GEOGRAPHIC INFORMATION SYSTEM (GIS)

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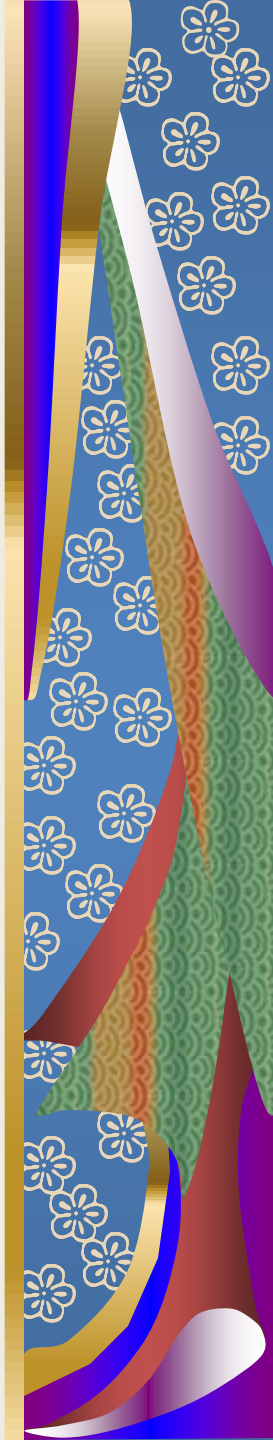



GIS
Designing
our future
esri

1. What is GIS ?

Definition, Concept, History and Development,

2. Applications of GIS,

1. G I S:

a) GIS is a system of “Hardware” and “Software”.

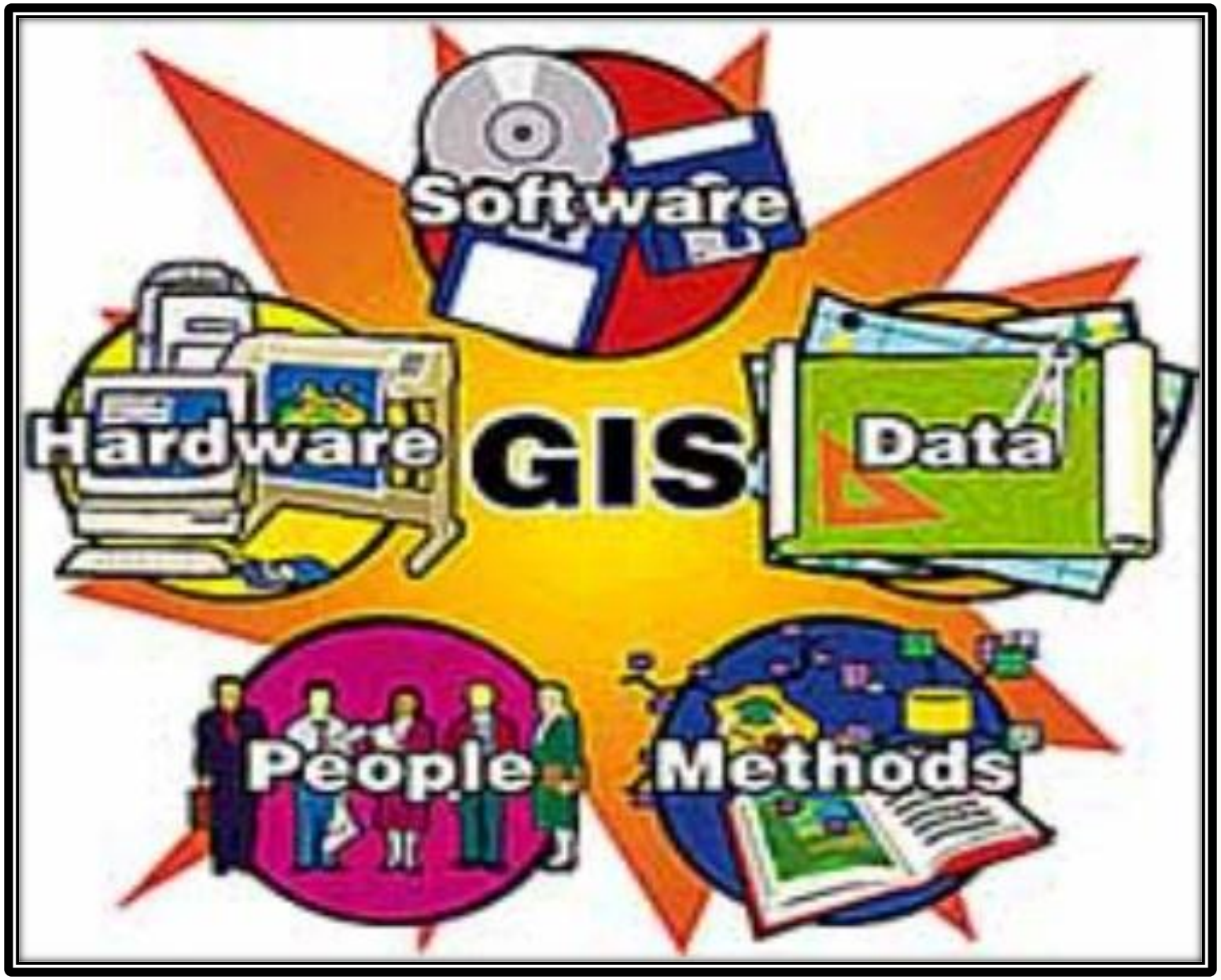
b) Wherein ‘Geographically referenced’ “spatial” and “non-spatial” data can be captured, stored for manipulation, analysis, manage and modeling, to present all type of ‘geographical data’, to get the result, according to our requirement.

c) GIS is sometime used for "Geographical Information Science" or "Geospatial Information Studies", within the academic discipline of "Geoinformatics".

d) Generally, the term describes for any 'information system', that integrates, stores, edits, analyses, shares and displays 'geographical information' for a decision making tool.

e) The ‘first’ application of spatial data was used by the French geographer “Charles Picquet” in 1832, for ‘epidemiology’ of the Paris city.

f) The term ‘GIS’ was first used by “Roger Tomlinson” in 1968, in his research paper on ‘regional planning’, he is known as “father of GIS”.


Software
Hardware
GIS
Data
People
Methods

Basic Requirements:

(A) Computer-

(i) Hardware

(ii) Software and

(B) The Data-

RSD / Required data

A (i) HARDWARE :

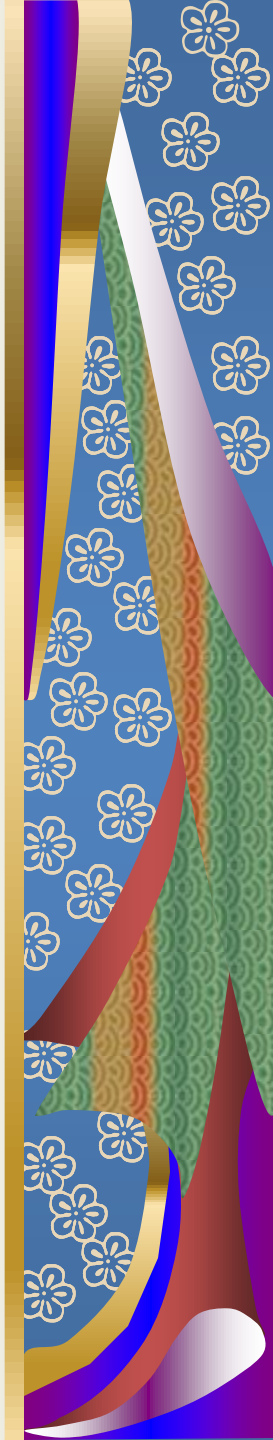
a) Input Devices

b) Output Devices

c) Display Device / Unit

d) C P U

e) Storage Devices



a) Input Devices:

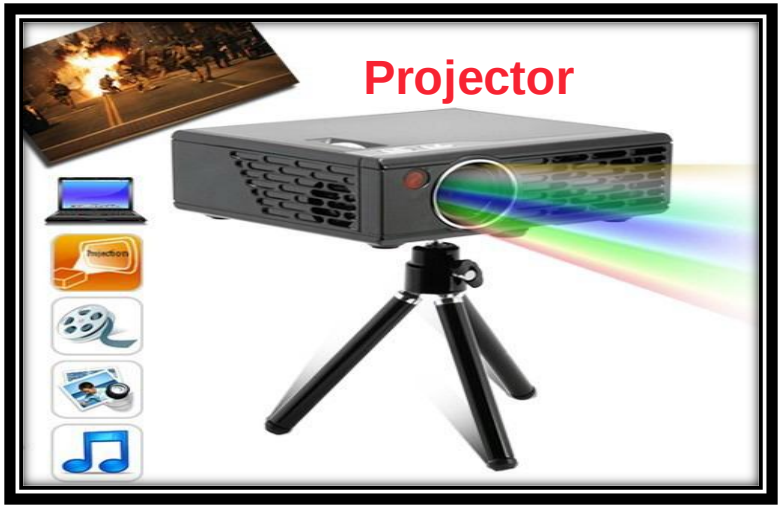
Keyboard

Mouse

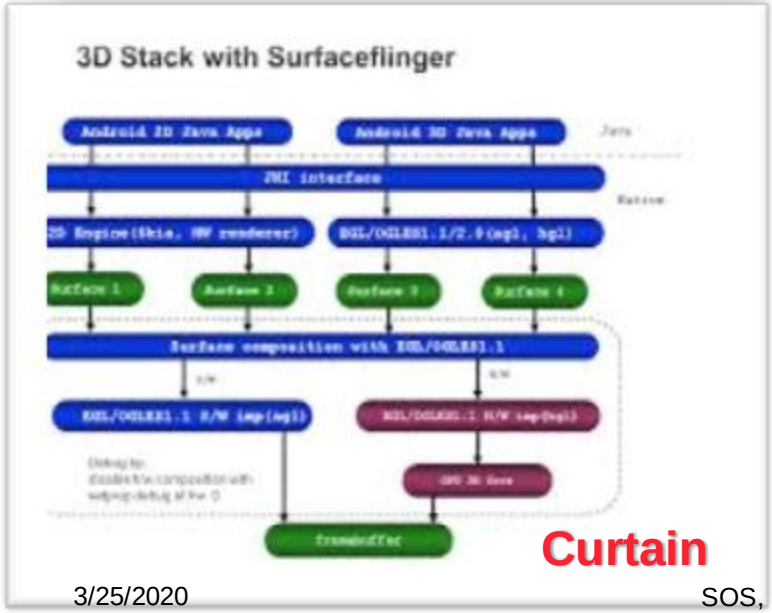
Remote

Charger

b) Output Devices:

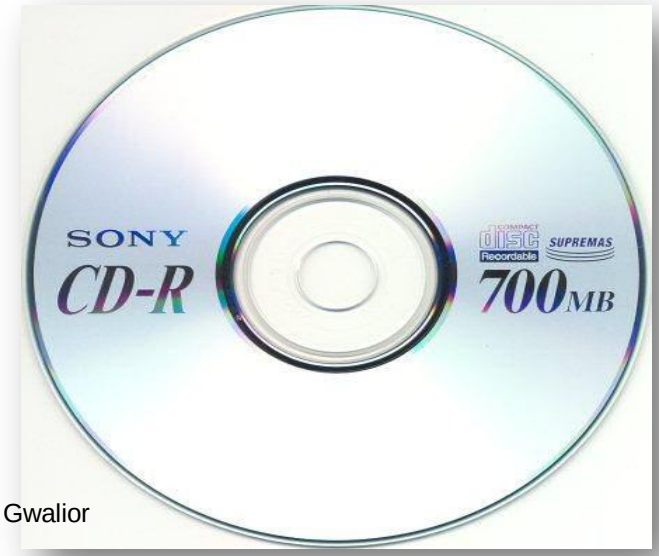


c) Display Devices:



d) Central Processing Unit (CPU):

e)Storage Devices:



What are these ?:

Mobile

Music Devices

A (ii) Software:

1. **Software is the prewritten program in computer language, to work on the task .**
2. **It is made for different purpose, sometime they are made for specific purpose.**
3. **Some "GIS" based software are as follows-**

   (a) Arc GIS (b) Arc View (c) Erdas Imagine etc.


ArcGIS®
ArcMap™ 10
Initializing Application...
esri
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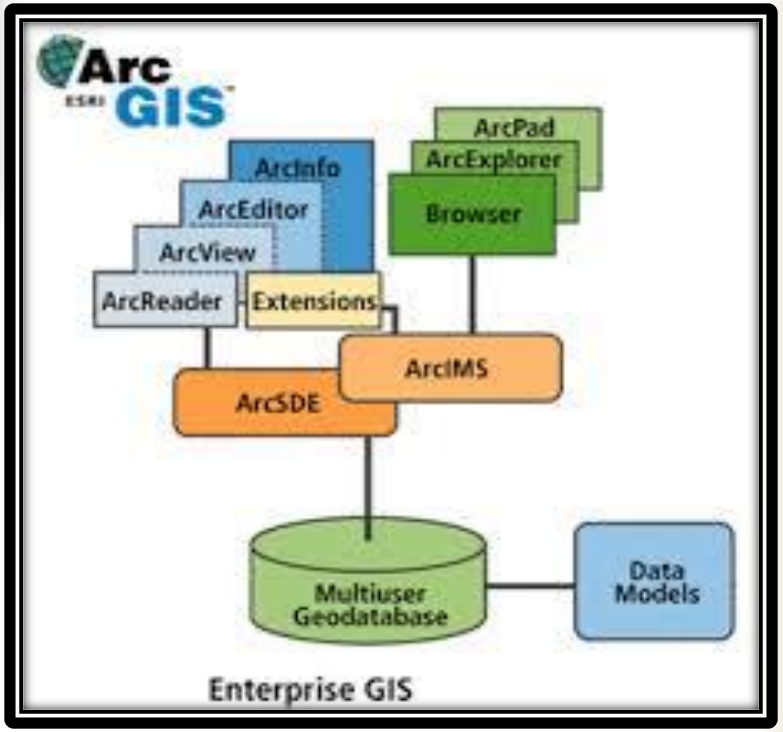
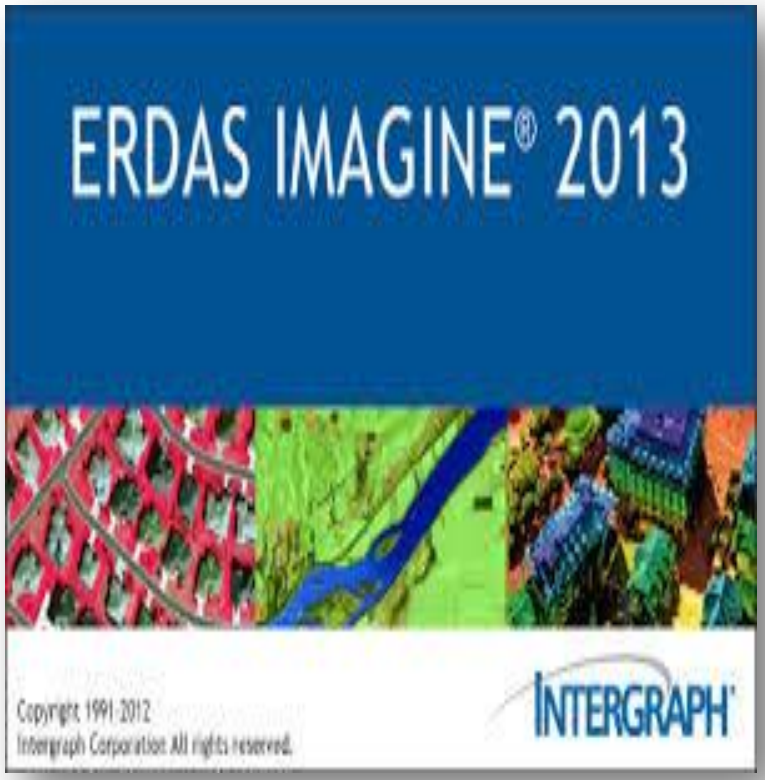

ArcGIS
ESRI
ArcPad
ArcExplorer
ArcInfo
ArcEditor
Browser
ArcView
ArcReader
Extensions
ArcIMS
ArcSDE
Multiuser Geodatabase
Data Models
Enterprise GIS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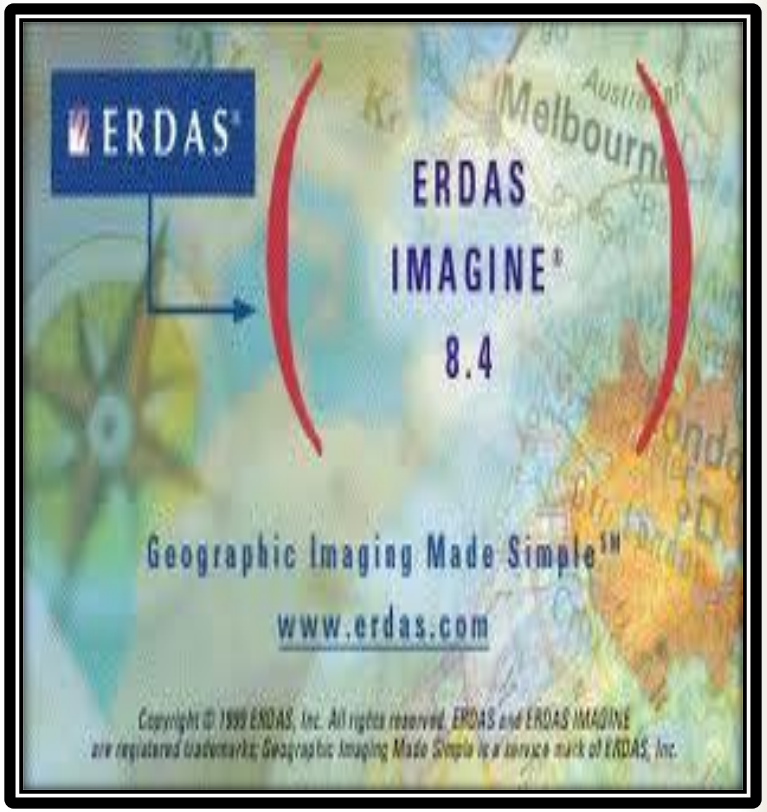
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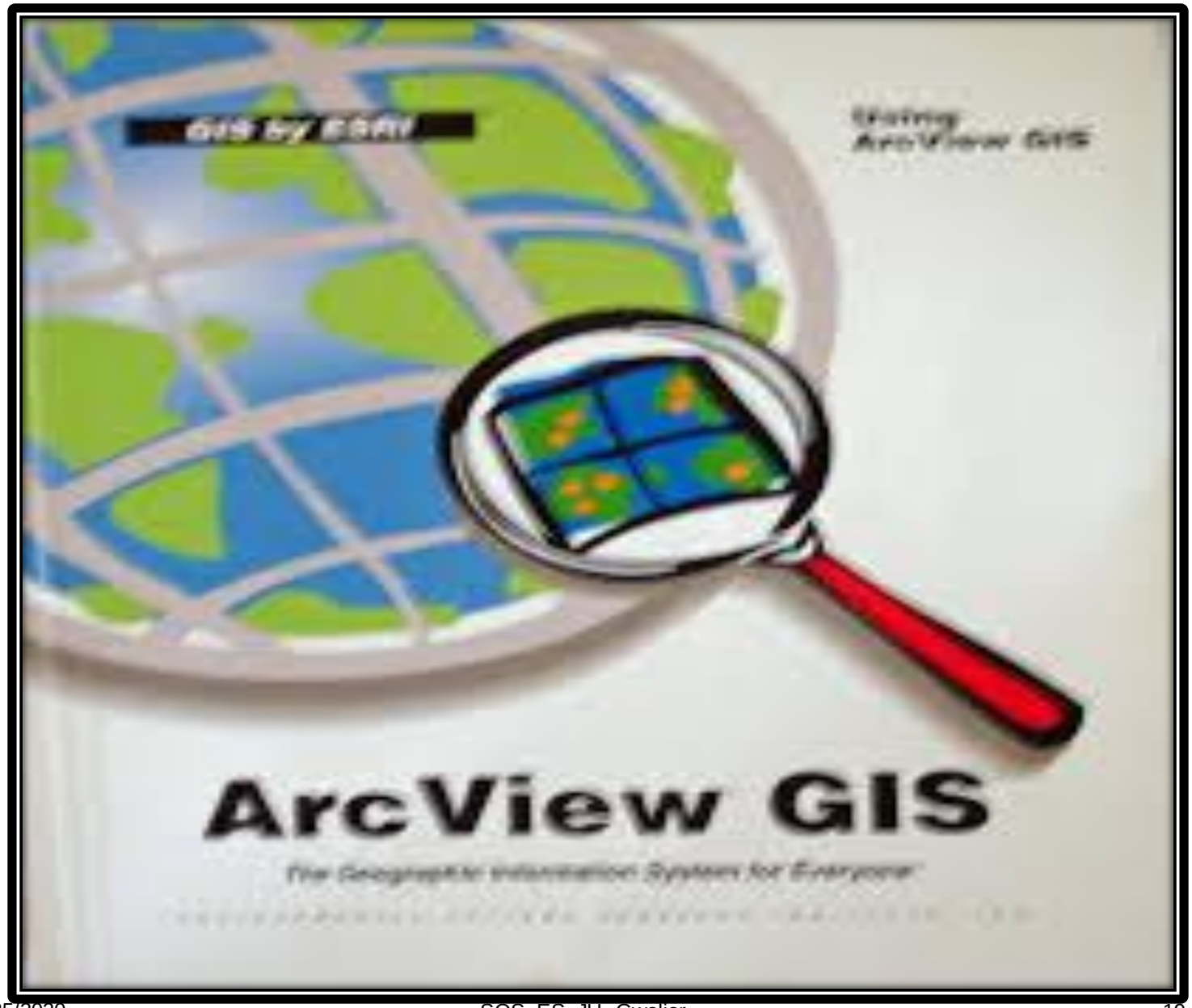

GIS by ESRI
Using
ArcView GIS
ArcView GIS
The Geographic Information System for Everyone

(B) The Data:-

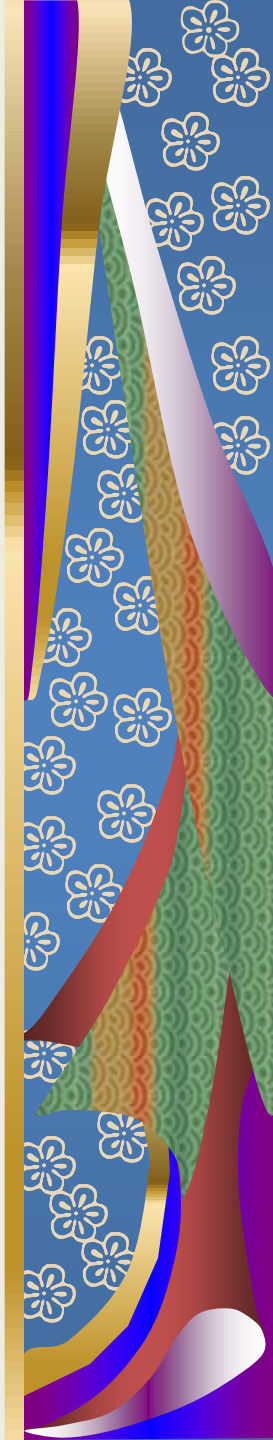
- **RSD / Required data-**

  Remotely Sensed Data

- **Types of data-**

  (a) Spatial and

  (b) Non-spatial data



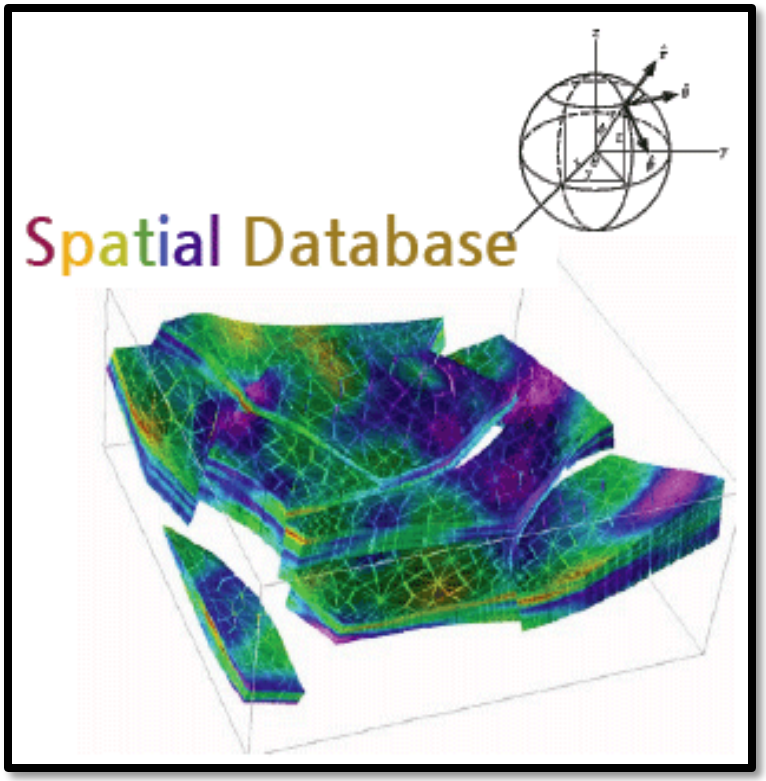
(a) Spatial Data-

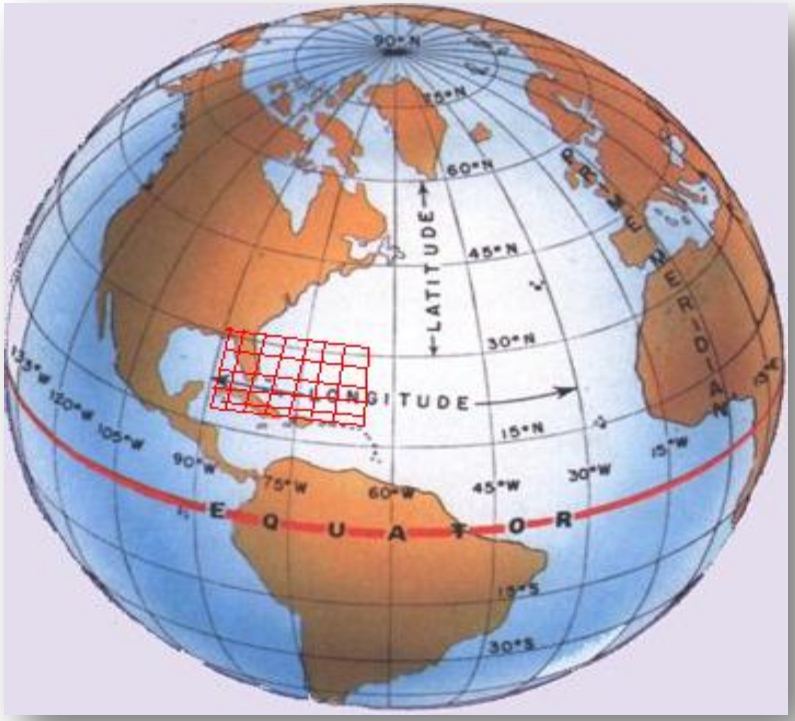
"Which describe the geographic location of the features" in form of 'X' , 'Y', and 'Z' subjected to Latitude, Longitude and Altitude of the features. The spatial data can be shown by three type of representation namely-

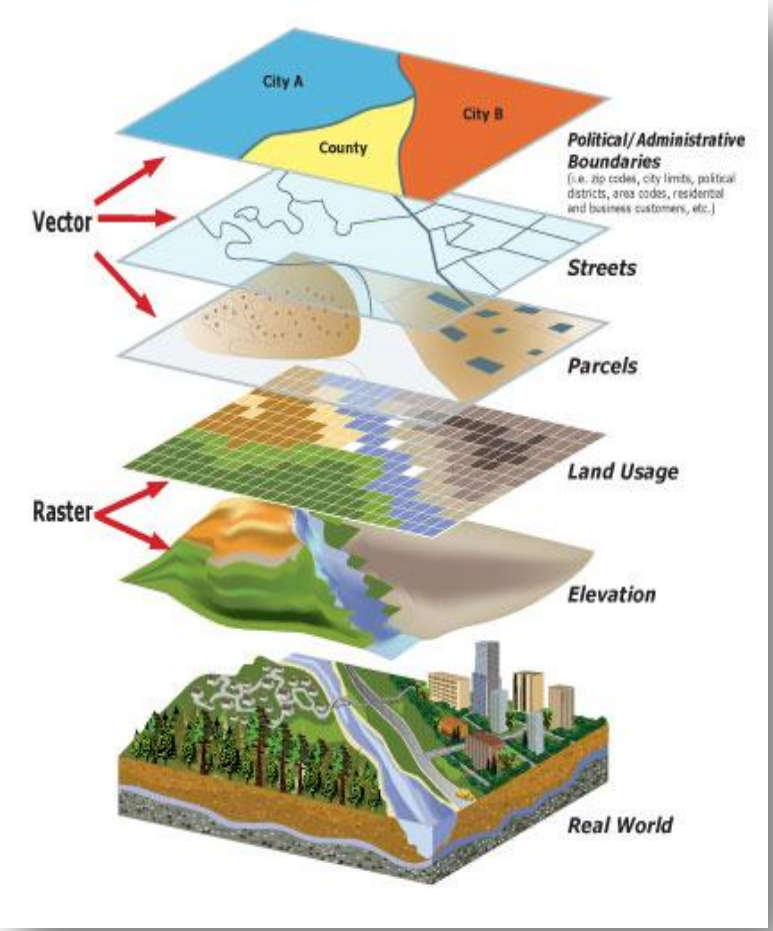
(i) Point
(ii) Line and
(iii) polygon.

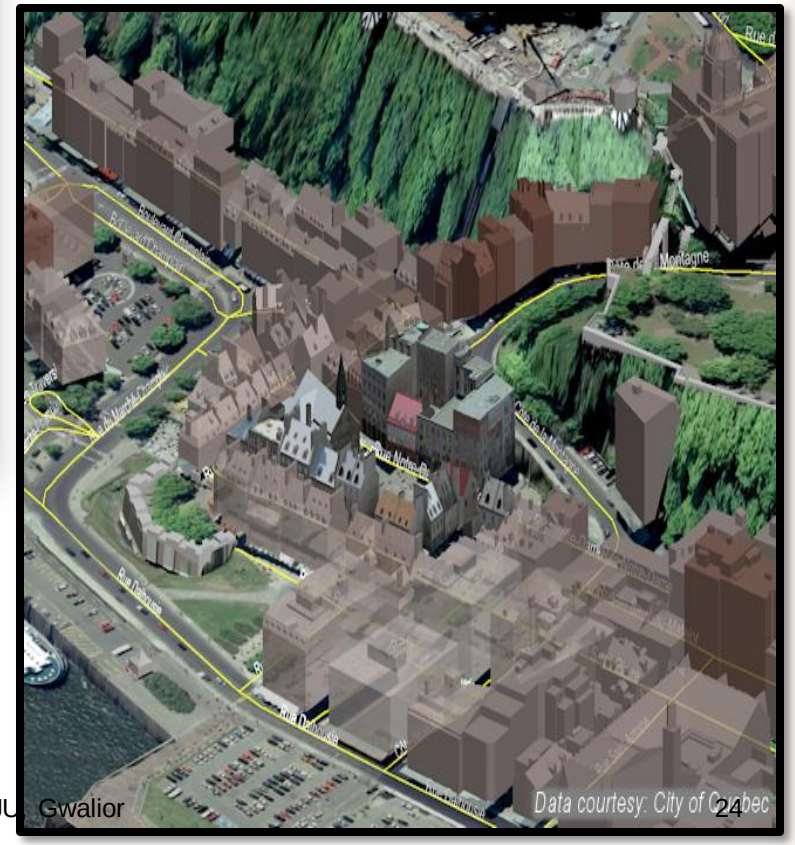
(b) Non-spatial Data-

"Which describe the attribute of the data", subjected to 'numeric' and 'textural' part of the data.


Spatial Database

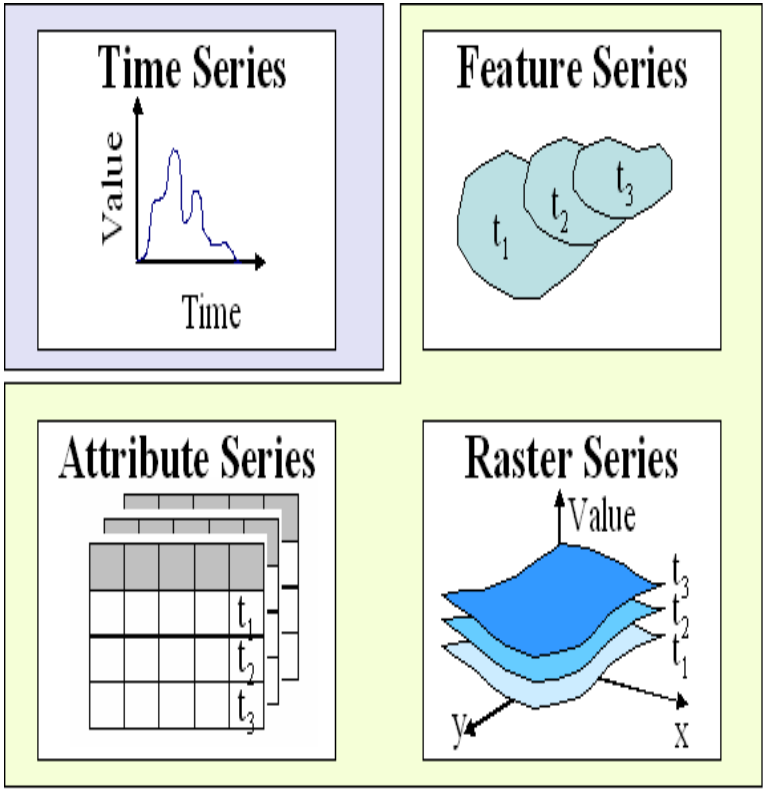

90°N
75°N
60°N
45°N
30°N
15°N
LATITUDE
LONGITUDE
MERIDIAN
135°W
120°W
105°W
90°W
75°W
60°W
45°W
30°W
15°W
EQUATOR
15°S
30°S

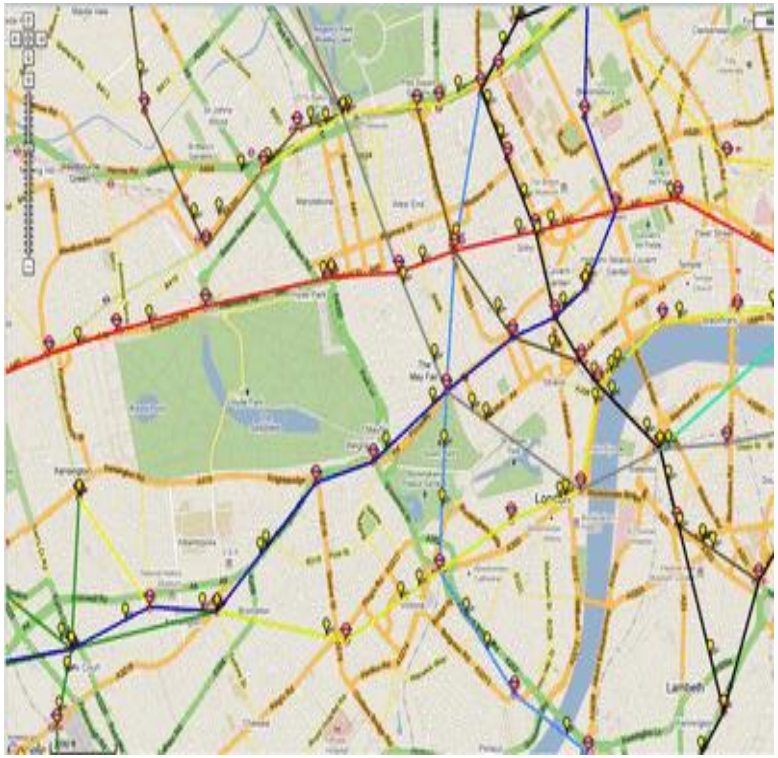




High Resolution data

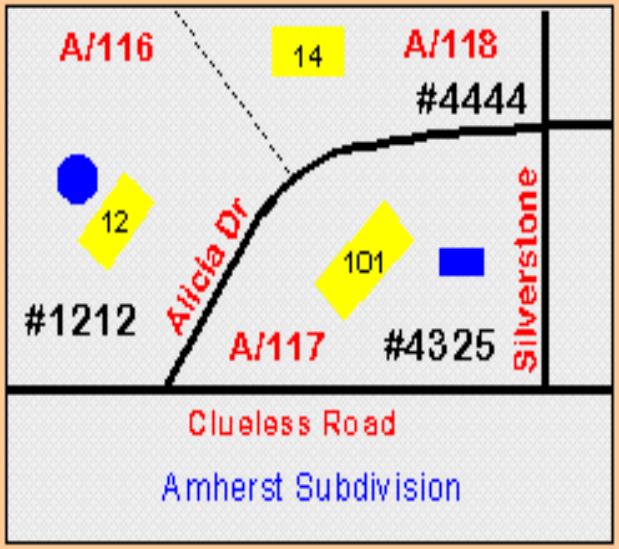
Non spatial data





Locational Information

Subdivision Map



Linking spatial and non-spatial data.

Whats there.

ID#	Address	Subdiv	Block/ Lot	Owner	Value	Stories/ Constr.	Pool
1212	12 Alicia Dr	Amherst	A/116	Verdi,G.	456,135	2/Brick	Yes
4325	101 Silverstone	Amherst	A/117	Wolf,P.	397,650	1/Rock	Yes
4444	14 Alicia Dr	Amherst	A/118	Ryan,M.	368,750	2/Stucco	No

Information in database

2. Applications of GIS:

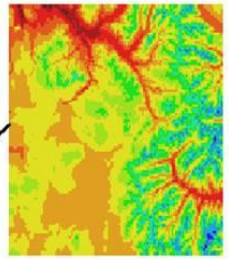
- GIS is a broad term, which refer to number of different technologies, processes and methods.
- It is covered to many operations and applications related to Engineering, Planning, Management, Transport / Logistics, Insurance, Telecommunications and Business etc.

- That's why, GIS applications can be the foundation for many location-enabled services,
- That rely on analysis, visualization and dissemination of results for collaborative decision making system.
- It is a powerful tool, to solve the problem related to the object under study, what is it ? and where is it ?.

Integrated GISc Database

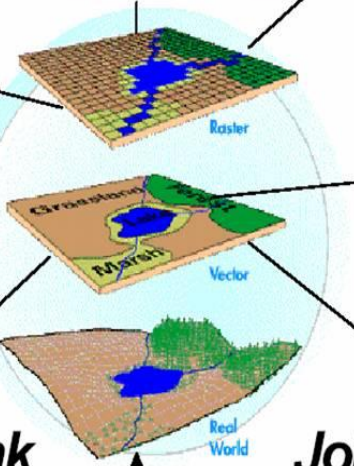
Aerial Photography

Digital Elevation Models

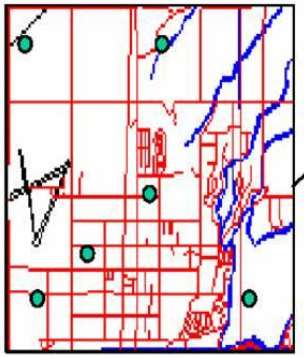


Satellite Imagery

Cadastral Data



Digital Line Graphs



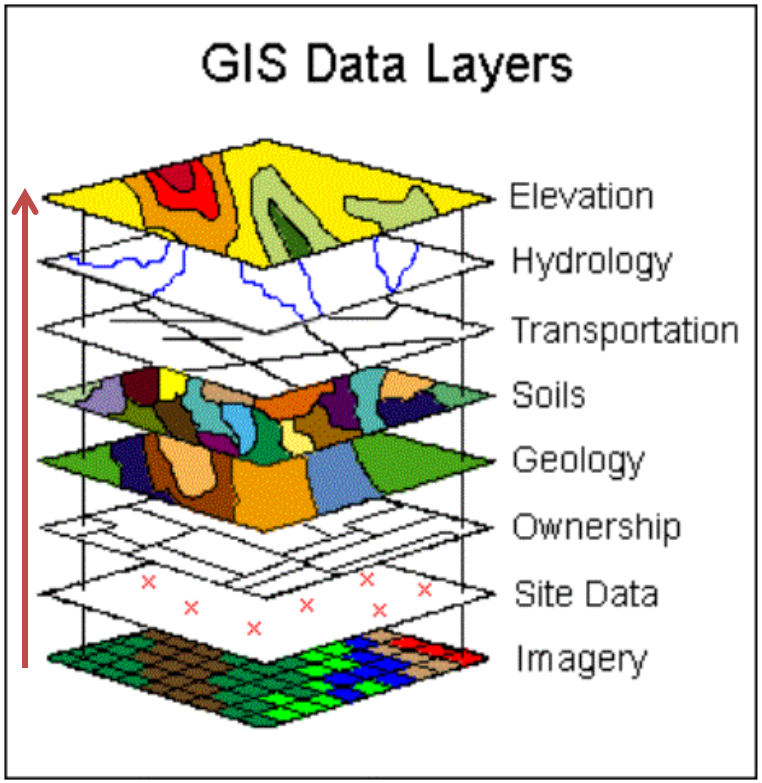
GPS Data

Link **Join**

Chris Betz	1757 Millbrook Ln 28226	Y 2
Christian Carl	1761 Millbrook Ln 28226	Y 1
Chris McAfee	1765 Millbrook Ln 28226	Y 2
Dale Legere	1776 Millbrook Ln 28226	N 6
Donna Black	1780 Millbrook Ln 28226	Y 2

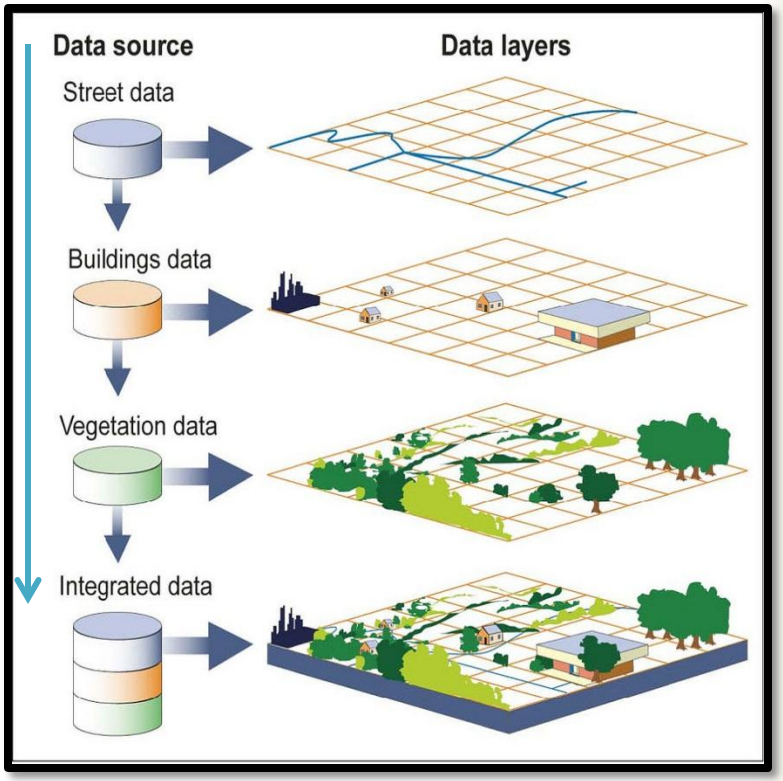
Social, Economic,Demographic, Health, and Environmental Data

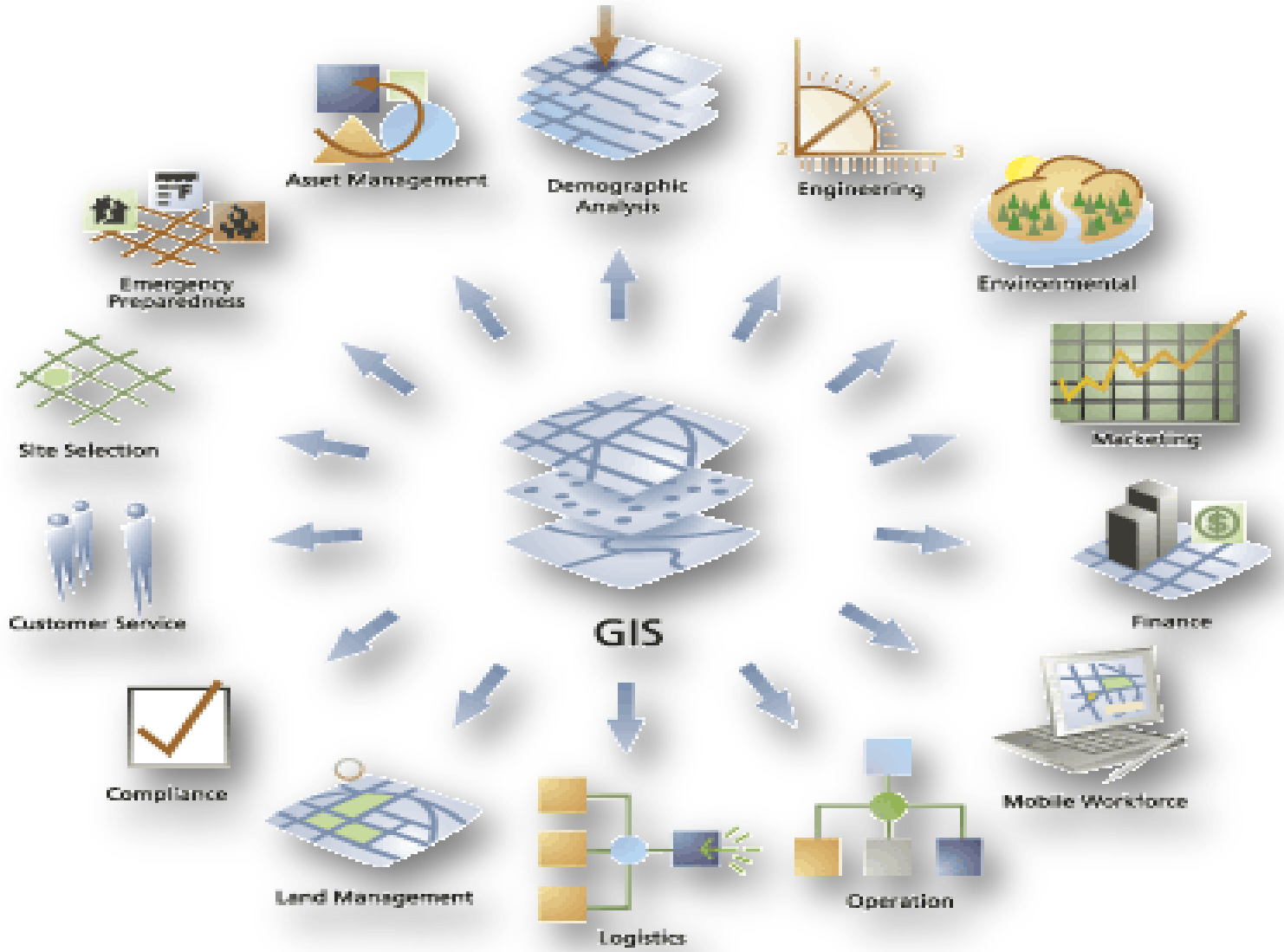
Differential GPS

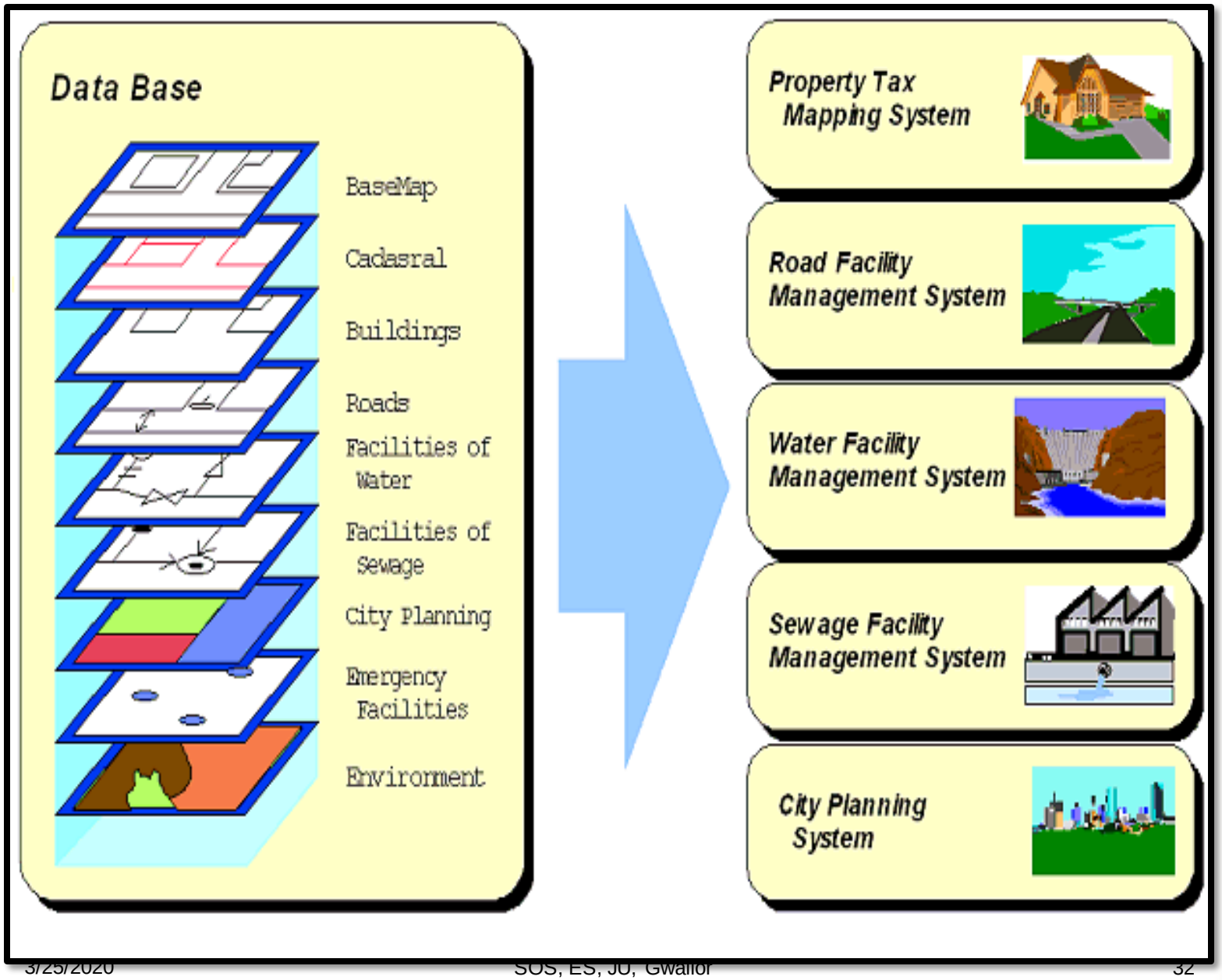


Extraction

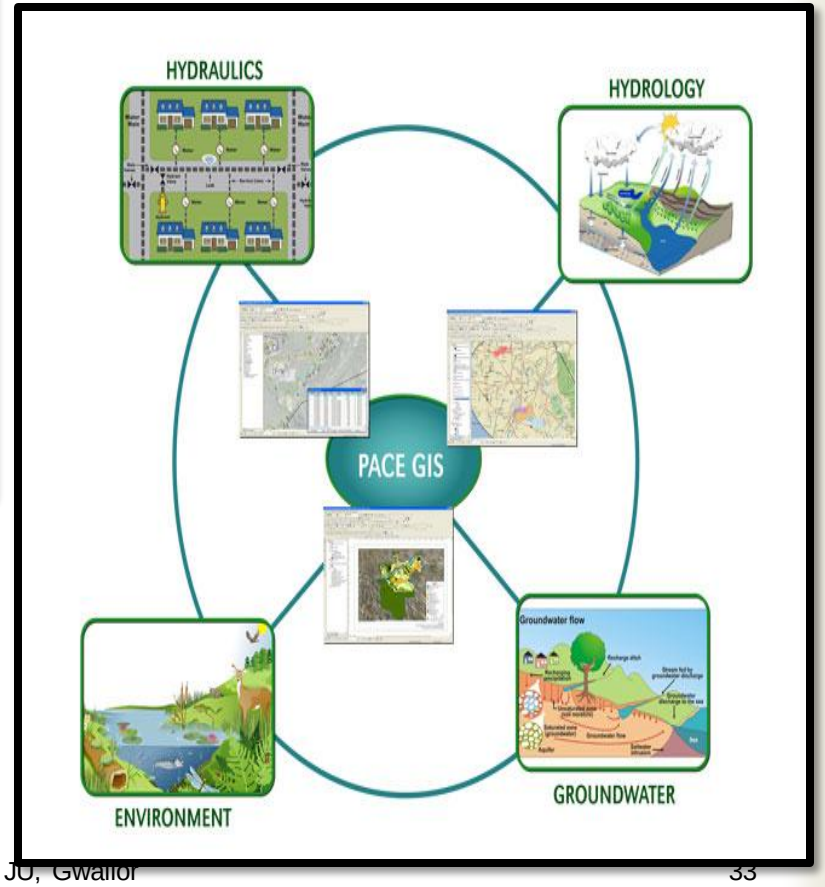
Clubbing




Asset Management
Demographic Analysis
Engineering
Environmental
Emergency Preparedness
Site Selection
Marketing
Customer Service
GIS
Finance
Compliance
Mobile Workforce
Land Management
Logistics
Operation


Data Base
BaseMap
Cadasral
Buildings
Roads
Facilities of Water
Facilities of Sewage
City Planning
Emergency Facilities
Environment
Property Tax Mapping System
Road Facility Management System
Water Facility Management System
Sewage Facility Management System
City Planning System


Municipal office
National Mapping Agency
Municipal GIS user
Commercial map browser
http://www
Government Worker
Consumer


HYDRAULICS
HYDROLOGY
PACE GIS
ENVIRONMENT
GROUNDWATER
Groundwater flow

Spatial DATA Model / Structure :

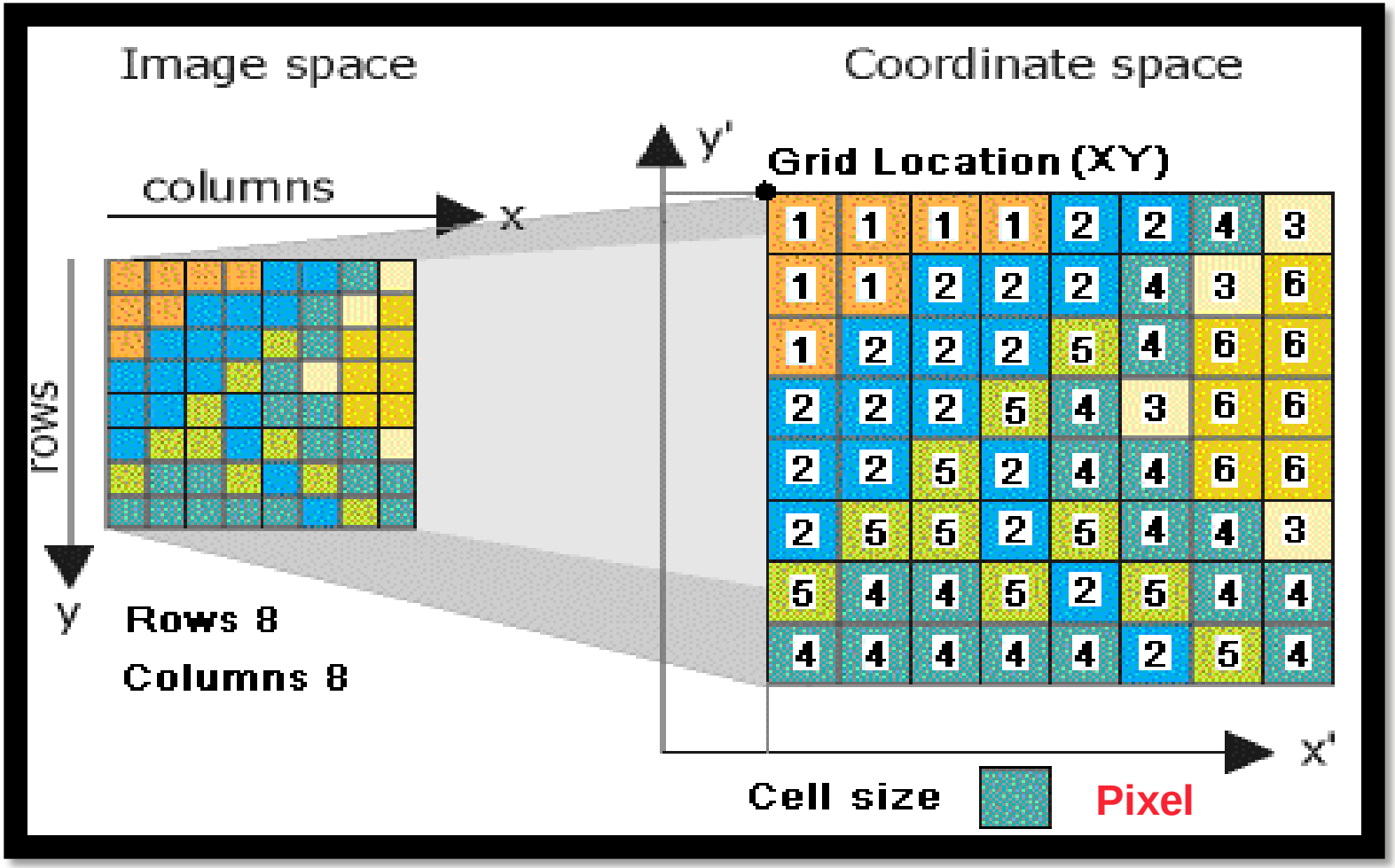
The data has to be structured (organized), to the compatible for computer processing, subjected to storing, analysis and modeling of data to get the "Result". The spatial data are structured as-

- **A. Raster and**
- **B. Vector**

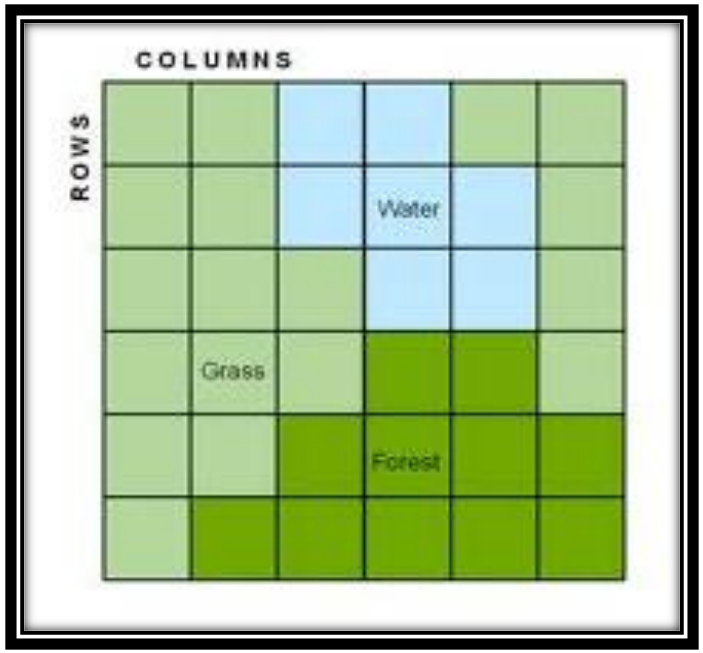
(A) Raster data model :

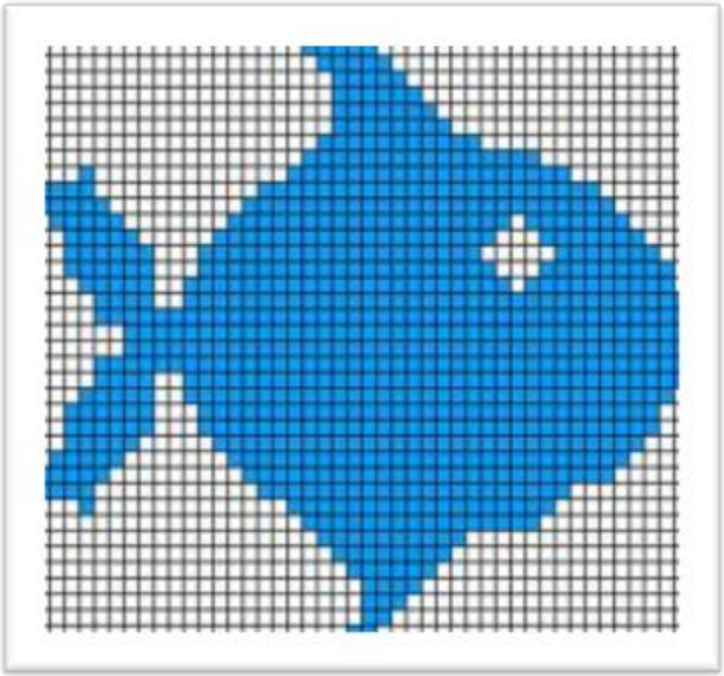
- **Raster model divides the entire area into regular grid of cells, or into rows and columns-**

Raster Structure :



Raster Images :

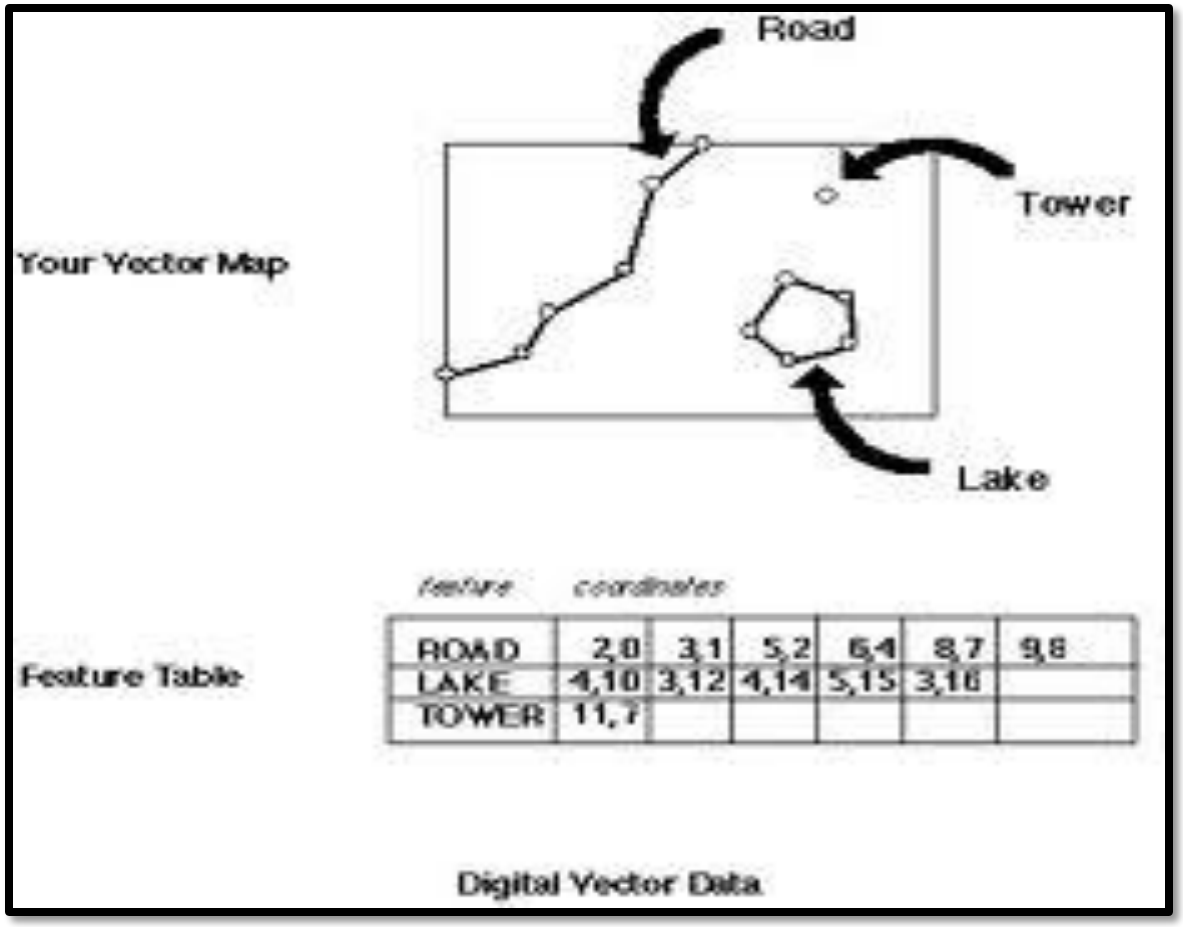




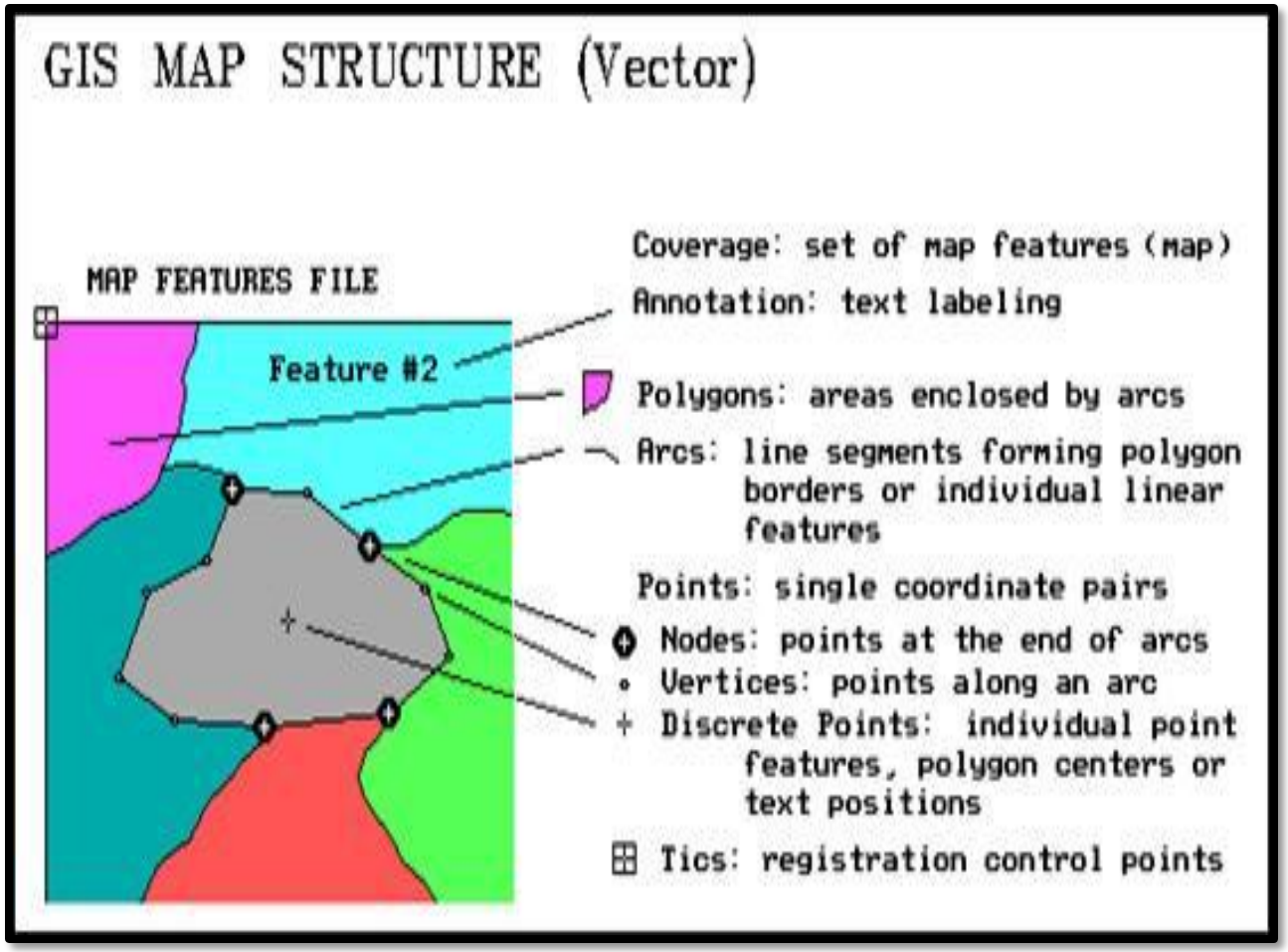
(B) Vector data Model :

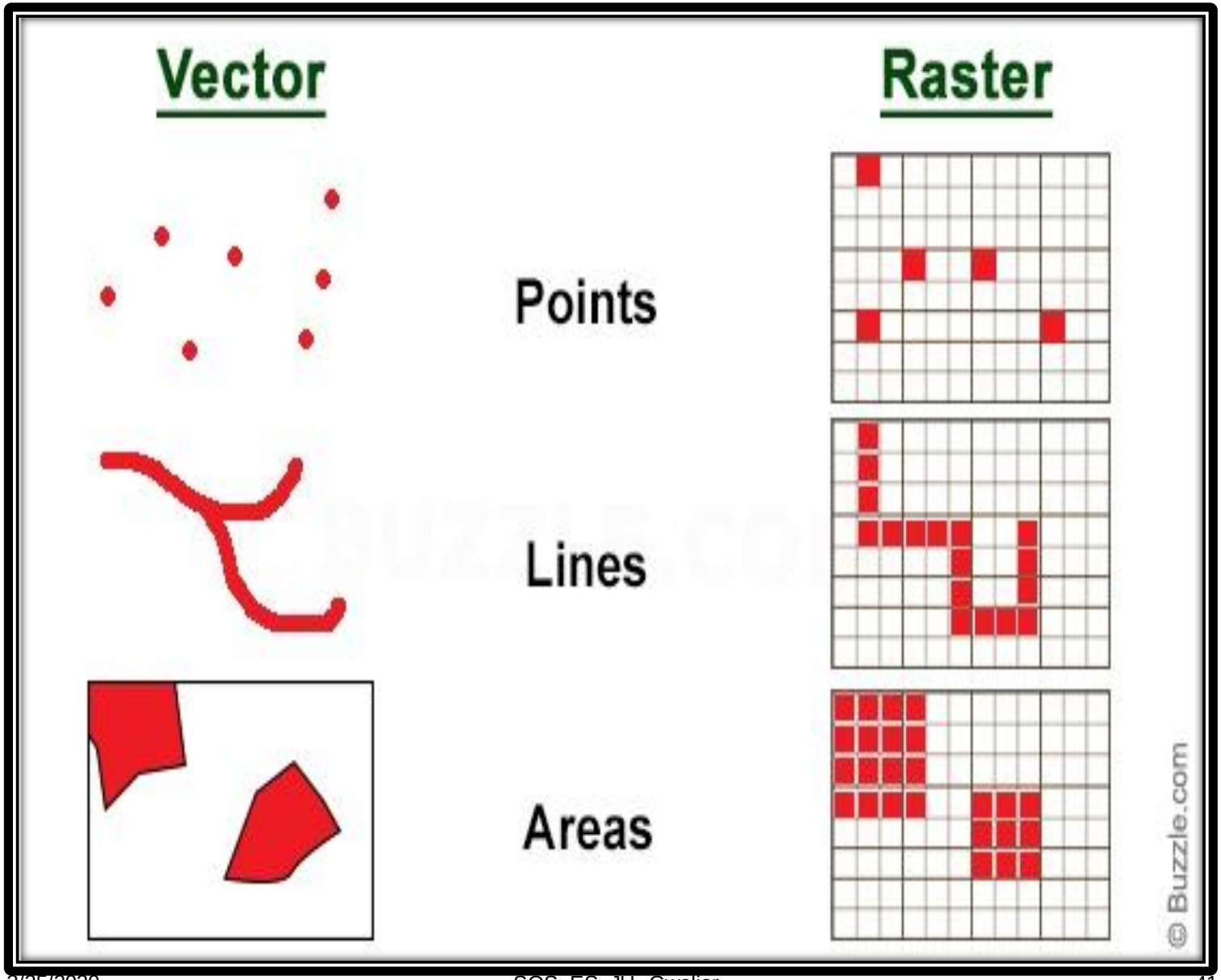
- **Vector model is that, as all geographic features look in real world (on a map), can be represented as 'point' (location), 'line' (arc) and 'polygon' (area)-**

Vector Data :


Road
Tower
Your Vector Map
Lake
feature
coordinates
Feature Table
ROAD 2,0 3,1 5,2 6,4 8,7 9,8
LAKE 4,10 3,12 4,14 5,15 3,16
TOWER 11,7
Digital Vector Data

Vector Structure :




Vector
Raster
Points
Lines
Areas
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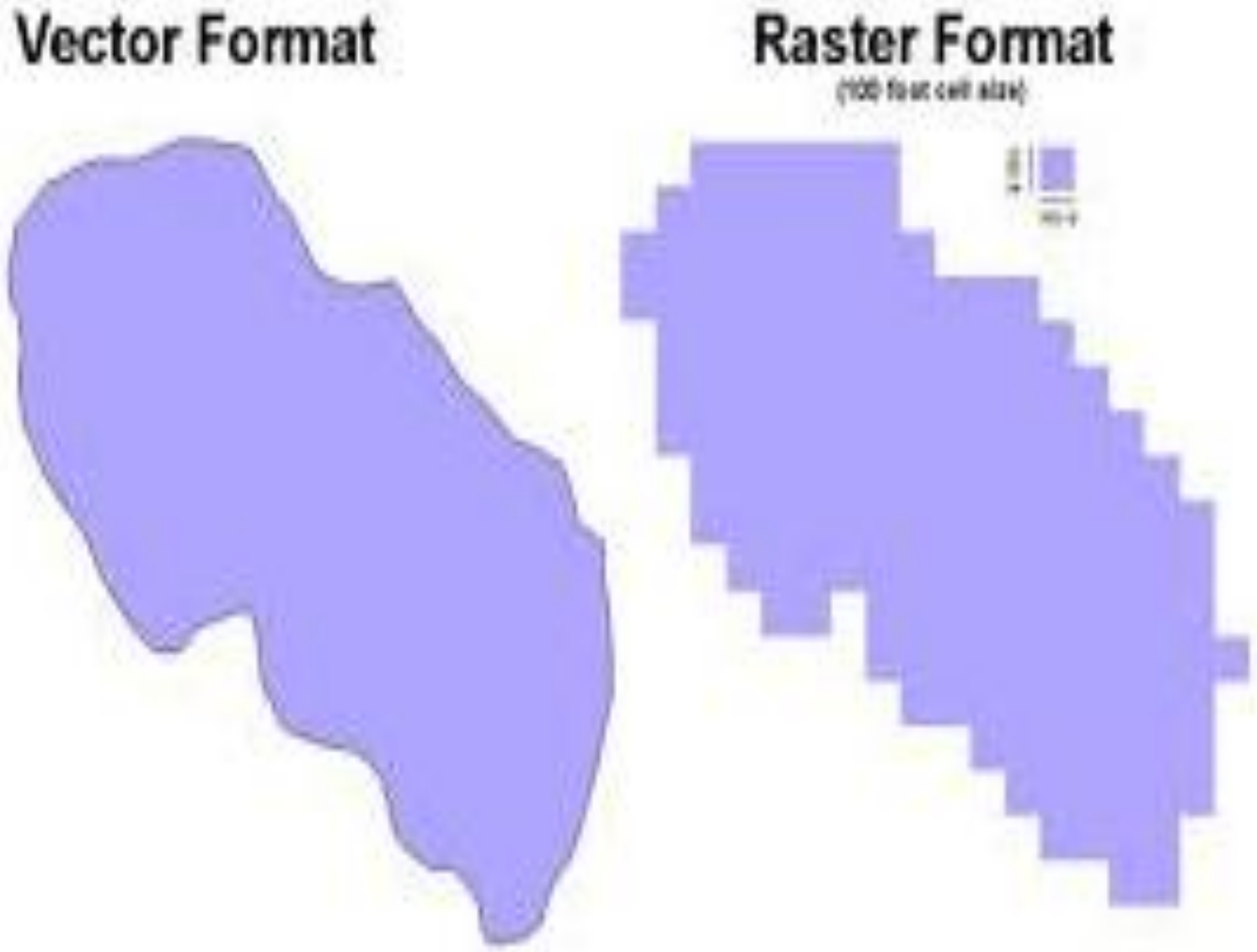
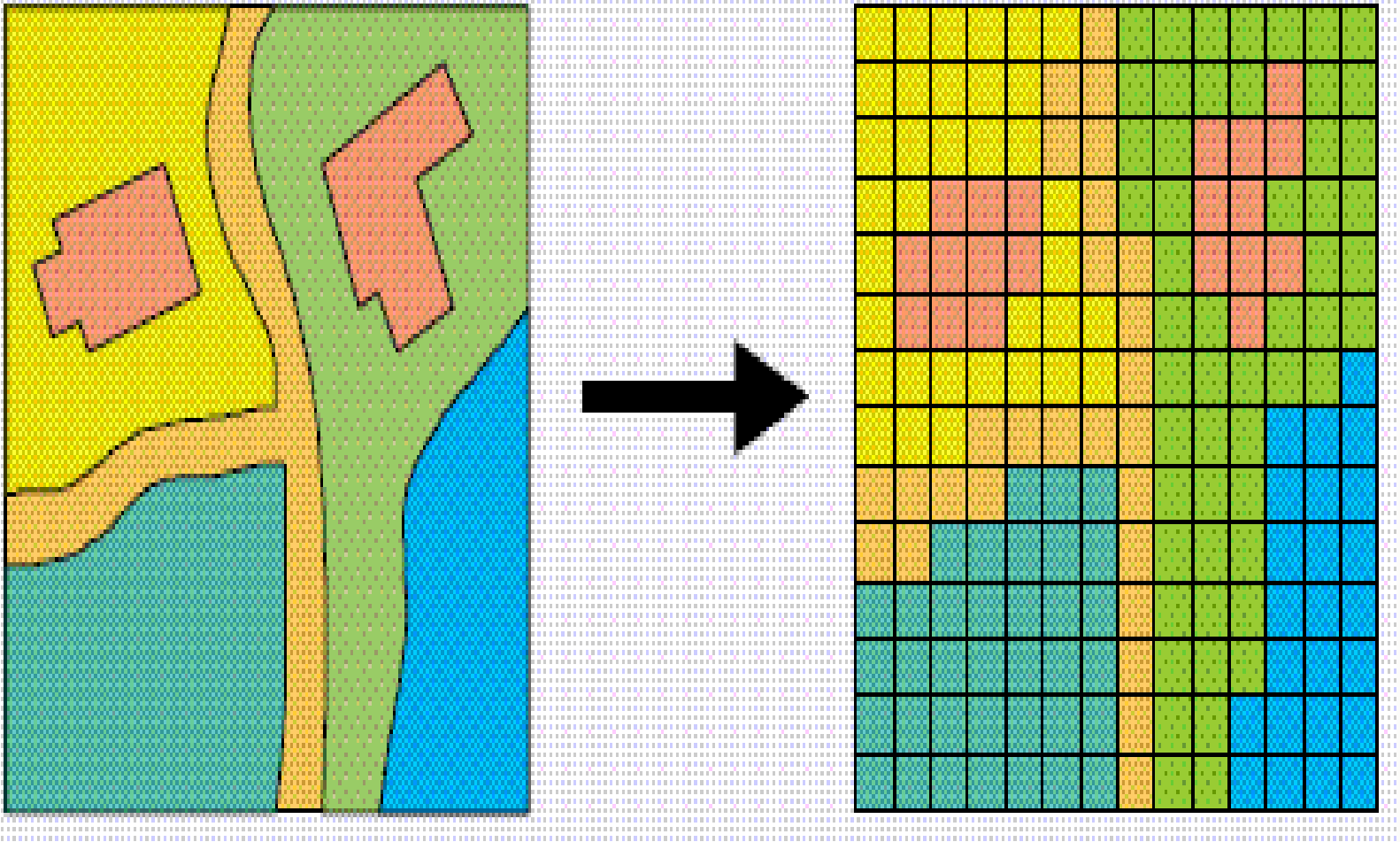
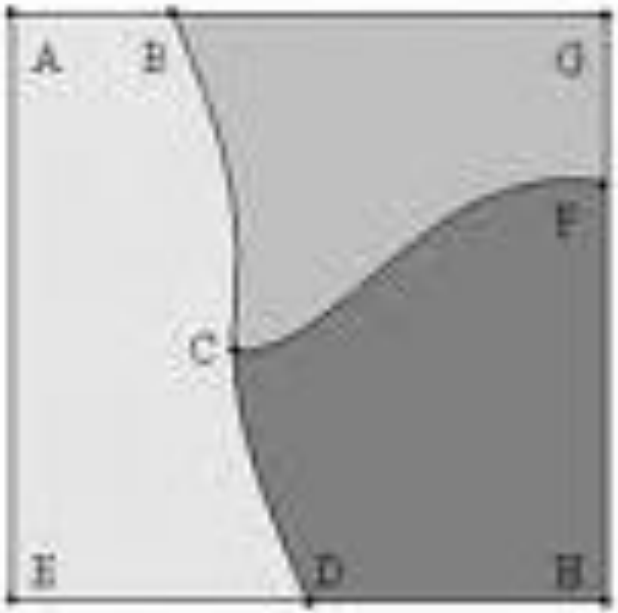

Vector Format
Raster Format

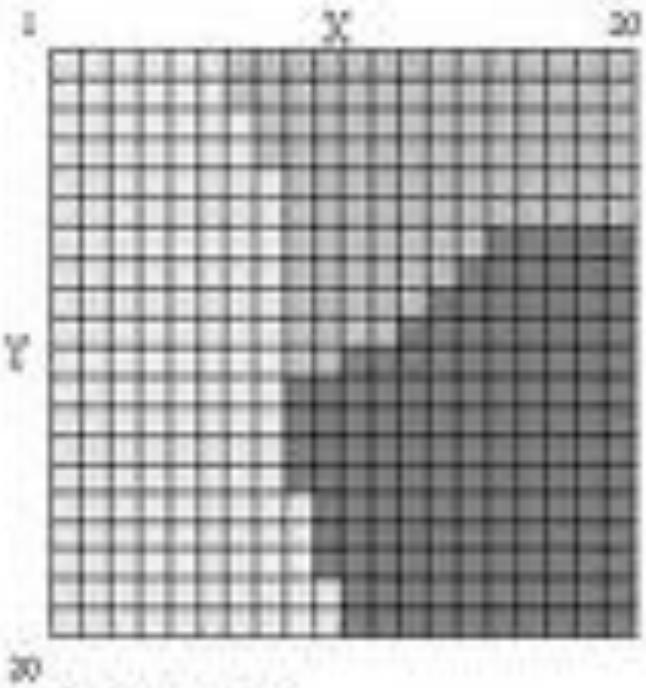
Vector Vs Raster :



Vector Image Vs Raster Image :



Vector image



Raster image

Vector		
Polygon ID	Coordinates	Soil Type
1	A,B,C,D,E	Chalk
2	B,C,F,G	Clay
3	C,F,H,D	Gravel

Raster	
Grid Ref.	Item
x=1, y=1	Chalk
X=2, y=1	Chalk
X=3, y= 1	Chalk
X=4 etc	
X=20, y=20	Gravel

DATA FORMATE :

- **Digital data from the various satellite systems supplied to the user in the form of computer readable tapes or CD-ROM.**
- **As no worldwide standard for the storage and transfer of RSD has been agreed upon.**

- **Through the CEOS (Committee on Earth Observation Satellites) following three format are accepted as the standard.**
- **Digital remote sensing data are often organized using one of the three common formats used to organize image data.**

- **These “three” common formats are-**

(i) BIP (Band Interleaved by pixel)

(ii) BIL (Band Interleaved by line)

and

(iii) BSQ (Band Sequential)