Types of GIS

- Vector GIS
- Raster GIS
- Hybrid GIS

Technology is moving towards hybrid GIS

Raster Vector Integration

Vector Representation

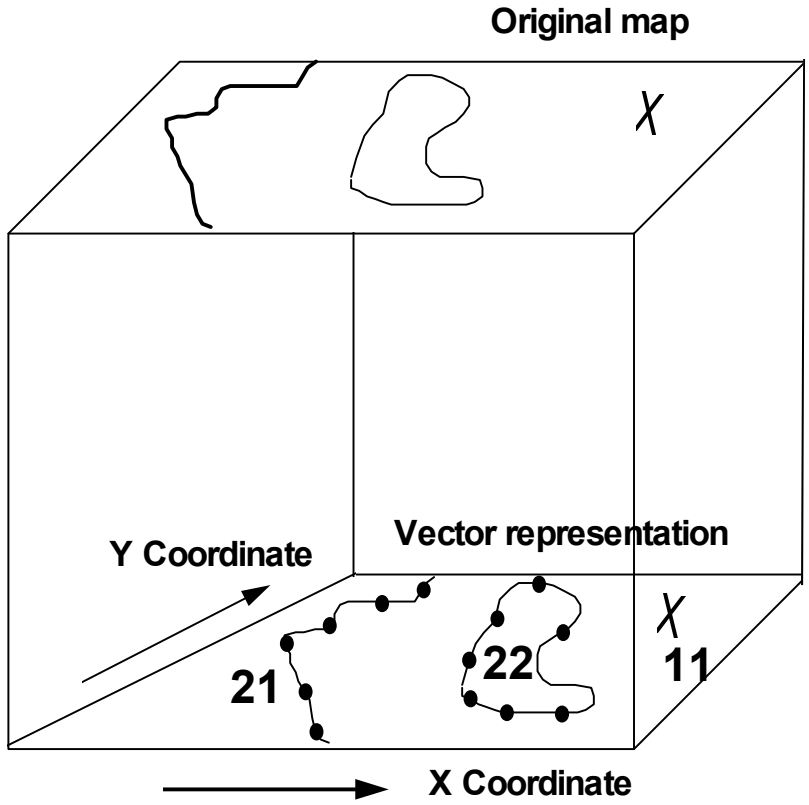
The Vector Data Model

Features of Spatial Object

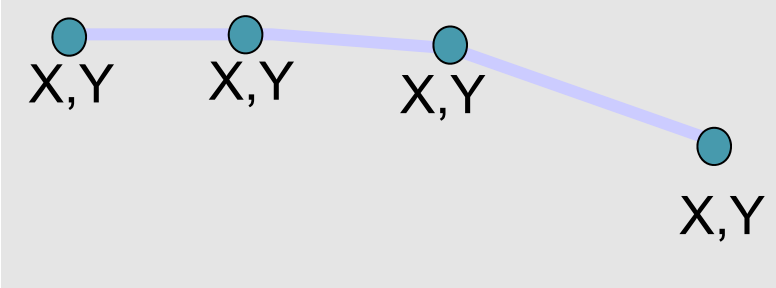
Points (Example : Location of house)
Lines(Example : Railway)
Polygons (Examples : Forest area)

The location of features on the earth's surface are referred to map positions using an XY coordinate system (termed a Cartesian Coordinate System).

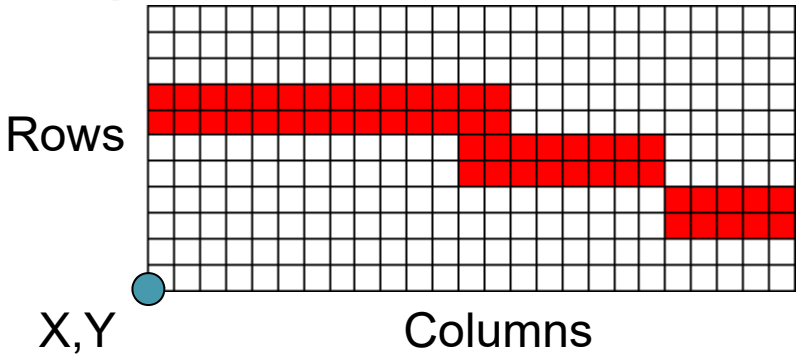
PointA Singly XY pair
LineSeries of XY pair
PolygonA closed loop of XY coordinate pairs that define the boundary



- Vector formats
  - Discrete representations of reality



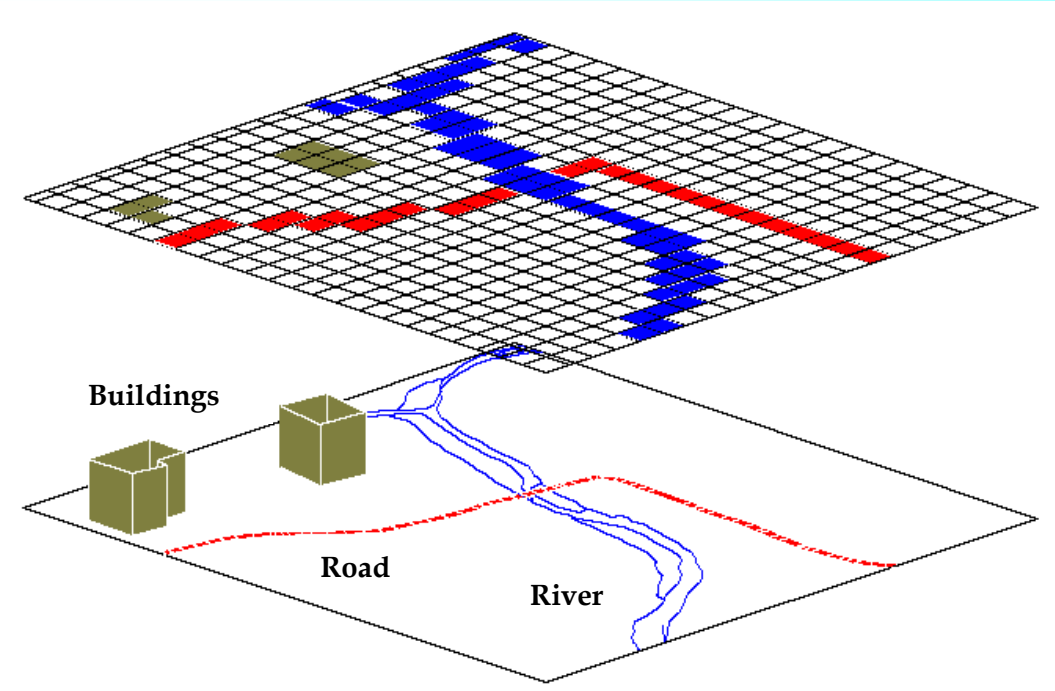
- Raster formats
  - Use square cells to model reality



Reality
(A highway)

Raster Representation

- Row
- Column
- Cell Size
- Resolution



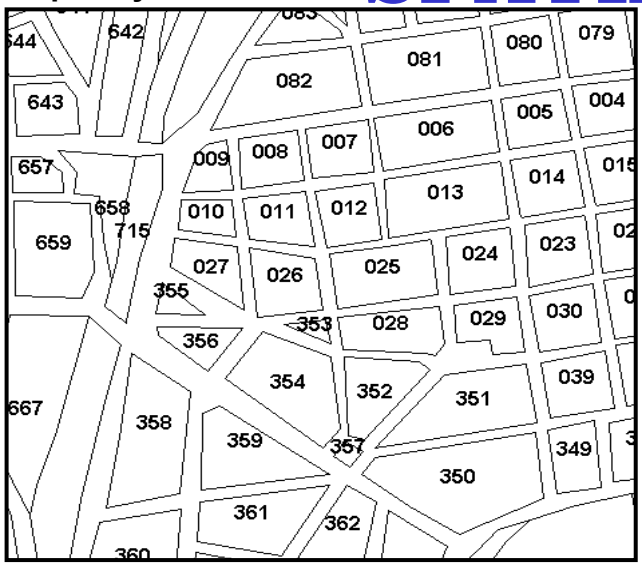
Attribute Data

District Name	Area	Population
Peshawar	395 sq. km.	6,75,341
Swabi	385 sq. km.	2,57,086
Dir lower	119 sq. km.	1,72,952

- Industry Information
- Agriculture Census
- Industry Information
- Education and Health

SPATIAL AND NON-SPATIAL DATA

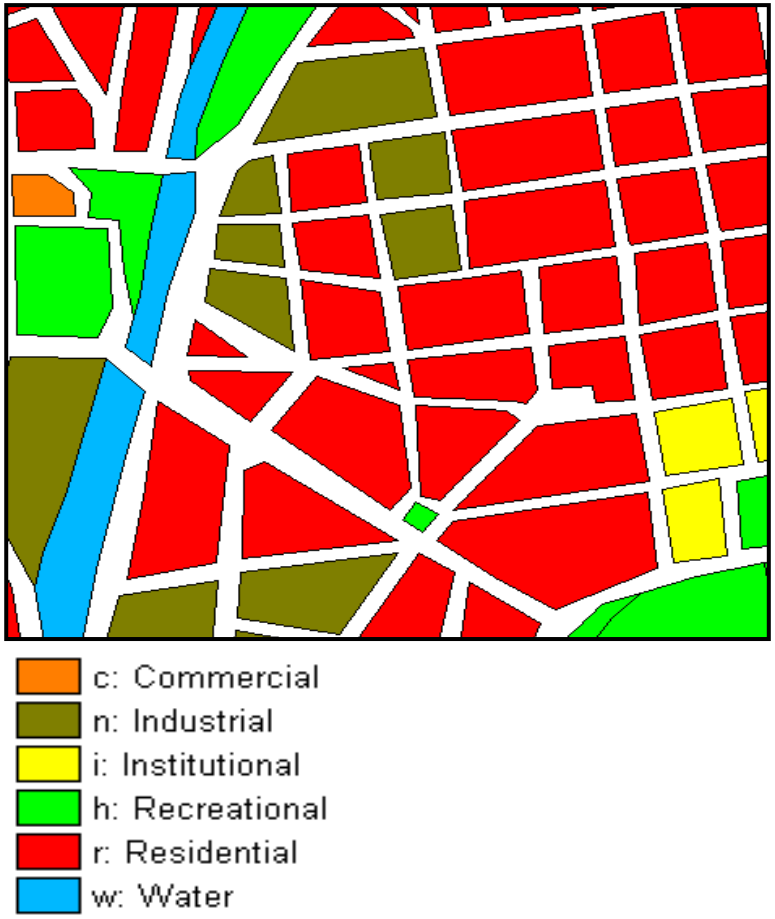
Map: City blocks



City blocks	Land use
001	Institutional
002	Commercial
003	Commercial
004	Residential
005	Residential
006	Residential
007	Industrial
008	Residential
009	Industrial
010	Industrial
011	Residential
012	Industrial
013	Residential
014	Residential
015	Residential

NON-SPATIAL DATA

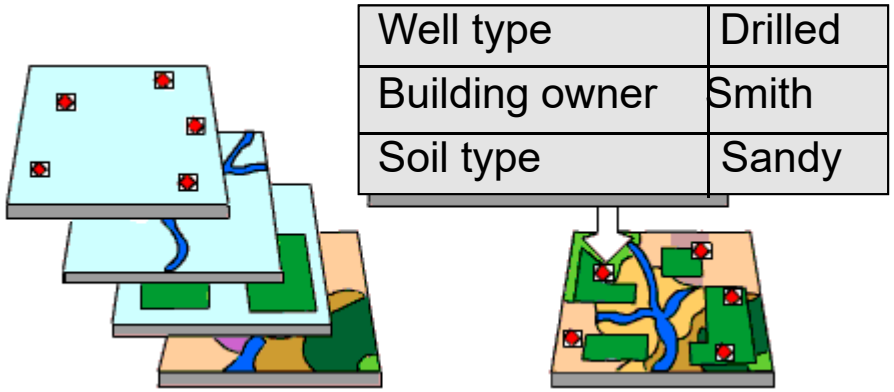
SPATIAL DATA



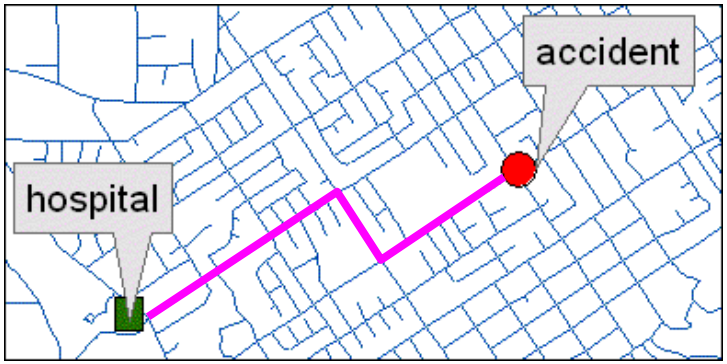
Analysis of Data

Proximity

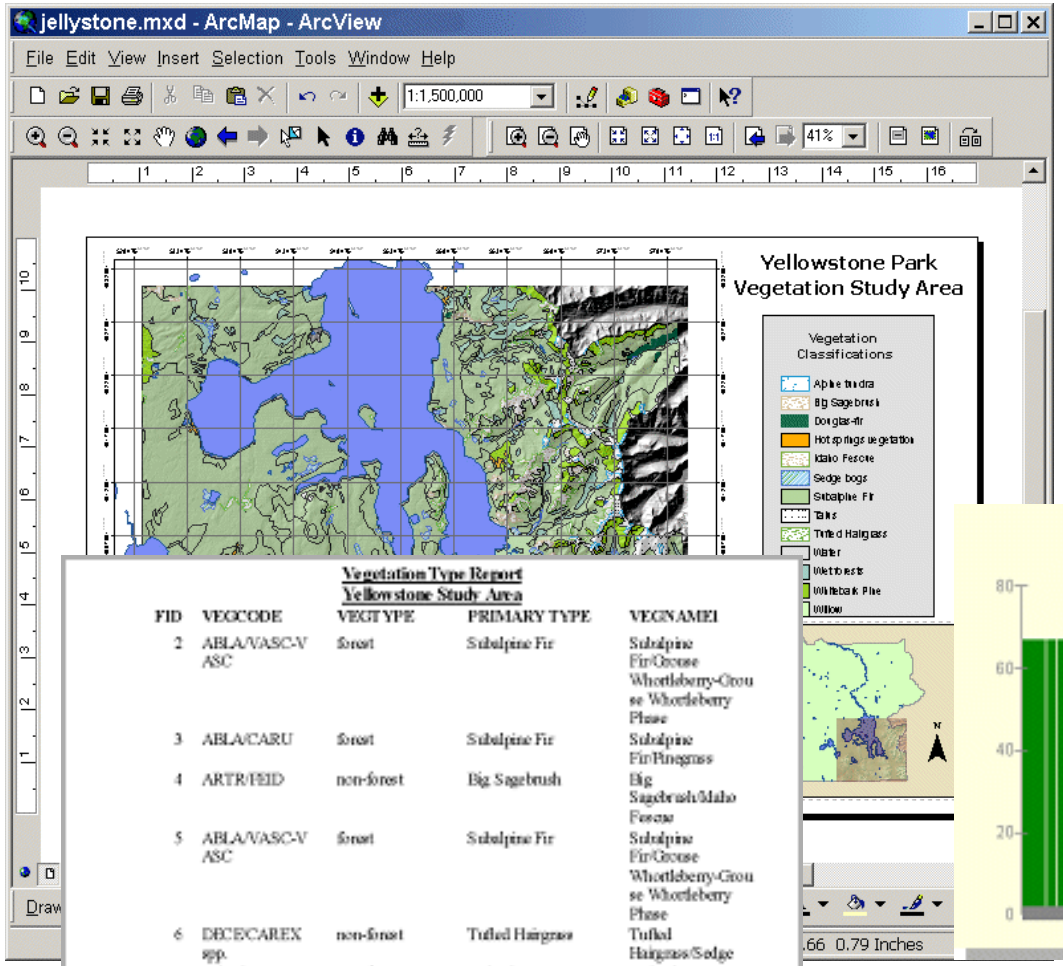
Overlay



Network

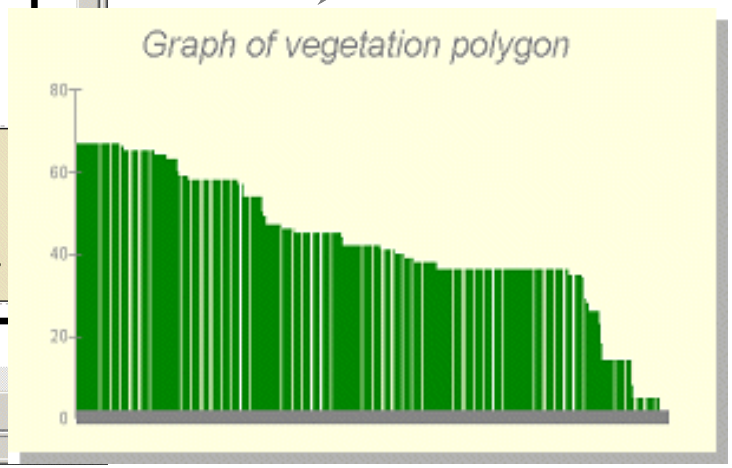


Display



Maps

Graphs



Vegetation Type Report
Yellowstone Study Area

FID	VEGCODE	VEGTYPE	PRIMARY TYPE	VEGNAME1
2	ABLA/VASC-VASC	forest	Subalpine Fir	Subalpine Fir/Grouse Whortleberry-Grouse Whortleberry Phase
3	ABLA/CARU	forest	Subalpine Fir	Subalpine Fir/Pinegrass
4	ARTR/FEID	non-forest	Big Sagebrush	Big Sagebrush/Idaho Fescue
5	ABLA/VASC-VASC	forest	Subalpine Fir	Subalpine Fir/Grouse Whortleberry-Grouse Whortleberry Phase
6	DECE/CAREX spp.	non-forest	Tufted Hairgrass	Tufted Hairgrass/Sedge
7	sedge bogs	non-forest	Sedge bogs	Sedge bogs
8	Wet forests	forest	Wet forests	Wet forests

Reports

WHAT ARE THE FUNCTIONS INVOLVED IN GIS

1. INPUT OF DATA

- **Data collection**

  (Both Geographical & Statistical)
- **Data verification**
- **Data transfer**
- **Data editing**

WHAT ARE THE FUNCTIONS INVOLVED IN GIS

2.DATA STORAGE

- On hard disk
- On floppy disk
- On CDs

WHAT ARE THE FUNCTIONS INVOLVED IN GIS

3.MANIPULATION OF DATA

- **Cartographic function**
  - **a.Scale changes**
  - **b.Vector-Raster changes**
  - **c.Projection changes**
  - **d.Map embellishment like adding north, title, scale and legend etc**

(continued….)

WHAT ARE THE FUNCTIONS INVOLVED IN GIS

3.MANIPULATION OF DATA

- **Data integration (Core of GIS)**
  - **a.Maps over laying**
  - **b.Spatial transformation**
  - **c.Spatial aggregation**

(continued……..)

HOW G.I.S. WILL ANALYSE THE DATA

Example: Selection of waste disposal site for Peshawar city under the following conditions

1. The selected site should be located within 20 km distance from the city center, but further than 300 meters from any existing built-up area.

2. The site should be located on clay-rich soils, with a maximum thickness of 5 meters and clay content greater than 50%.

3. The site should have an area of at least 2 hectares.

(Continue…..)

HOW G.I.S. WILL ANALYSE THE DATA

Example: Selection of waste disposal site for Peshawar city under the following conditions

4. Should have an area, which do not have an important economic or ecological value.

5. Site should be located on a terrain with slope less than 20 degree to prevent erosion and to assure accessibility.

6. Should be free from active landslides.

HOW G.I.S. WILL ANALYSE THE DATA

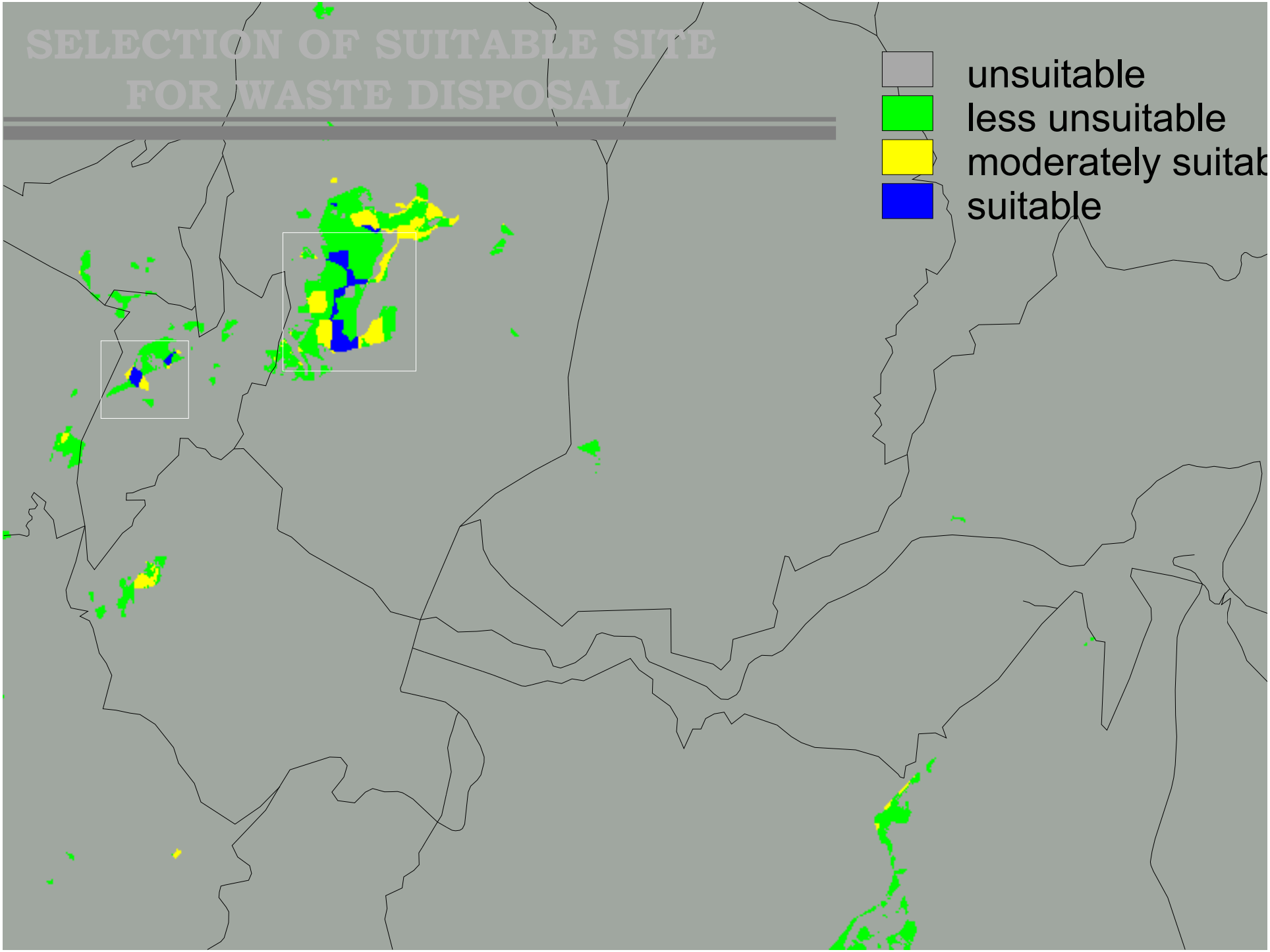
Following data are available for data input

a. Contour map indicated in degrees
b. Landuse map
c. Road map
d. Slide map with landslide distribution
e. City map
f. Borehole tables
g. Geological map

FORMULAS WILL BE USED AS

Lslide=iff((slide="dormant")or(slide="active"),1,0)

Luse=iff((landuse="barren")or(landuse="forest"),1,0)


SELECTION OF SUITABLE SITE
FOR WASTE DISPOSAL
unsuitable
less unsuitable
moderately suitab
suitable

WHAT ARE THE FUNCTIONS INVOLVED IN GIS

3. MANIPULATION OF DATA

- **Feature measurement**
  - a. Number of features
  - b. Calculate distance, area
  - c. Statistical analysis like crossing of tables and correction

WHAT ARE THE FUNCTIONS INVOLVED IN GIS

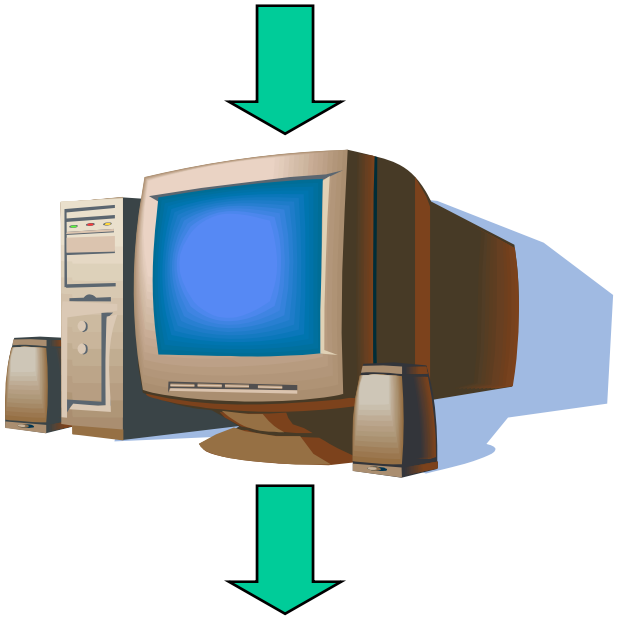
4. DATA OUTPUT

- **Data presentation**
  - **a. Maps**
  - **b. Tables**
  - **c. Diagrams**

DATA TRANSFERING/DATA SHARING

YOU SHOULD BE CLEAR IN MIND WHILE ENTERING DATA INTO COMPUTER

"Rubbish in"



"Rubbish out"