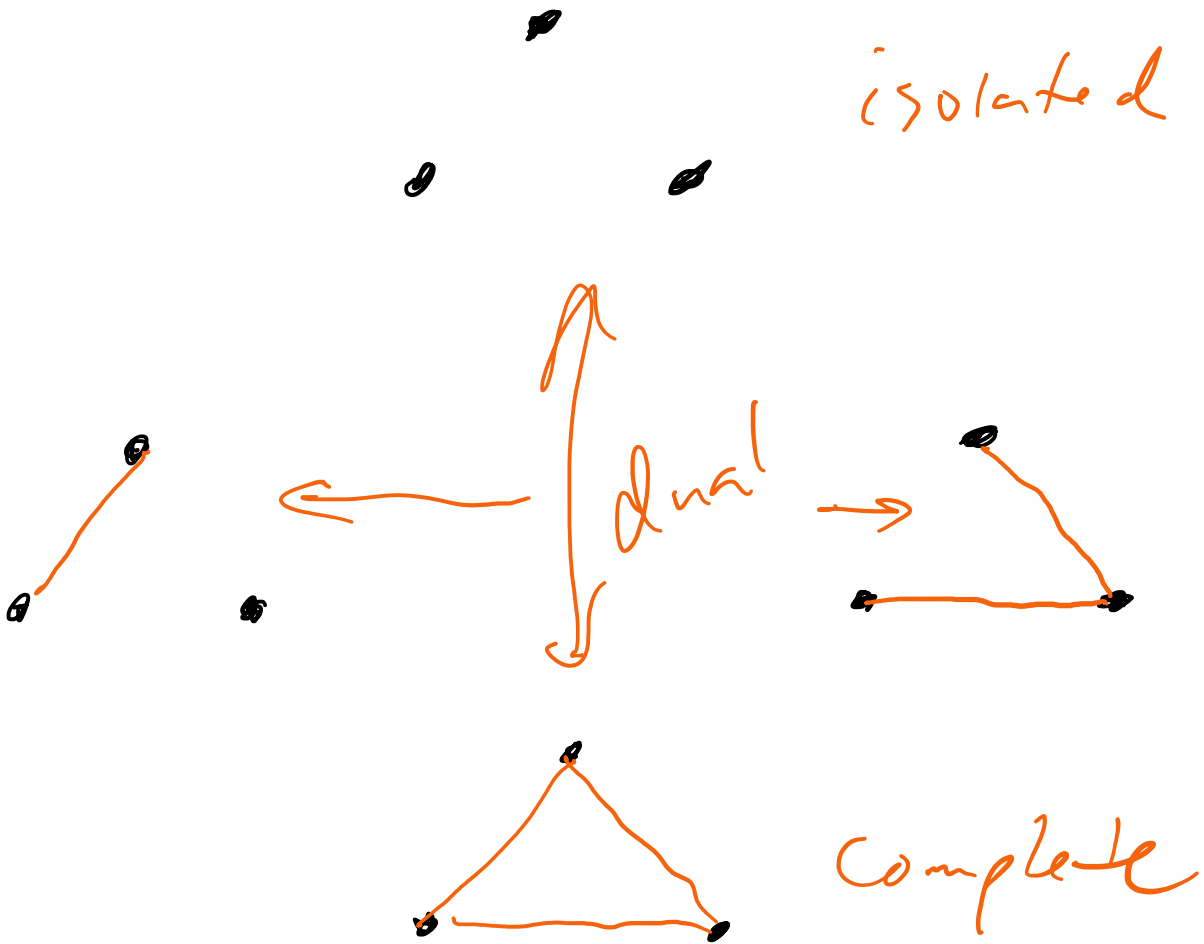


Simple Graphs w/ Three vertices



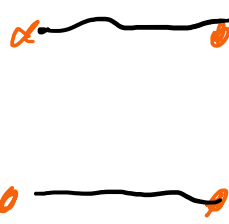
Simple Graphs w/ Four Vertices



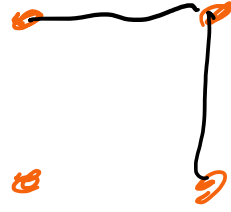
isolated



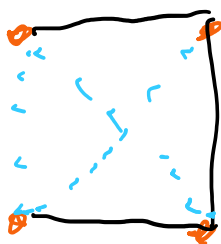
single edge



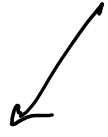
dual to
tree



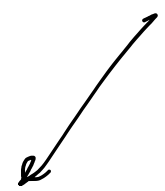
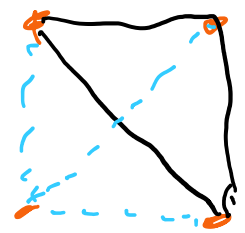
dual to
the
umbrella

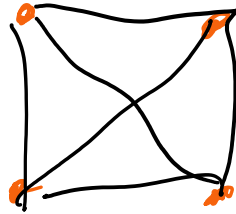
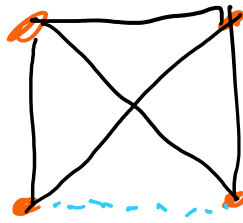
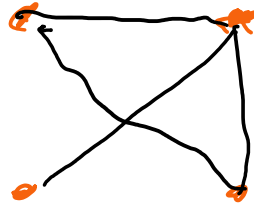
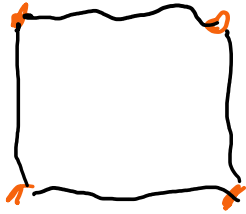


(self
dual)



(duals)



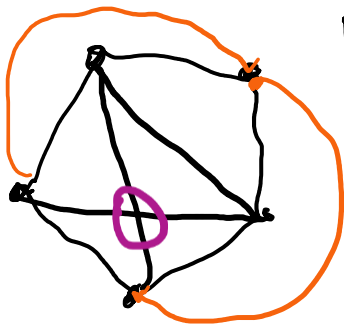
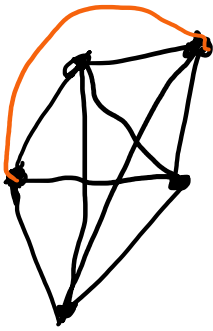
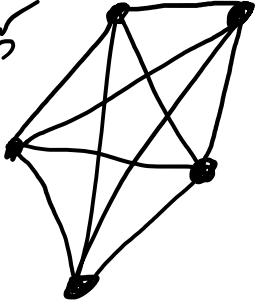


dual to
the single
edge
above

Complete
graph K_4

Planar Graphs:

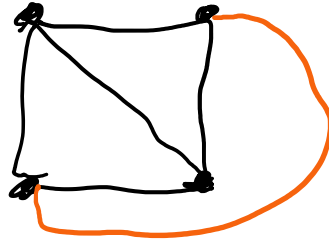
K_5



not
planar

can't get
rid of
that last
false
intersection

K_4



planar

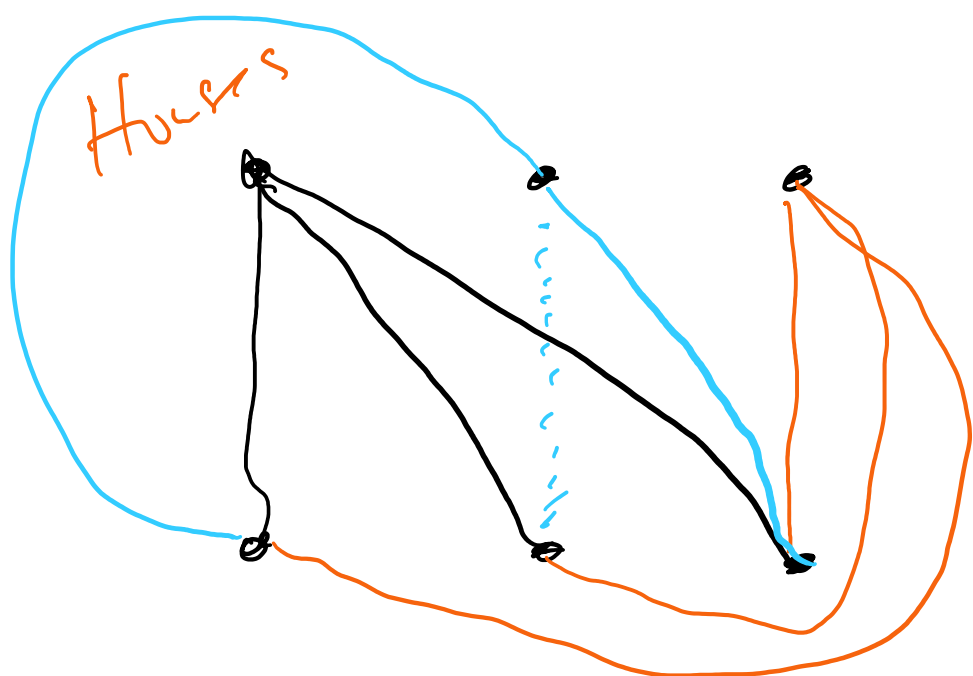
(no
false

intersec-
tions)

The other
simple non-planar
graph is $K_{3,3}$:

Houses + Utilities
graph

$K_{3,3}$:



Utilities

not
planar!

All non-planar graphs
contain a copy of K_5 or
 $K_{3,3}$ within them!