

NCERT SOLUTIONS

CLASS - 12th



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Class : 12th

Subject : Geography

Chapter : 6

Chapter Name : Spatial Information technology

Q1 Choose the right answer from the four alternatives given below :

(i) The spatial data are characterised by the following forms of appearance :

- (a) Positional
- (b) Linear
- (c) Areal
- (d) All the above forms

(ii) Which one of the following operations requires analysis module software?

- (a) Data storage
- (b) Data display
- (c) Data output
- (d) Buffering

(iii) Which one of the following is a disadvantage of Raster data format ?

- (a) Simple data structure
- (b) Easy and efficient overlaying

(c) Compatible with remote sensing imagery

(d) Difficult network analysis

(iv) Which one of the following is an advantage of Vector data format ?

(a) Complex data structure

(b) Difficult overlay operations

(c) Lack of compatibility with remote sensing data

(d) Compact data structure

(v) Urban change detection is effectively undertaken in GIS core using:

(a) Overlay operations

(b) Proximity analysis

(c) Network analysis

(d) Buffering

Answer.

(i) (b) Linear

(ii) (d) Buffering

(iii) (d) Difficult network analysis

(iv) (d) Compact data structure

(v) (b) Proximity analysis

Page : 100 , Block Name : Multiple Choice Questions

Q2 Answer the following questions in about 30 words :

- (i) Differentiate between raster and vector data models.
- (ii) What is an overlay analysis?
- (iii) What are the advantages of GIS over manual methods?
- (iv) What are important components of GIS?
- (v) What are the different ways in which spatial data is built in GIS core?
- (vi) What is Spatial Information Technology?

Answer.

(i) Raster data represents data in grids of squares or a matrix of small rectangles or pixels. This type of data representation allows the user to easily reconstruct or visualise the original image. It represents real world phenomenon.

Vector Data is representation of data by drawing diagonal lines, coordinates, polygons and points. Each point would be expressed as two or three numbers (2D or 3D). The Vector Data Model is based around Coordinate Pairs. A vector data model uses points stored by their real (earth) coordinates.

(ii) Overlay Analysis is applying layers of methods on same site selection to undertake integrated analysis. It is also known as suitability study. Eg.



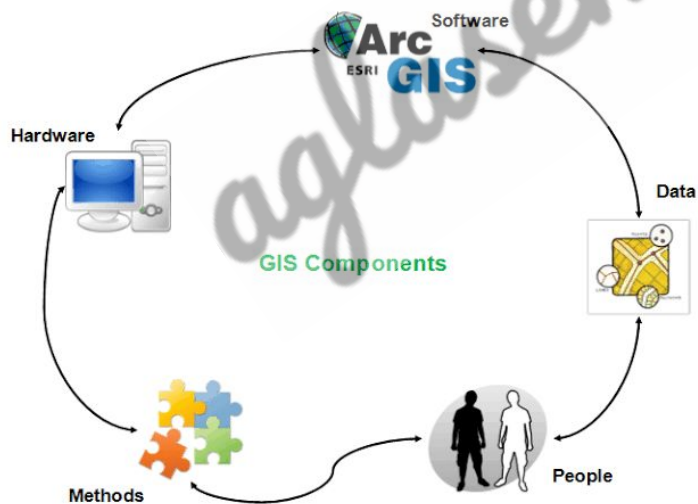
(iii) Advantages of GIS over Manual Methods :

1. Users can interrogate displayed spatial features and retrieve associated attribute information for analysis.
2. Maps can be drawn by querying or analysing attribute data.
3. Spatial operations (polygon overlay or buffering) can be applied on integrated database to generate new sets of information.
4. Different items of attribute data can be associated with one another through shared location code

(iv)

The important components of a Geographical Information System include the following:

- (a) Hardware
- (b) Software
- (c) Data
- (d) People
- (e) Procedures



(v) The different ways in which spatial data is built in GIS core are :

- Spatial Data Input
- Entering the Attribute Data
- Data Verification and Editing
- Geographic Data : Linkages and Matching

- Spatial Analysis

(vi) Spatial comes from the word space. Spatial information include the features distributed in a defined geographical space, having quantifiable measurements. Most data points that are used can be defined using spatial components, such as an address, coordinates etc. Hence, the Spatial Information Technology relates to the use of the technological inputs in collecting, storing, retrieving, displaying, manipulating, managing and analysing the spatial information. It uses techniques of Remote Sensing, GPS, GIS, Digital Cartography and Database Management Systems.

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Q3 Answer the following questions in about 125 words :

- Discuss raster and vector data formats. Give example.
- Write an explanatory account of the sequence of activities involved in GIS related work.

Answer.

(i) Spatial data can be represented in raster or vector data formats. Raster data represent feature as a pattern of squares, by subdividing the image into a matrix of small cells. Each cell is assigned a position and given a value. This data representation allows the user to easily reconstruct or visualise the original image. The relationship between cell size and the number of cells is called the resolution.

Uses - For digital representations of aerial photographs, satellite images etc. • When costs need to be kept down. • When the map does not require analysis of individual map features. • When “backdrop” maps are required.

Vector data represent the object as a set of lines drawn between points by simply recording the coordinates of its starting and ending points. Each point would be expressed as two or three numbers (depending on whether the representation was 2D or 3D) The first number, X, is the distance between the point and the left side of the paper; Y, the distance between the point and the bottom of the paper; Z, the point’s elevation above or below the paper.

The Vector Data Model is based around Coordinate Pairs A vector data model uses points stored by their real (earth) coordinates. Lines have a direction to the ordering of the points. Vectors can store information about topology.

Uses - Highly precise • When individual map features require analysis • When descriptive information must be stored.

(ii) Sequence of GIS activities are :

1. Spatial data input
2. Entering of the attribute data
3. Data verification and editing
4. Spatial and attribute data linkages
5. Spatial analysis

Spatial Data Input can be created from a variety of sources : (a) Acquiring Digital Data sets from a Data Supplier. Although, using such existing data sets is attractive and time saving, serious attention must be paid to data compatibility when data from different sources/ supplies are combined in one project. The next stage involves the transfer of data from a medium of transfer to the GIS. DAT tapes, CD ROMS and floppy disks can be used for this.

(b) Creating digital data sets by manual input : • Entering the spatial data. • Entering the attribute data. • Spatial and attribute data verification and editing. • Where necessary, linking the spatial to the attribute data.

The most common ways of inputting spatial data into a GIS are through: • Digitisation • Scanning. The use of digitisers and the scanners greatly reduce the time and labour involved in writing down coordinates.

Entering the Attribute Data Attribute data define the properties of a spatial entity that need to be handled in the GIS, but which are not spatial. For example certain colour, symbol or data location. The attribute values associated with the road, such as road width, type of surface, estimated number of traffic and specific traffic regulation may also be stored separately. The attribute data acquired from sources like published record, official censuses, primary surveys or spread sheets can be used as input into GIS database either manually or by importing the data using a standard transfer format.

Data Verification and Editing The spatial data captured into a GIS require verification for the error identification and corrections so as to ensure the data accuracy. The errors caused during digitisation may include data omissions, and under/over shoots. The best way to check for errors in the spatial data is to produce a computer plot or print of the data, preferably on translucent sheet, at the same scale as the original. Missing data and locational errors should be clearly marked on the printout. Transformation from one coordinate system to another may be needed if the coordinate system of the database is different from that used in the input document or image. These errors need corrections through various editing and updating functions as supported directly by most GIS software.

Spatial and Attribute Linkages The linkages of spatial and attribute data are important, A GIS typically links different data sets. Suppose, we want to know the mortality rate due to malnutrition among children under 10 years of age in any state. If we have one file that contains the number of children in this age group, and another that contains the mortality rate from malnutrition, we must first combine or link the two data files. land transformation data are collected in small areas but at less frequent intervals.

Spatial Analysis It includes: (i) Overlay analysis (ii) Buffer analysis (iii) Network analysis (iv) Digital Terrain Model

The distinguishing feature of GIS is its spatial analysis function. The analysis functions use spatial and non-spatial attributes to answer questions about the real world.. Such models provide the underlying trends in geographic data and thus, make new possibilities available. It helps to transform data into useful information to satisfy the requirements of the decision-makers. GIS may effectively be used to predict future trends over space and time related to a variety of phenomena.

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