\binom{5}{3} = 10$

with Mary $\binom{5}{3} = 10$

neither $\binom{5}{4} = 5$

25

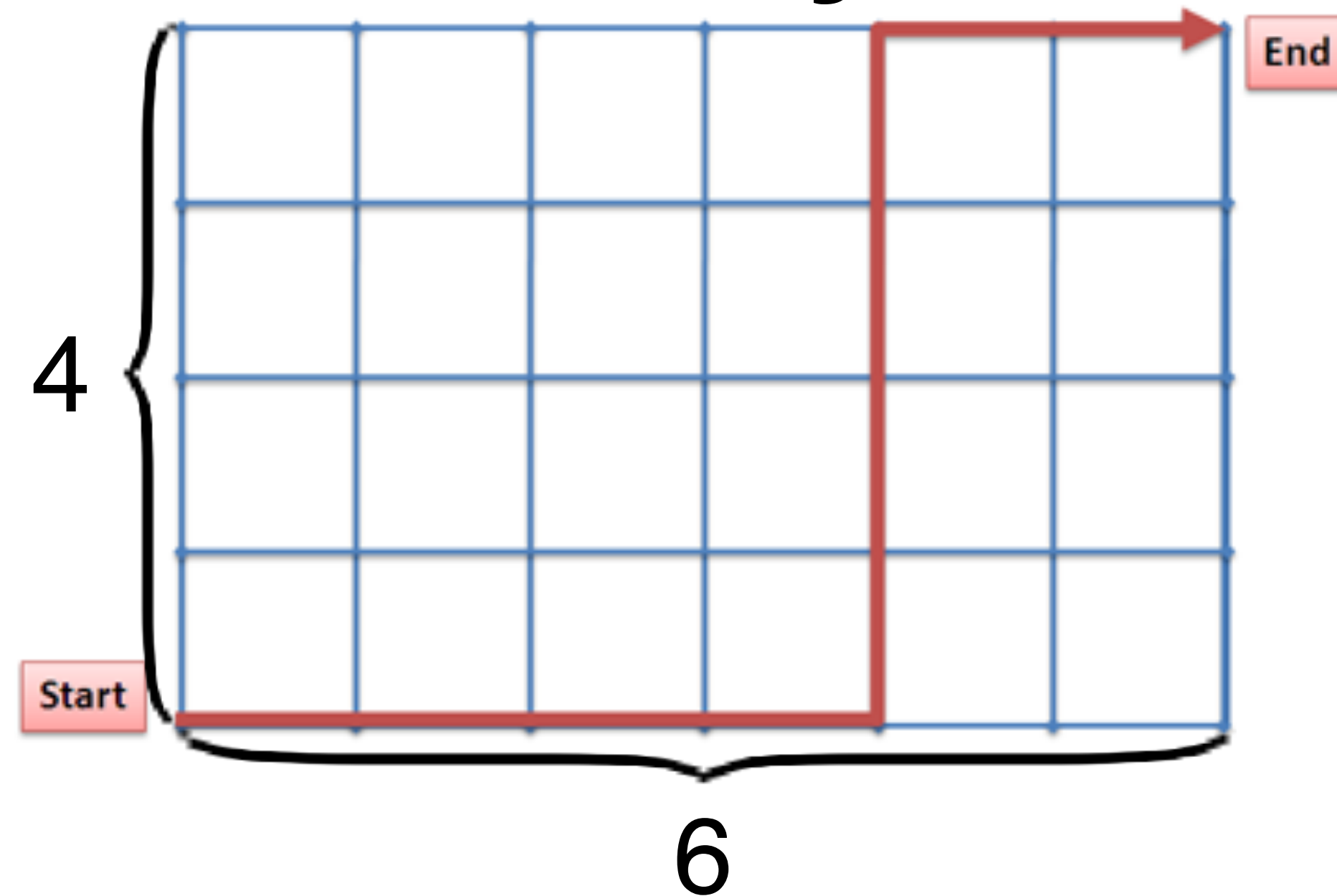
Triangles

n points in general position in plane

How many triangles can be formed?

$$\binom{n}{3}$$

How Many Paths?



Every path from Start to End is a length-10 sequence of U,R with 6 R's

$$\# \text{ of paths} = \binom{10}{6} = 210$$

Next: Properties