

Math 3385

Talking about topology in the club

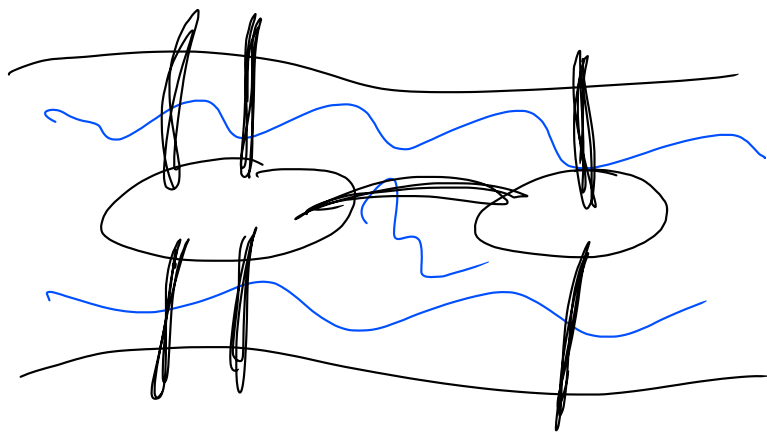
"A modern form of geometry"

"Like geometry, but without distances & angles"

Like geometry of "rubbery shapes"

The "original" topology problem (Euler, 1736)

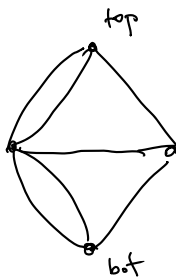
"The 7 Bridges of Königsberg"



Can you walk
across each bridge
without repeating
any?

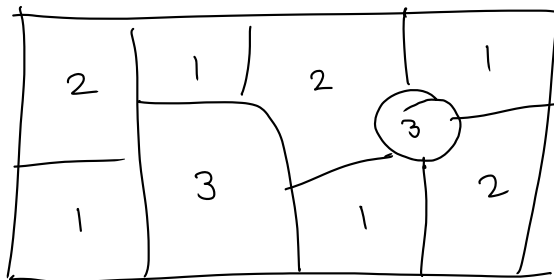
Looks like geometry, but it's not.

Euler's idea:



All that matters are the points, and the connections.

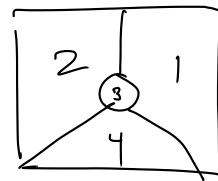
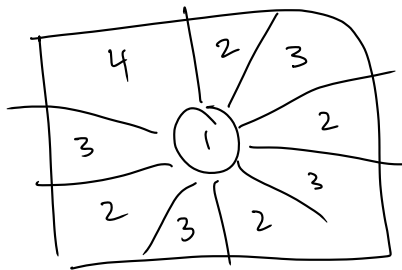
The 4 color problem



Any planar
map

We want to color it so no neighbors
have the same color

I can do it with 3.



Sometimes 4 are required.

The 4 color problem (1852)

Are 4 colors enough for any map?

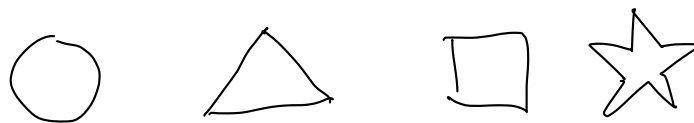
Eventually proved that 4 colors suffice
in 1976

Proof was done by computer

Haken & Appel proved that any map
has a reduction to one of 1834
configurations. These were individually checked
by the computer

~~Still~~ no short proof - best modern proof
uses 633 cases.

In geometry, these shapes are different:



in topology they're all the same.

I ● TOPOLOGY

We'll do lots of set theory
proofs