~ GIS components ~

Data structure and representation models

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Our definition of GIS

Map + database

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Points, lines and polygons – VECTOR data

Three generic 'feature' types in GIS

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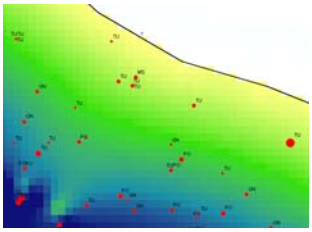
Feature geometry

1. Points

Individual representation of physical entity at one XY position



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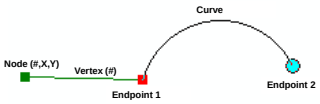
Feature geometry

2. Lines

A series of 'nodes' connected by 'vertices' (lines)



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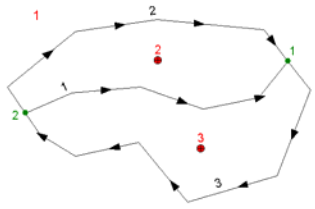
Feature geometry

3. Polygons (polys)

A 'closed' *area* bound by nodes and vertices



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Topology

A record (in tables) of the relationship between features:

- Connectivity of line features
- Directionality of line features
- Adjacencies of polygons
- Containment of features (points & lines) within polygons

NOTE:

Also defines 'rules' e.g. lines cannot overlap without a node.

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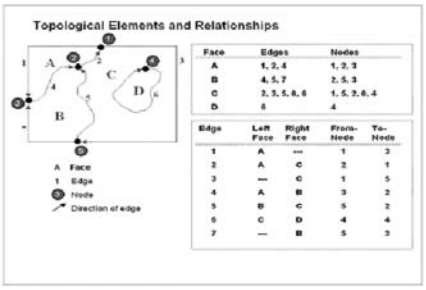
Topology tables



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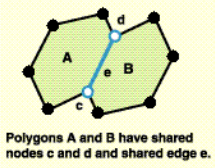
Importance of topology

Editing shared geometry

If one polygon is edited (e.g. removed), without topology in place the other polygon will lose a side !!



Polygons A and B have shared nodes c and d and shared edge e.

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Shapefiles (vector data)

An extremely useful and flexible file format that allows transfer of GIS information between computers, systems and software.

- Caution when copying files !!

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GIS definition

Map + database

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Database

Geographic information + attributes

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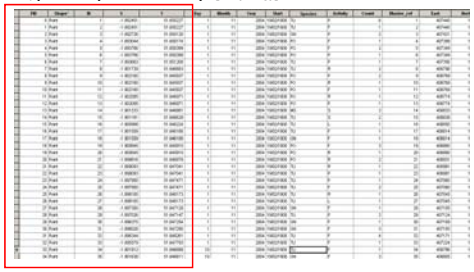
Database: geographic information

ID, position (XY co-ordinate) [+ topology]



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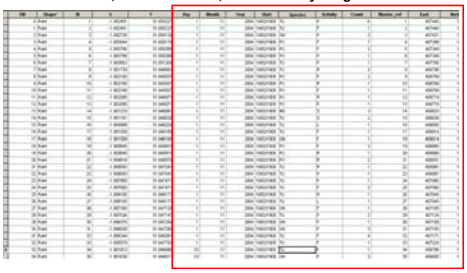
Database: attributes

'Values': counts, measurements, classes – anything !!



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Data representation models

- **Vector**
- **Raster**

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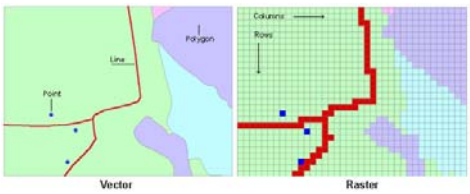
RASTER data

Representation of environment by 'grids' (pixels)



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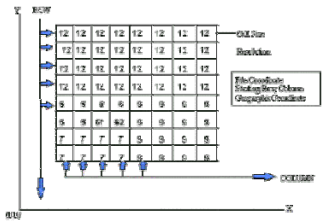
Raster data - mapping

Each pixel has a 'value'



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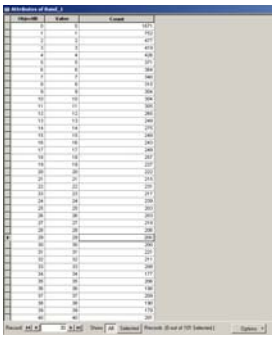
Raster data - tables



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How to make a GIS - key data input methods

- ✓ Import from geodatabase, existing GIS layer or coverage
- ✓ Download from satellite
- ✓ Google Earth (.KML)
- ✓ Ordnance Survey
- ✓ Download data from GPS
- ✓ Add XY from text file
- ✓ Digitise on screen
- X Digitise using 'tablet'

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