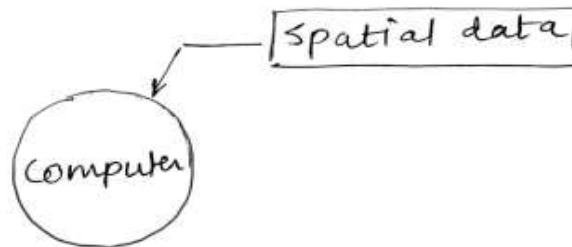


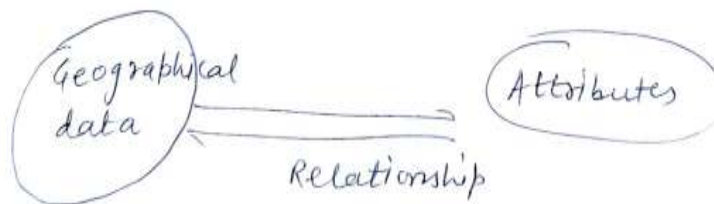
## GIS (Geographic Information system)

- GIS (Geographic Information system) can be defined as a set of location specific data information system defined to accept large volumes of spatial data derived from variety of sources and to efficiently store, retrieve, manipulation, analysis and display the findings.

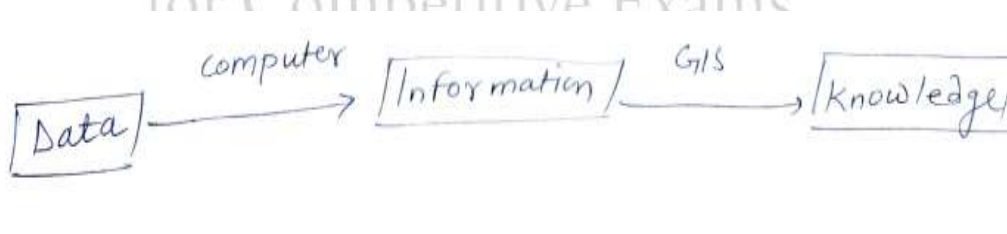


**Important Function of GIS :-** Data Integration

**Main Capability :-** establish relationship between geographical data and the attributes.



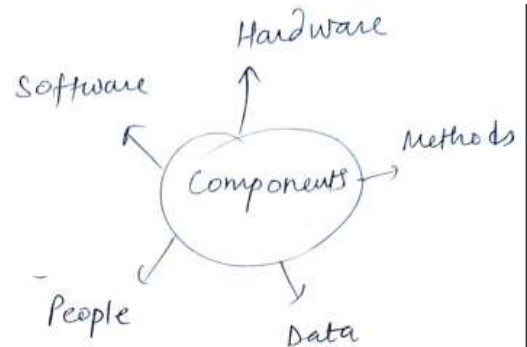
**Purpose of GIS :-** Converting data into information and then finally to knowledge which can help in all kind of scenario.



**Components of GIS :- [Father of GIS – Roger Tomilson]**

**Five Components of GIS :-**

(1) **Hardware** :- Hardware is the computer on which GIS operates. Today it is not necessary to have centralized computer servers (main frame computer). It can run on wide range of hardware which can be your smart phones also.



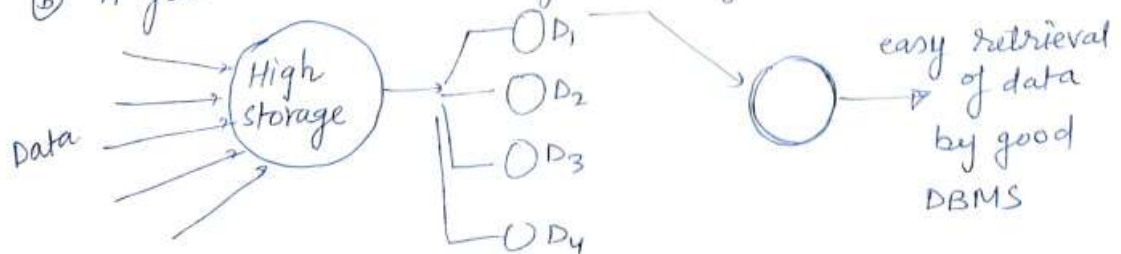
(2) **Software** :- GIS Software provides the functions and tools needed to store, analyze and display geographic information key software components are –

(a) Tools for the input and manipulation of geographic information.



(b) A good database management system –

(b) A good database management system



(3) **Data** :- It is the most important component of a GIS Geographic data and (Spatial data) related tabular data (Non-spatial data) can be collected in house or purchased from a commercial data provider.

**Types of GIS Data :-**

**Spatial Data** :- Having co-ordinates (Latitude and Longitudinal that shows position of features) [Inform of Maps].

It represent the location of geographical features – Points, lines, polygons.

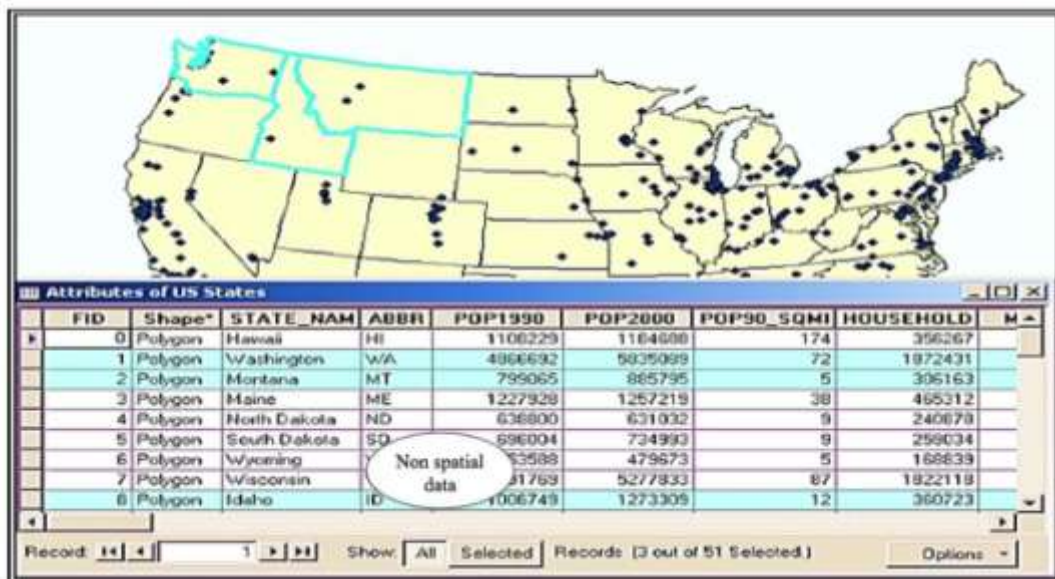
1. Raster Data
2. Vector Data

**Non-Spatial Data** :- Representing a set of information about geographical features [In Tabular form].

Knows as attribute data –

1. Statistical (Numerical)
2. Descriptive (Word or text)

**Spatial and Non Spatial Data**



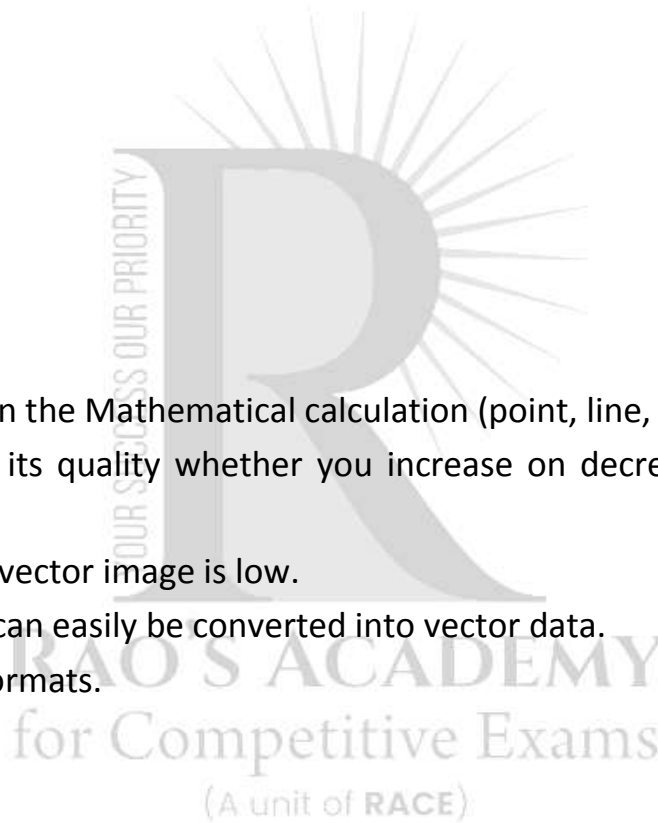
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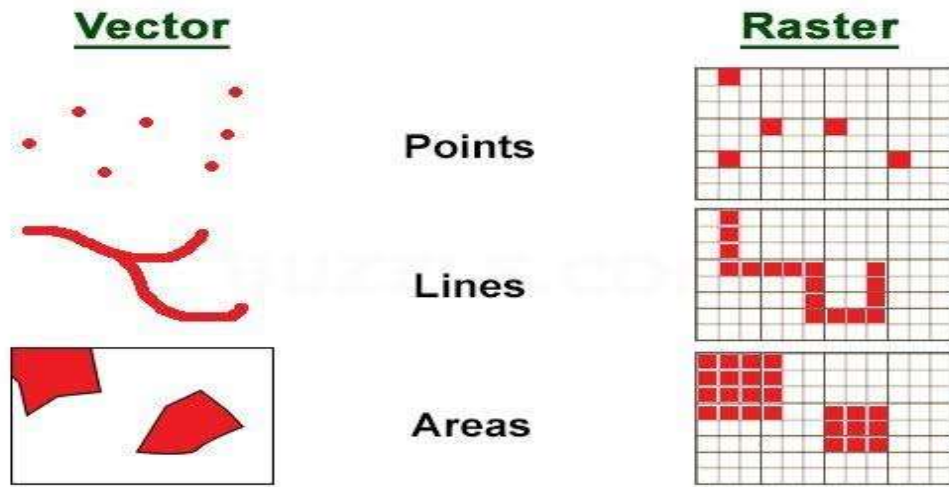
### Raster Data –

- It depends on the pixels (square cells) with specific DN values.
- Dimension and Resolution of Raster data is fixed and it can be magnified up to a limit.
- If the Raster image is big then the file of size will also be large.
- It is hard to convert a vector data into Raster data.
- Raster file formats.
  - JPEG
  - PNG
  - GIF
  - BMP
  - TIFF

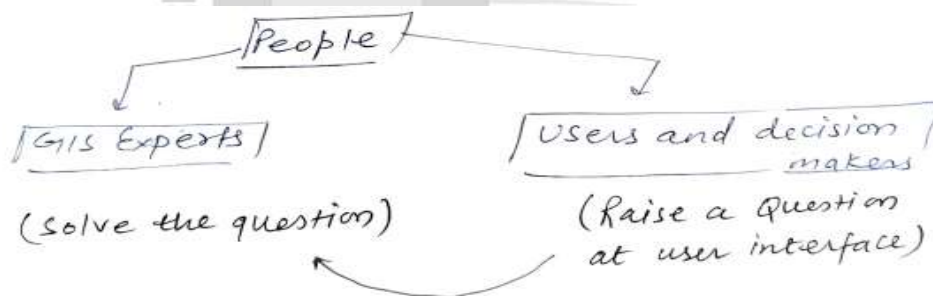
### Vector Data –

- It depends on the Mathematical calculation (point, line, polygon)
- It maintains its quality whether you increase or decrease the size of the data.
- Then size of vector image is low.
- Raster data can easily be converted into vector data.
- Vector file formats.
  - PDF
  - CDR
  - AI
  - SVG





- (4) **People** :- GIS technology is of limited value without the people who manage the system and develop plans for applying it to real world problems.



- (5) **Methods** :- A successful GIS operates according to a well designed plan and business rules, which are the models and operating practices unique to each organization.

**Limitations of GIS –**

- 1) It is expensive, sometimes paper atlases/maps are cheaper and easy to handle.

**Note:-** Initially it may be costly in buying software but once the setup is there then it is cost effective and simple to use.

- 2) Requires too much data that too it digital format.
- 3) Requires big storage.

- 4) Its databases are software dependent and hence their exports and imports are very limited.

### **Applications of GIS –**

**GIS in mapping** – Mapping is a central function of GIS which provides a visual interpretation of data in database and then represent it visually in mapped format. Google map is best example of web based GIS mapping solution

**Telecom and Network** – GIS data enables wireless telecommunication organizations to incorporate geographic data into the complex net work design. This enhances customer relationship management and location based services.

**Accident analysis and hot spot Analysis** – Gis can be used as a tool to minimize accidents by identifying the accident locations and take remedial actions by district admin to minimize accident by re-routing using GIS.

**Urban planning** – Analyze the urban growth and its direction of expansion and to find suitable sites for further urban development

**Transportation planning** – New Railway or Road Route can be determined by adding environmental and topographical data into GIS plat form to get best output Routes. It can also help in monitoring conditions of rail & road systems.

**Environment impact Analysis** – By integrating different layers of GIS including the construction, roads, pipelines forest, minerals etc. assignment of natural features can be performed.

**Agricultural Application** – GIS can be used in efficient farming techniques by analyzing soil data of a specific location to determine best Crop.

**Disaster Management** – Gis can help in DM by locating the areas which are prone to natural or manmade disasters. By locating such areas we can mitigate the effect of Disaster by taking preventive measures.

**Navigation (Routing & scheduling)** – GIS supports safe navigation system and provides accurate topographic and hydrographic data, this helps to minimize risk of collision & injury.