# SHORTEST PATHS IN PORTALGONS

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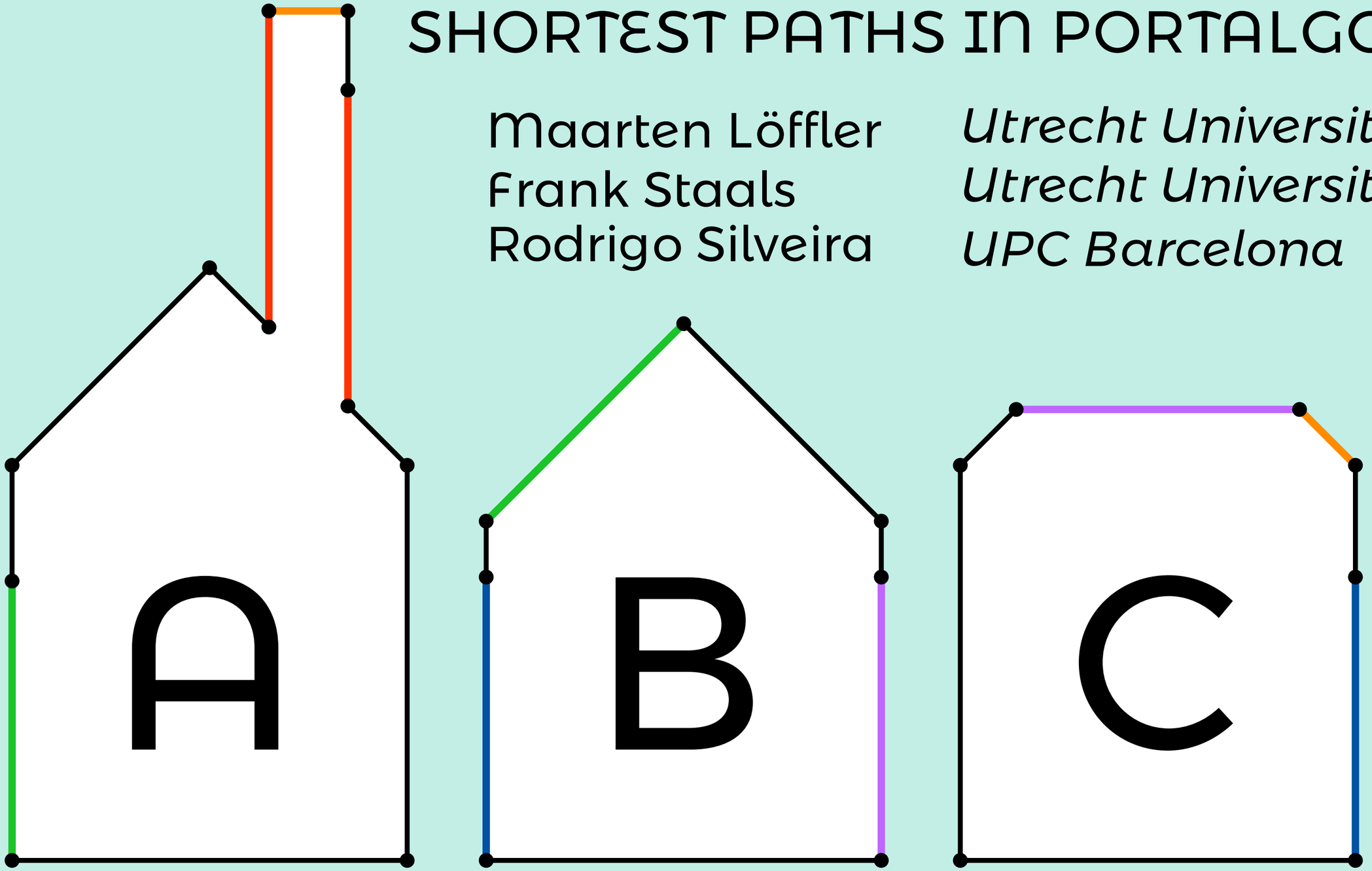
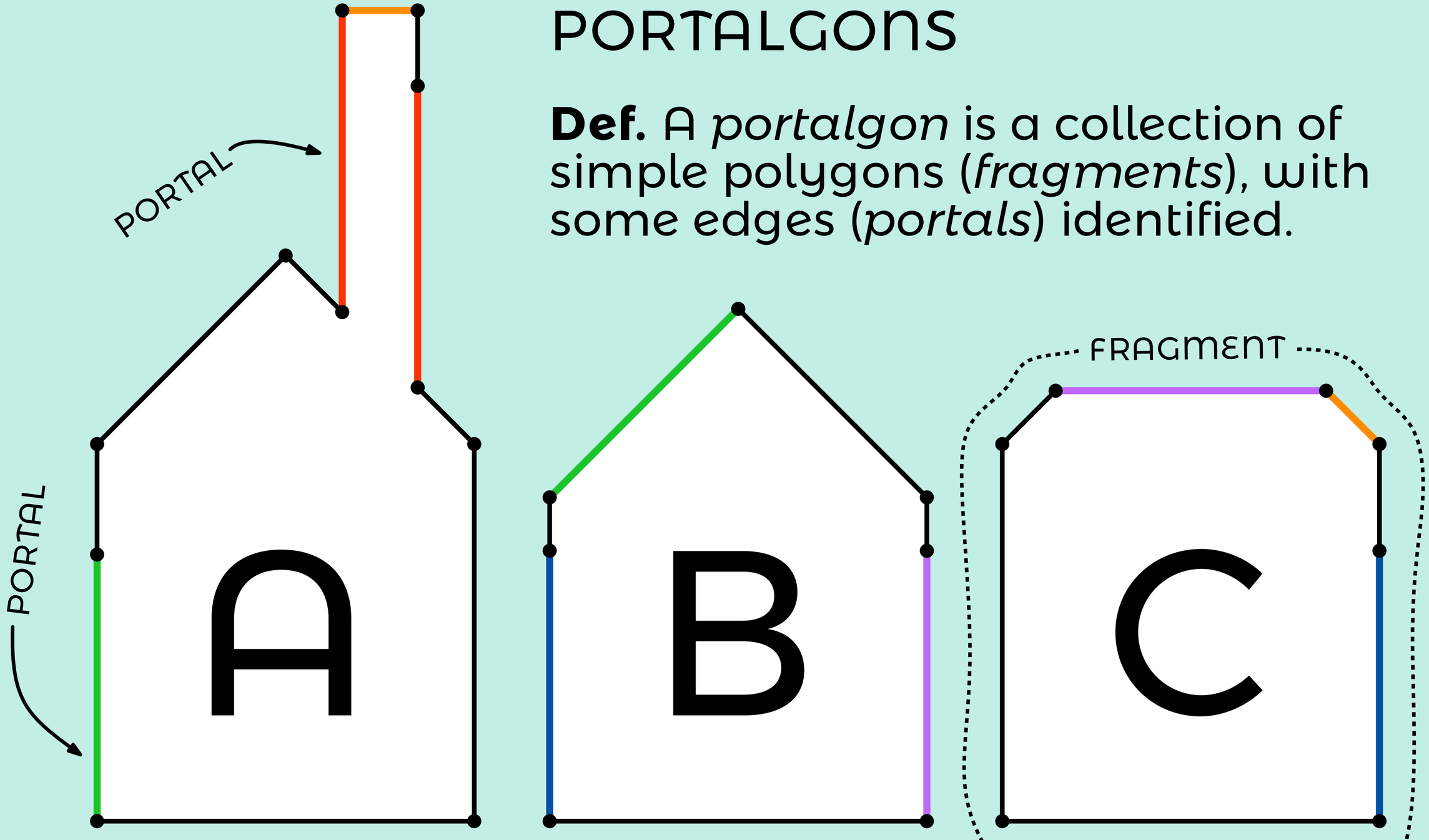
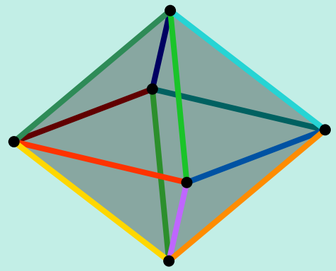


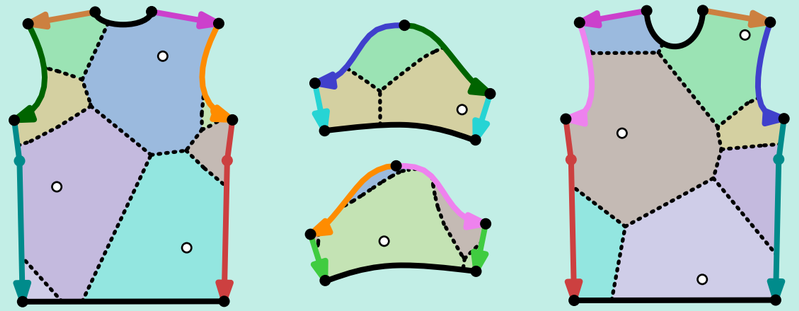
# PORTALGONS

**Def.** A *portalgon* is a collection of simple polygons (*fragments*), with some edges (*portals*) identified.



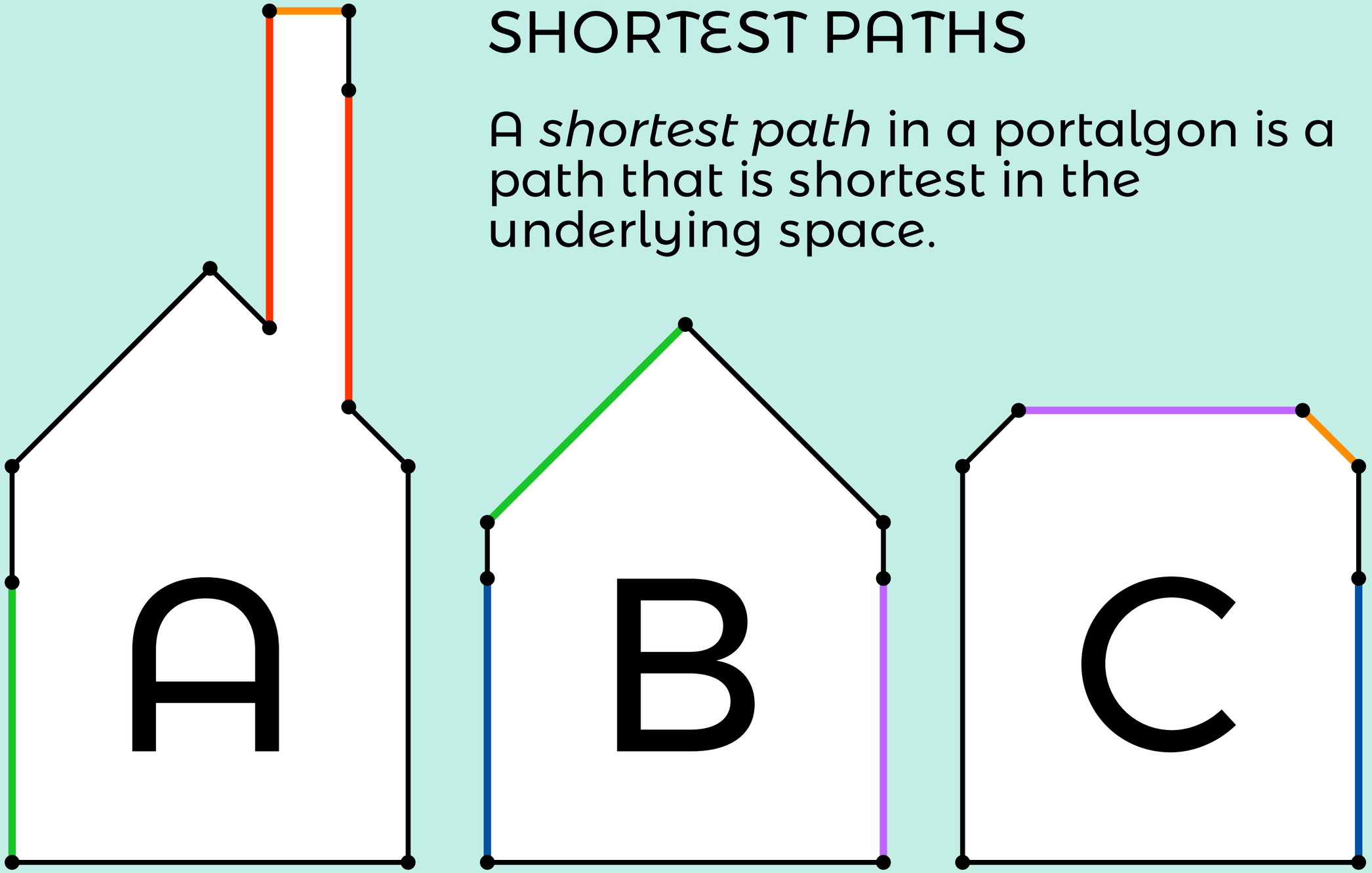
# MOTIVATION





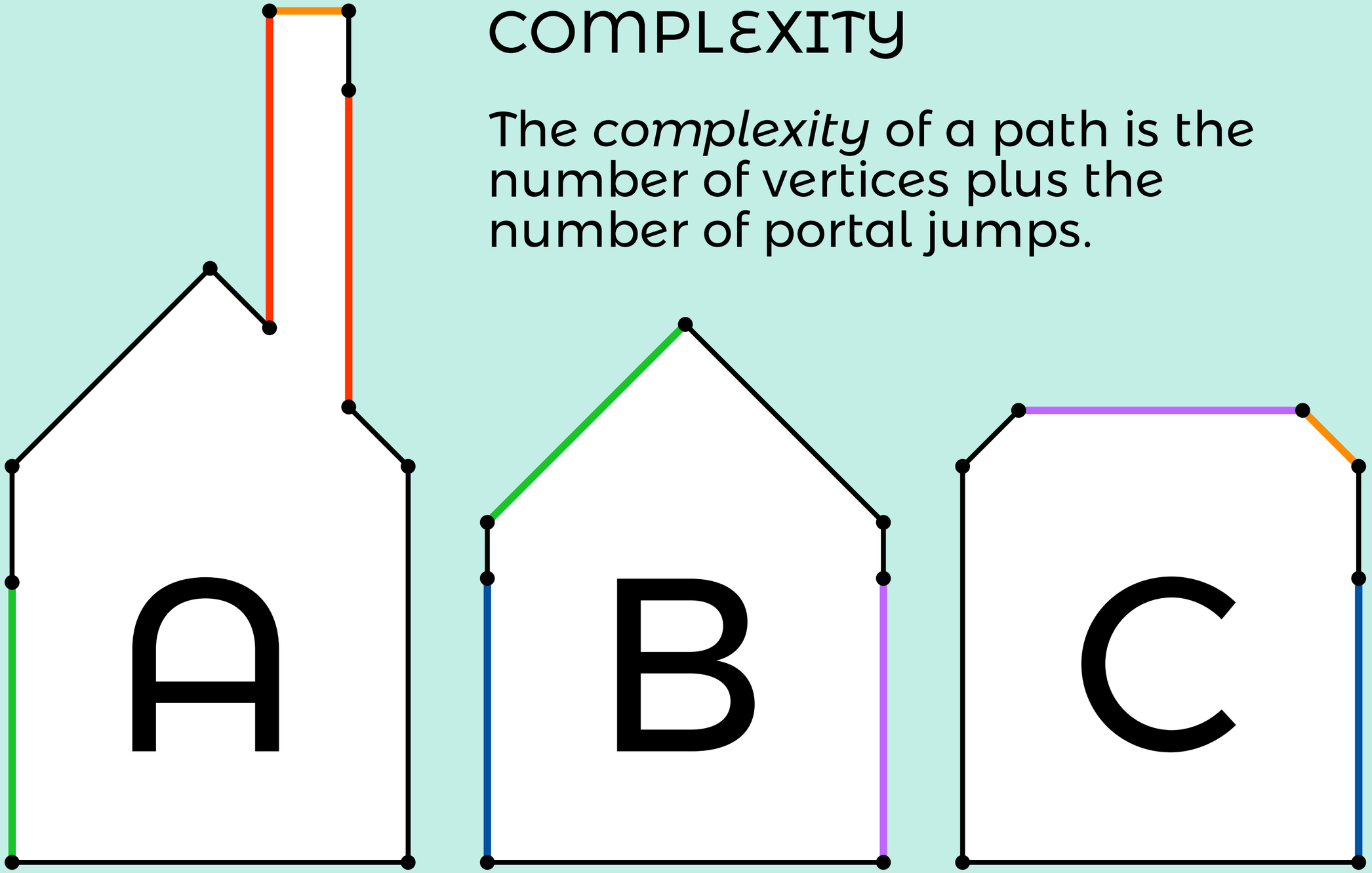
# SHORTEST PATHS

A *shortest path* in a portalgon is a path that is shortest in the underlying space.



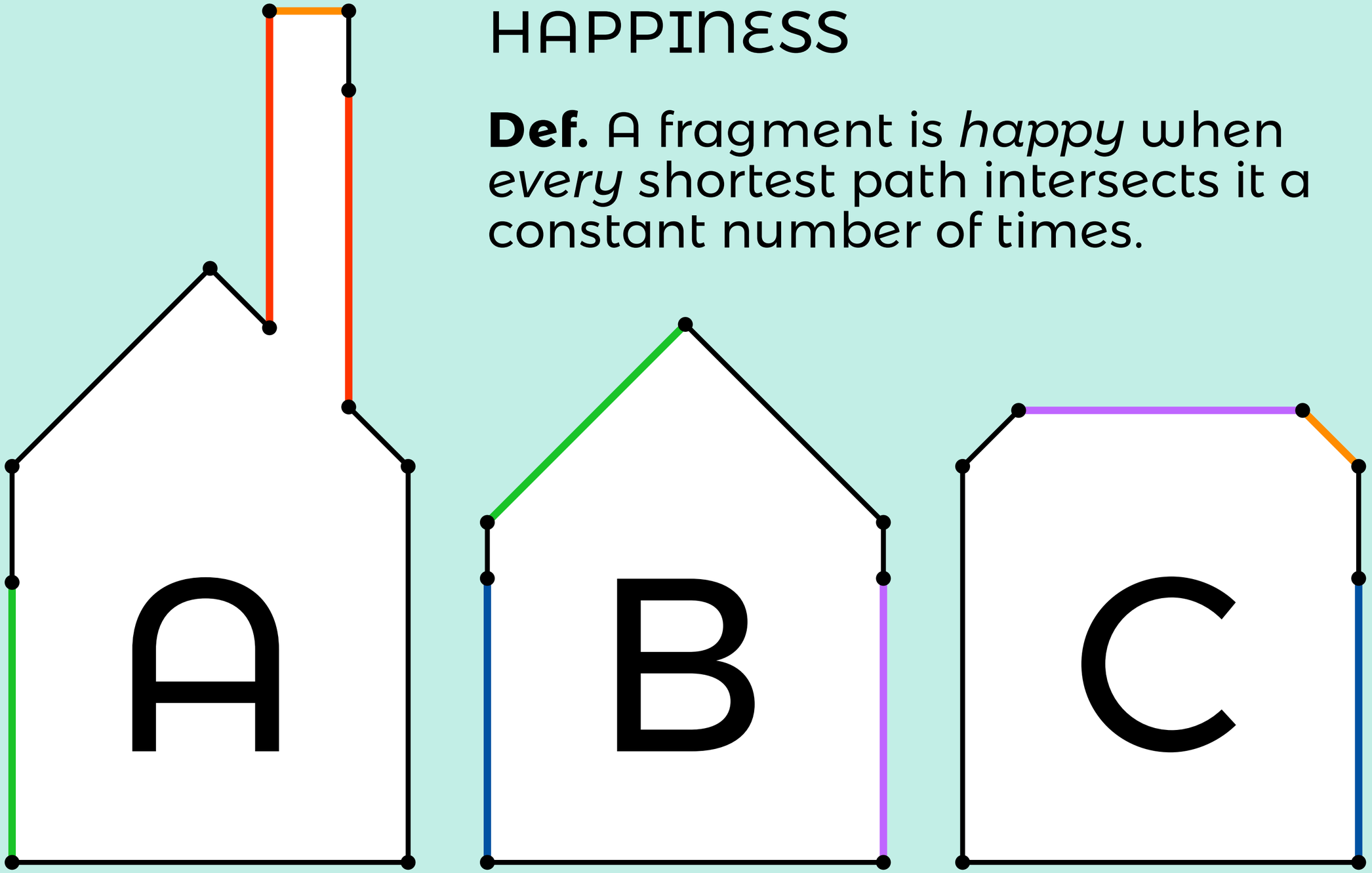
# COMPLEXITY

The *complexity* of a path is the number of vertices plus the number of portal jumps.



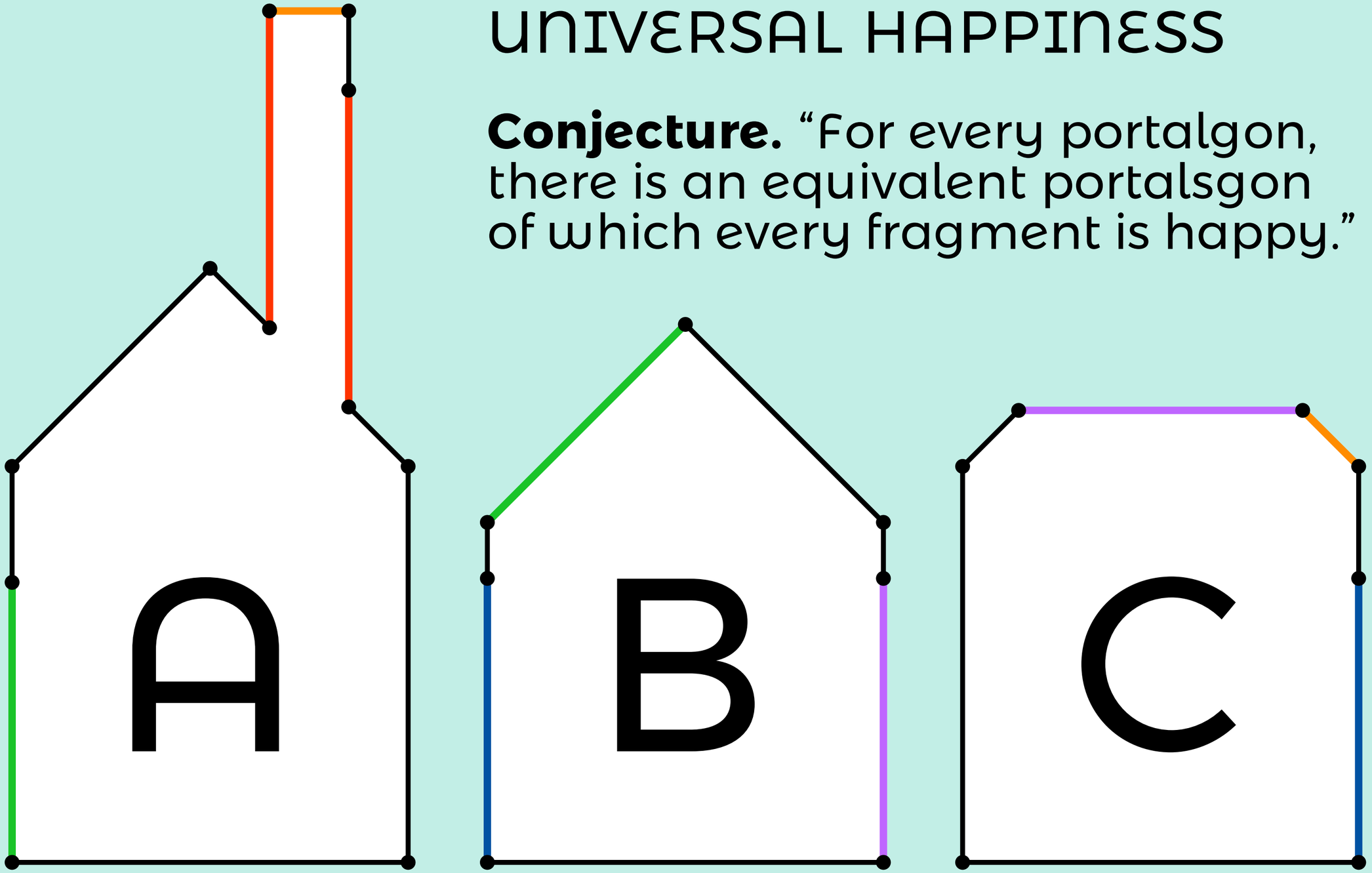
# HAPPINESS

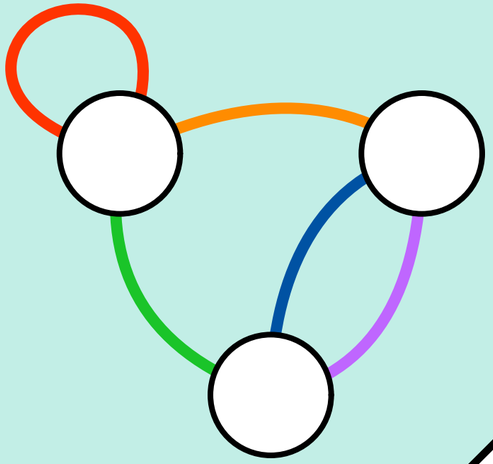
**Def.** A fragment is *happy* when *every* shortest path intersects it a constant number of times.



# UNIVERSAL HAPPINESS

**Conjecture.** “For every portalgon, there is an equivalent portalsgon of which every fragment is happy.”



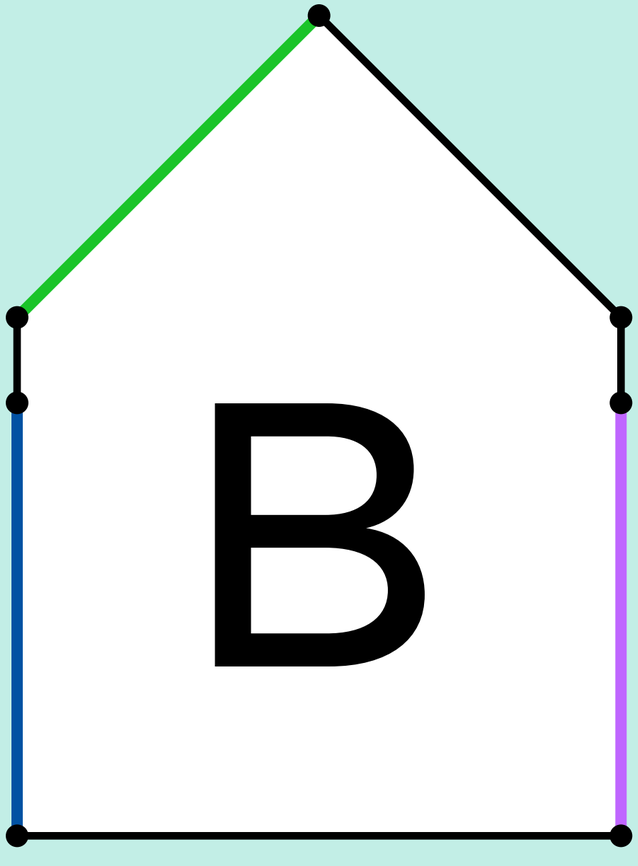


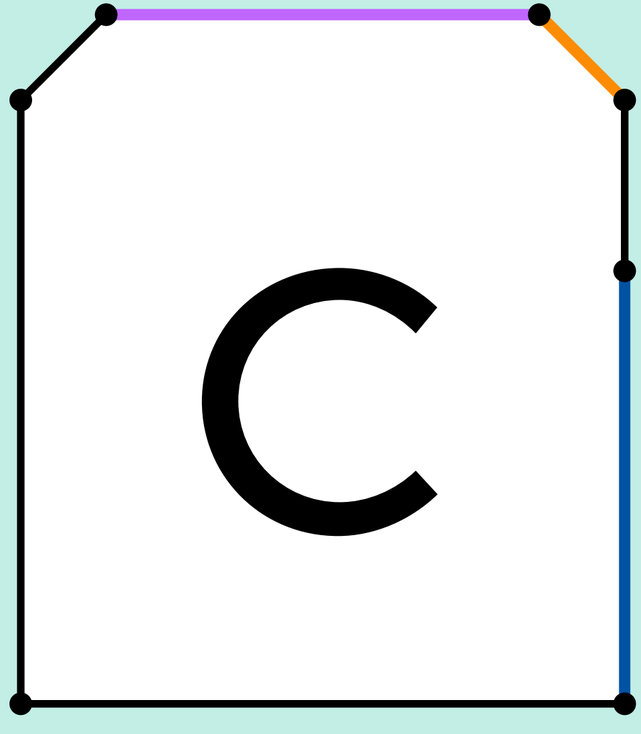
# RESULTS

We prove the conjecture for:

- 1 fragment with 1 portal;
- “simple” fragment graphs.

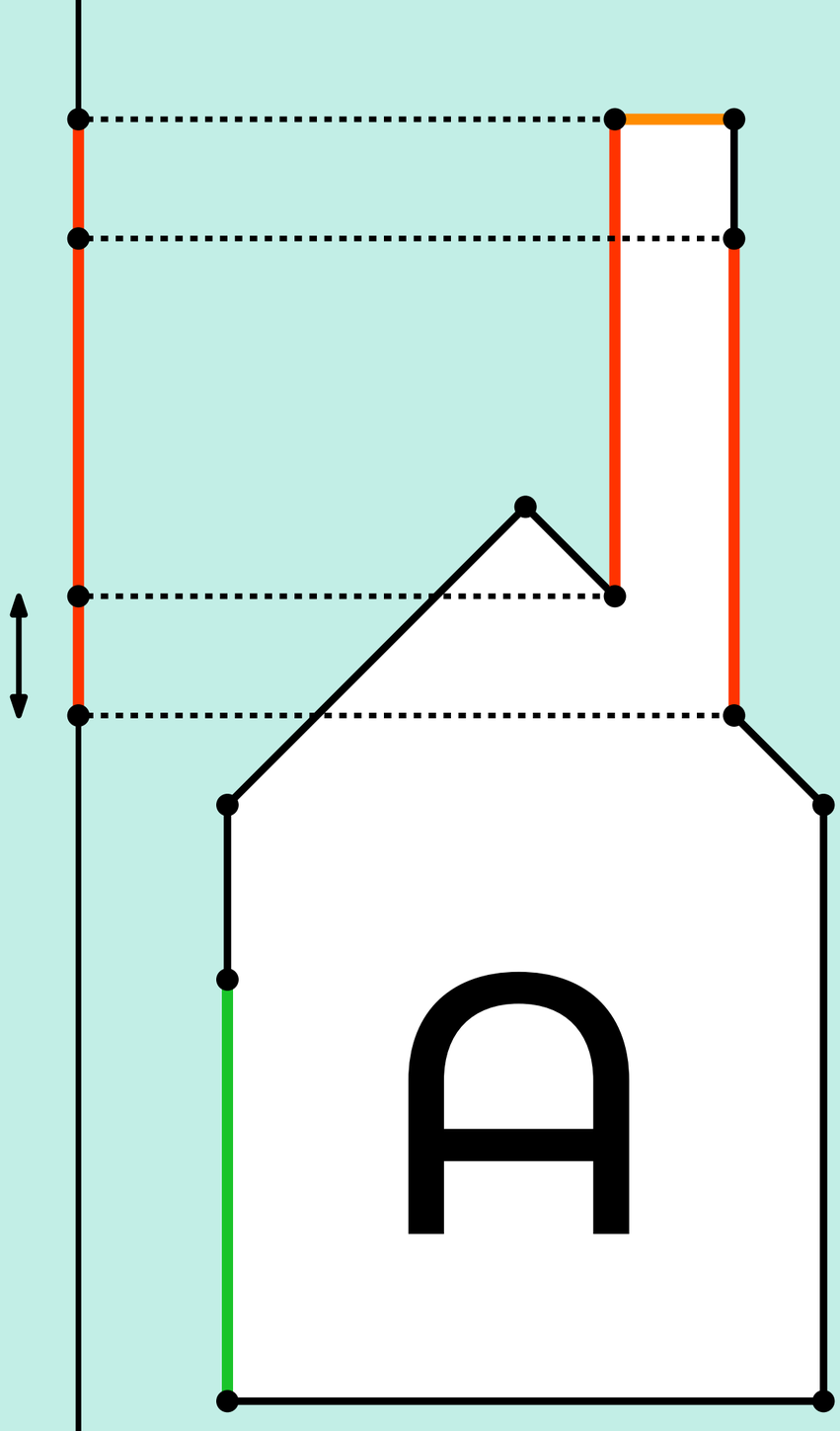


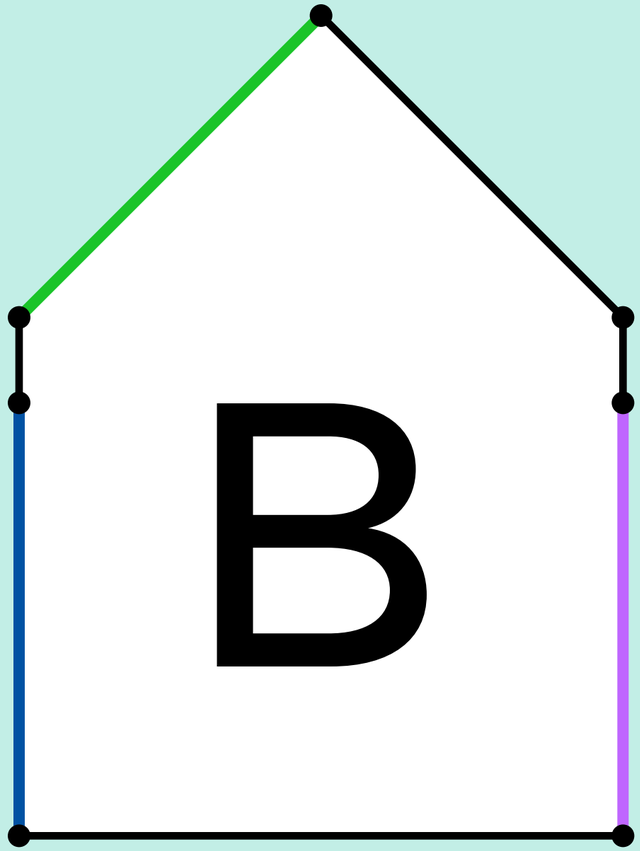



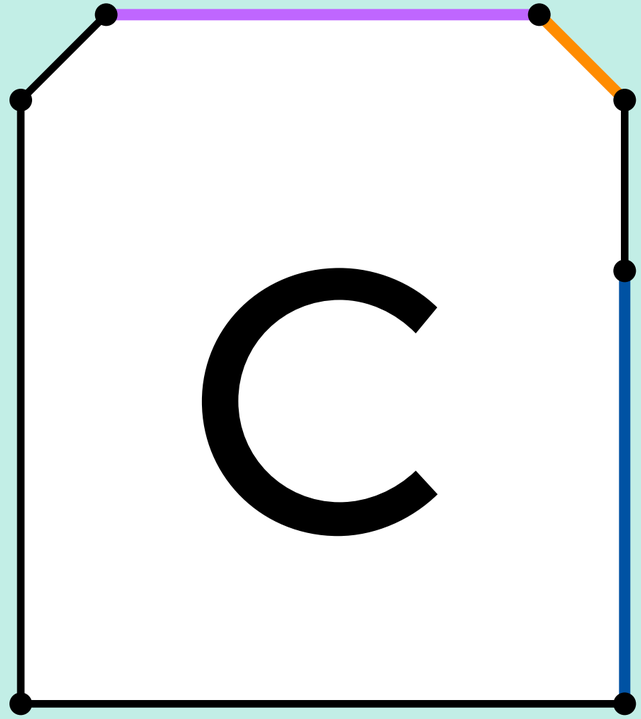



# SHIFT

**Def.** The *shift* of a portal is the distance between the projections of the two edges on their bisector.







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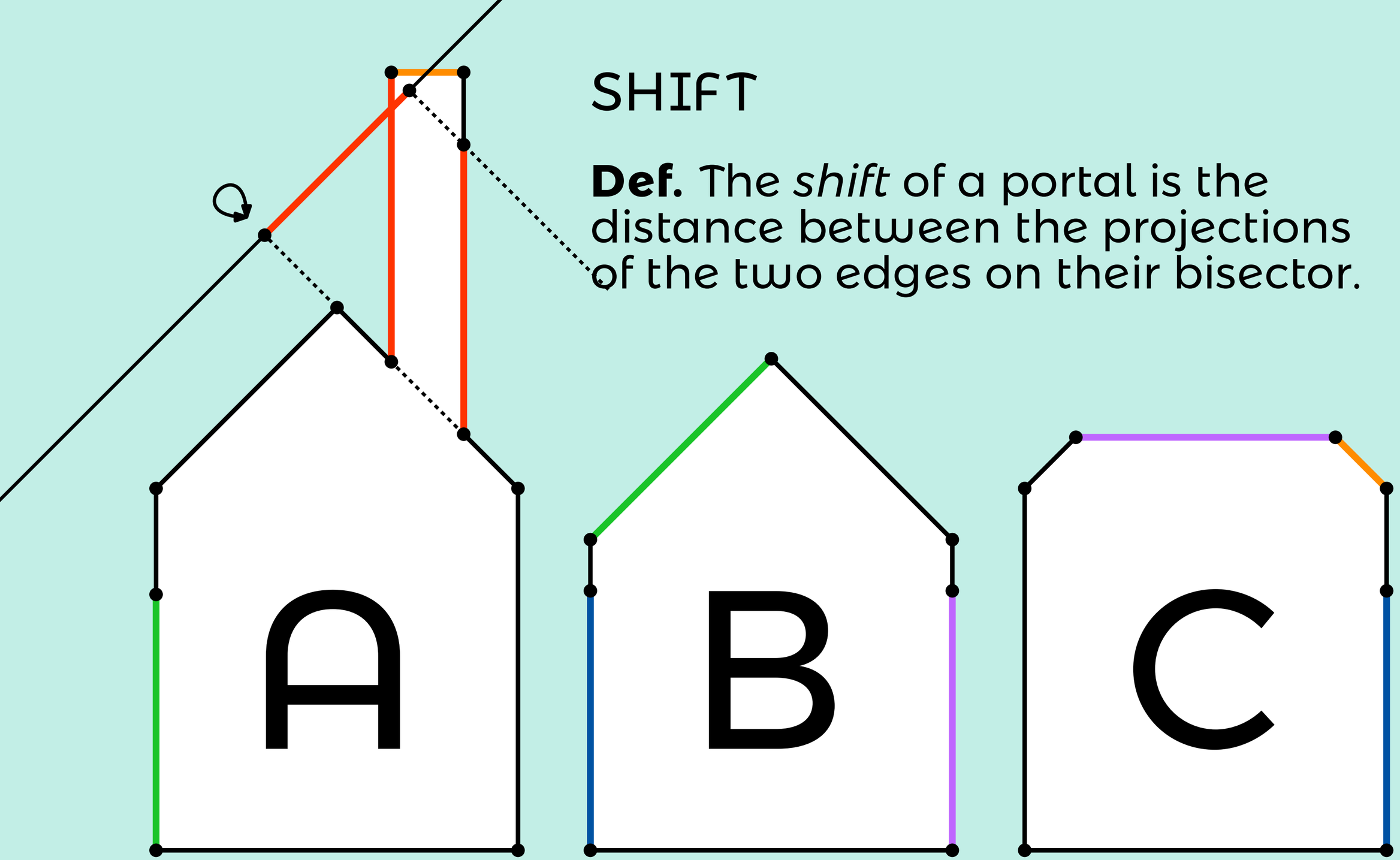

# THANKS FOR WATCHING!

**Conjecture.** “For every portalgon, there is an equivalent portalgon in which every fragment is happy.”