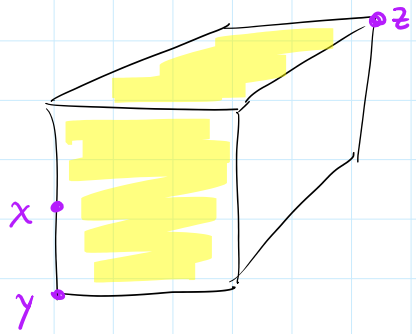
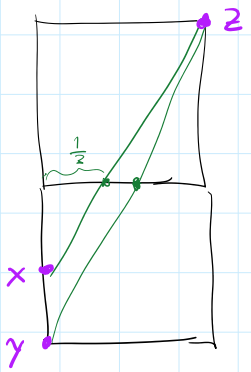
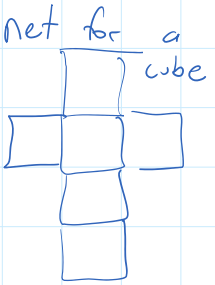
SHORTEST PATHS ON POLYHEDRA

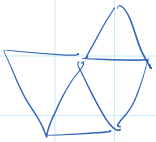


unfold →





POLYHEDRAL NET: connected planar layout of faces, that can be folded and glued to build a polyhedron



net for a tetrahedron

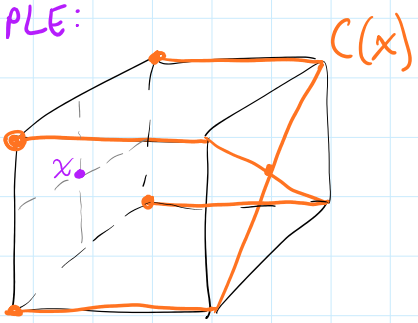
QUESTION: Does every convex polyhedron have a net?

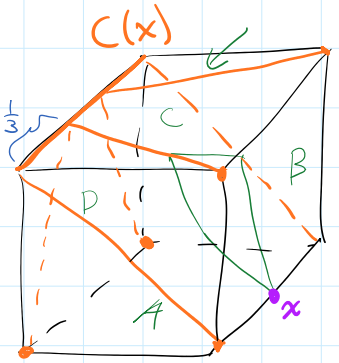
No – some nonconvex polyhedra have no nets.
You can cut along edges, but it not lie flat without overlaps.

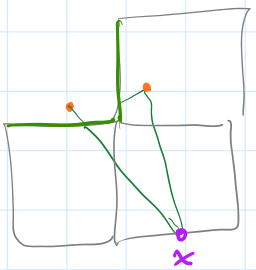
CUT LOCUS

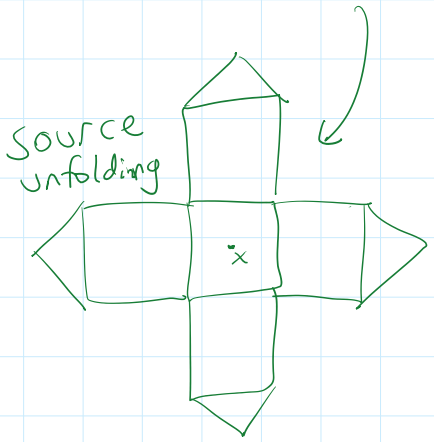
The cut locus $C(x)$ of a polyhedron is the closure of the set of points y from which there is more than one shortest path to x.

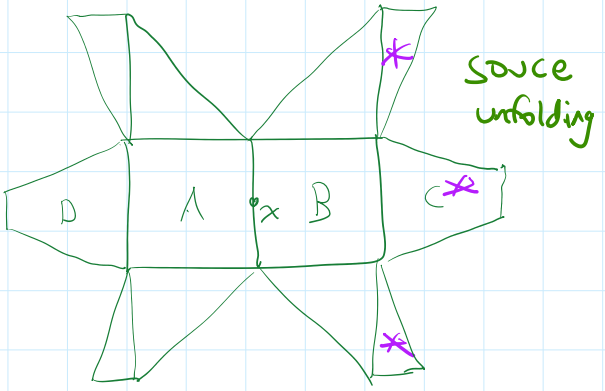
EXAMPLE:











SOURCE UNFOLDING OF A POLYHEDRON

Cut along the cut locus.

UNFOLDINGS:

	edge unfoldings (nets)	general unfoldings
Convex polyhedra	open question	YES
Nonconvex polyhedra	NO	open question