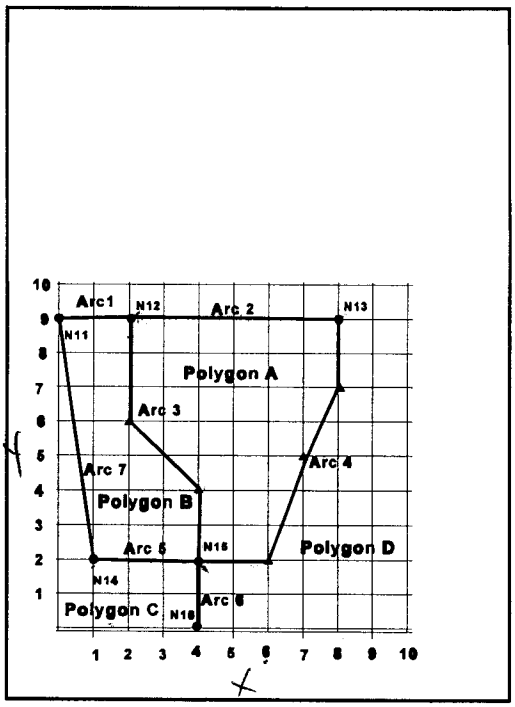
In Class Exercise - Geometric Elements and Topology

The Figure at the right is a polygon map theme with polygons A, B, C, and D. The polygons are constructed from arcs 1 through 7. The arcs are composed of Nodes N 11 through N 14. The topology of the map is built upon graphical analysis of the georeference coordinates of the nodes and the arcs/polygons that they build.



The table below shows a typical topological framework for the spatial relations. The abbreviations are as follows:

Fnode The node at the beginning or start of an arc, "From Node"
Tnode The node at the end of an arc, "To Node"
Arc# The internal number assigned to identify the arc
Lpoly Attributes of the Left Polygon while "driving" from the Fnode to Tnode, along the arc.
Rpoly Attributes of the Right Polygon while "driving from the Fnode to Tnode, along the arc.

Exercise to complete. Based on the answer model for the first row below, complete the topological tables for the map to the right.

Arc Node List

Arc#	Fnode	Tnode
1	11	12
2	12	13
3	12	15
4	13	15
5	14	15
6	15	16
7	11	14

Arc Coordinate List

Arc#	x,y Coordinates
1	(0,9) (2,9)
2	(2,9) (8,9)
3	(2,9) (4,2) (4,4) (2,6)
4	(4,2) (6,2) (8,7) (8,9)
5	(1,2) (4,2)
6	(4,2) (4,0)
7	(0,9) (1,2)

Arc Polygon List

Arc#	Lpoly	Rpoly
1	Polygon D	Polygon B
2	Poly D	A
3	A	B
4	A	D
5	B	C
6	D	C
7	B	C

D. Topological Errors
1. topological errors arise when nodes and arcs are not properly "snapped" to one another or aligned
2. Error Types
   a. dangling nodes - nodes dangle in space without being snapped to another node
   b. undershoots - nodes are short of being snapped
   c. overshoots - nodes are long on being snapped
   d. leaky polygons - polygons are not closed, nodes are not properly snapped

See diagram below for examples