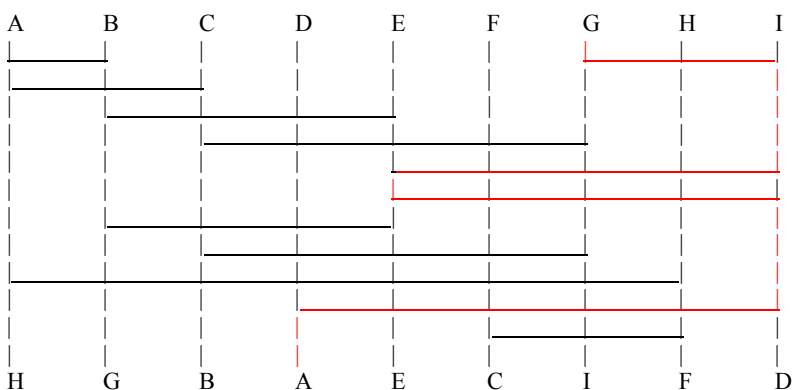


## Discrete Mathematics --- Day 16 --- October 6, 2003

\*Exam Friday and Homework is due\*



How do you get  $G \rightarrow A$  by placing a line in the middle of the permutation between the lines connecting CG and BE?

1. Trace lines from G at the top to that level in the middle
2. Do the same for A from the bottom
3. Then connect the two points at the level in the middle.

Choose Numbers

“n choose k”  $\binom{n}{k}$

Number of ways to select K objects out of n distinct objects

There is NO ARRANGING with the choose numbers, JUST SELECTING

The *selection* of A, V and X is the same as the selection of X, A and V, even if the order is different.

In some situations, order matters. For example, with passwords.

$AVX \neq XAV$

Number of 3-letter passwords without repeats is  $26 * 25 * 24$

When selecting and arranging don't use choose numbers. The product rule usually applies.

Sample Question: Given 26 students, how many ways to select 3 of them to fail?

$AVX = XAV$

Same selection

Use choose numbers  $\binom{26}{3} = \frac{26 * 25 * 24}{3 * 2 * 1} = 2600$

Pay attention:

Are you simply selecting -  $\binom{n}{k}$  or selecting and arranging – product rule

7 X 11 Grid

Bobby leaves school and walks directly home; (moves only south and east.)

How many such routes are there?

1	1	1	1	1	1	1	1	1	1
1	2	3	4	5	6	7	8	9	10
1	3								
1									
1									
1									
1									?

A: Number of Ways

^

B: Strategy

$$\frac{16!}{6!*10!} = 8008$$

Anagram = ways to walk

Every way to walk is an anagram of the word “EEEEEEEEEESSSSSS,” because regardless of the route you walk, you must take 6 steps to the south and 10 steps to the east.