Assignment #3 Due Wednesday 10/4

Exam 1 Wednesday 10/4

Covering
1. Basic enumeration
2. Binomial Coefficients
3. Inclusion/Exclusion + Pigeonhole Principle.

Assignments 1, 2, 3

Exam questions will be similar to HW problems or almost exactly like examples done in class.
Lattice paths on grids covered on 9/4 will be one topic.

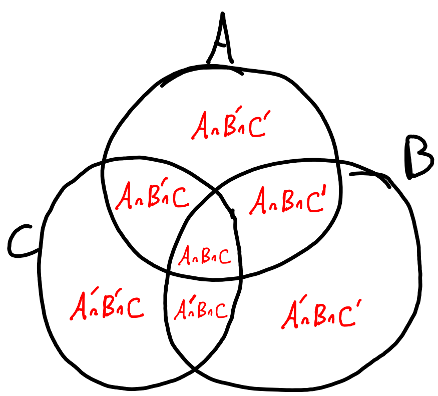
Assignment #4 due Wednesday 10/11

Comments for assignment #3.

① similar to the example in lecture notes using $\{1,2,3,4,5,6,7\}$.

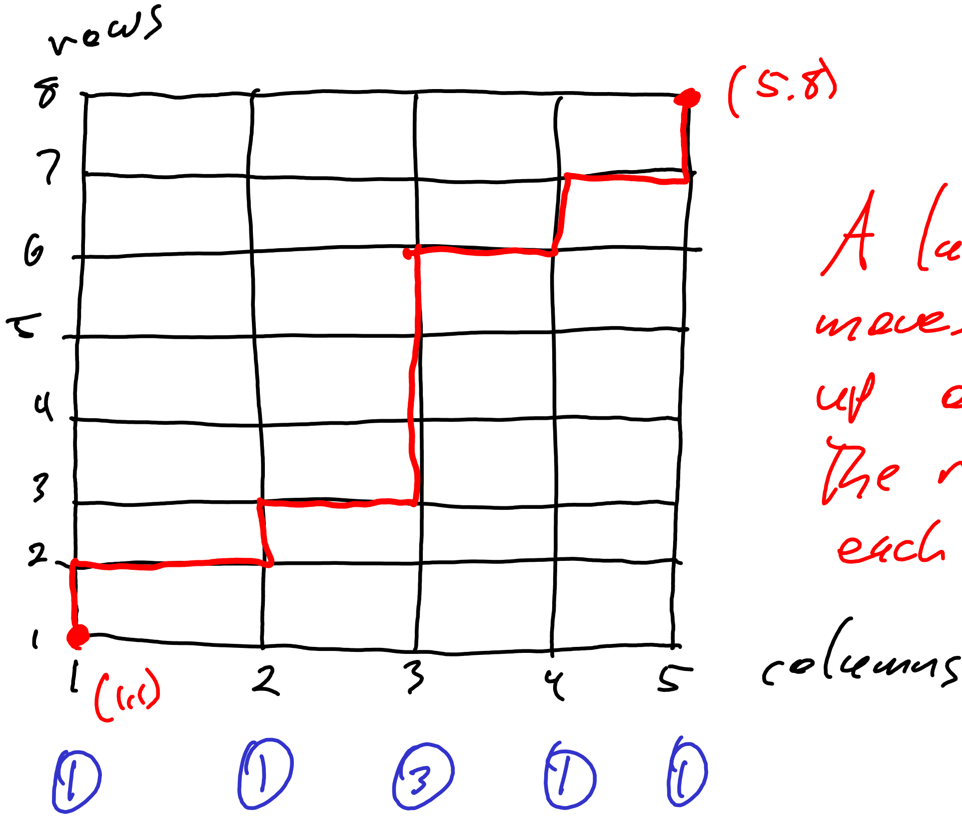
② Similar to the example about studying for an exam.

③

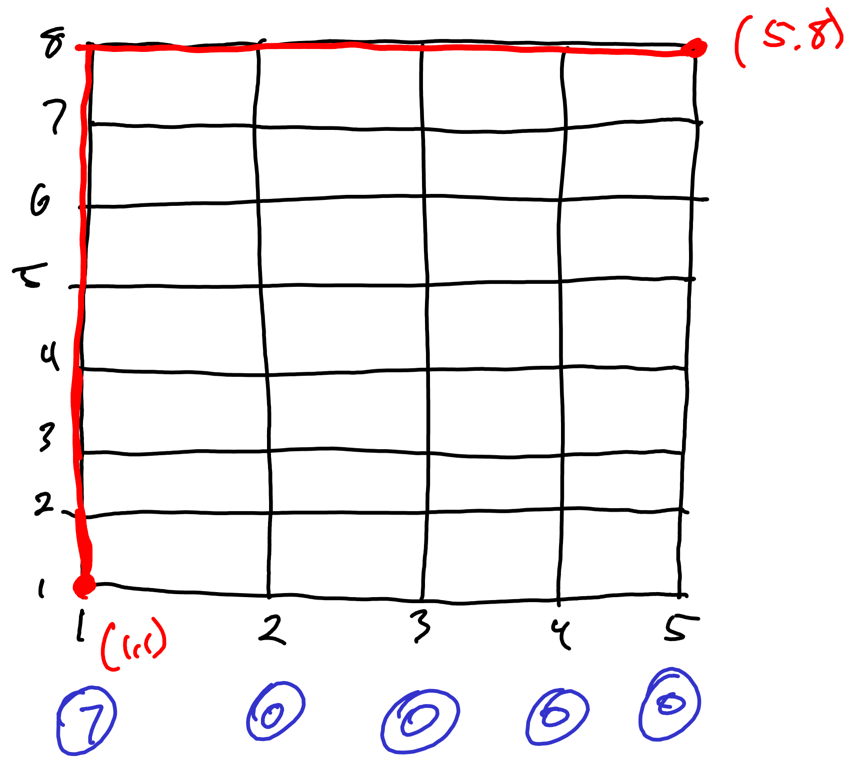


When you try to fill in the diagram with the number of elements in the 7 mutually exclusive sets, one set will be forced to have a negative number of elements, which is impossible.

Lattice paths



A lattice path moves either up or to the right at each step, staying on the grid lines



etc ....

A lattice path in this 8×5 grid has 7 upward steps distributed among the 5 distinct columns

So a lattice path is defined exactly by the distribution of 7 upward steps (identical) distributed into the 5 (distinct) columns.

Remember distributing n identical balls into k distinct baskets is done in $\binom{n+k-1}{k-1} = \binom{n+k-1}{n}$ ways.

So here the number of lattice paths is

$$\binom{7+5-1}{5-1} = \binom{11}{4} = 330$$

More generally, the number of lattice paths in a grid with r rows and c columns

is $$\binom{r-1+c-1}{c-1}$$

because there are $r-1$ upward steps (balls) distributed into c columns (baskets).