

## Chapter : 4

### Use of Computer in Data Processing and Mapping

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1. Choose the correct option for the alternatives given below:

(i). What type of graph would you use to represent the following data?

States	Share of Production of Iron-ore (in %)
Madhya Pradesh	23.44
Goa	21.82
Karnataka	20.95
Bihar	16.98
Orissa	16.30
Andhra Pradesh	0.45
Maharashtra	0.06

- (a) Line
- (b) Multiple bar graph
- (c) Pie-diagram
- (d) None of the above.

**Answer:** (c) Pie-diagram

(ii). Districts within states would be represented in which type of spatial data?

- (a) Points
- (b) Lines
- (c) Polygons
- (d) None of the above

**Answer:** (c) Polygons

(iii). Which is the operator that is calculated first in a formula given in a cell of a worksheet?

- (a) +
- (b) -
- (c) /
- (d) ×

**Answer:** (c) /

## 2. Answer the following questions in about 30 words:

(i). What are the functions of different hardware components and software requirements of a computer?

**Answer:** The hardware components of a computer include the following:

- **A Central Processing Unit and Storage System:** It facilitates the execution of program instructions for processing data and controlling peripheral equipments  
All data together with the operating system and the application programs occupy space in disk storage unit which functions as working memory.
- **A Graphic Display Sub-system:** A graphic display system or monitor serves as the user's prime visual communication medium in all computers. A high resolution display system with a greater range of possible display colours and Look-up Tables (LUT) for rapid alteration of colour patterns is generally preferred in graphic and mapping applications.
- **Input Devices:** The instruction and the statistical data are entered into the computer using the keyboard functions. The keyboard is an important input device that resembles with a typewriter. It has various keys for different purposes.
- **Output Devices:** The output devices include a variety of printers such as ink-jet, laser and colour laser printers; and the plotters that are available in different sizes ranging from A3 to A0 size.

### Computer Software Requirements

Computer Software: It is a written program that is stored in memory. It performs specific functions as per the instructions given by the user.

1. **The Data Entry and Editing Modules:** These inbuilt modules in the data processing and mapping software facilitate the data entry system interface, database creation, error removal, scale and projection manipulations, their organisation, and maintenance of the data.

2. Coordinate Transformation and Manipulation Modules: The present day softwares provide a wide range of capabilities used to create layers of spatial data, coordinate transformation, editing and linking the spatial data sets with the related non-spatial attributes of data.
3. Data Display and Output Modules: The data display and output operations vary over a range of functions and are very much dependent on the skills developed in the field of computer graphics. Some of the common capabilities that the present day software's provide are:
  - Zooming/Windowing to display of selected areas and scale change operation
  - Colour assignment/change operation
  - Three dimensional and perspective display
  - Selective display of various themes
  - Polygon shading, line styling and point markers display
  - Output device interface commands for interfacing with plotter devices/printers
  - Graphic User Interface (GUI) based menu organisation for an essay interface

**(ii).** What are the advantages of using computer over manual methods of data processing and representation?

**Answer:** When we use computer, it is less time consuming and the results arrived are more reliable but manual data processing takes too much time and results are not so reliable

**(iii).** What is a worksheet?

**Answer:** A worksheet is a rectangular table (or grid) to store information. The worksheets are located in Workbooks or Excel files. Most of the MS Excel screen is devoted to the display of the worksheet, which consists of rows and columns. The intersection of a row and column is a rectangular area, which is called a cell. In other words, a worksheet is made up of cells. A cell can contain a numerical value, a formula (which after calculation provides numerical value) or text. Texts are generally used for labelling numbers entered in the cells. A value entry can either be a number (entered directly) or result of a formula. The value of a formula will change when the components (arguments) of the formula change.

**3. Answer the following questions in about 125 words:**

**(i).** What is difference between spatial and non-spatial data? Explain with examples.

**Answer:** Spatial Data: The spatial data represent a geographical space. They are characterised by the points, lines and the polygons. The point data represent positional characteristics of some of the geographical features such as schools, hospitals, wells, tube- wells, towns and villages, etc. on the map. In other words, if we want to present occurrence of the objects on a map in dimensionless scale but with reference to location, we use points.

Similarly, lines are used to depict linear features like roads, railway lines, canals, rivers, power and communication lines, etc. Polygons are made up of a number of inter-connected lines bounding a certain area and are used to show area features such as administrative units (countries, districts, states, blocks); land use types (cultivated area, forest lands, degraded/wastelands, pastures, etc.) and features like ponds, lakes, etc.

Non-spatial Data: The data describing the information about spatial data are called as non-spatial or attribute data. For example, if you have a map showing positional location of your school you can attach the information such as the name of the school, subject stream it offers, number of students in each class, schedule of admissions, teaching and examinations, available facilities like library, labs, equipment's, etc. In other words, you will be defining the attributes of the spatial data. Thus, non-spatial data are also known as attribute-data.

Sources of Geographical Data: The geographical data are available in analogue (map and aerial photographs) or digital form (scanned images).

**(ii).** What are the three forms of geographical data in computer?

Answer: There are three forms of geographical data in a computer. The extensions of these files are shp, shx and dbf. The dbf file is dbase file that contains attribute data and is linked to shx and shp files. The shx and shp files, on the other hand, contain spatial (map) information. The dbf file can be edited in MS Excel.

### ACTIVITY

**Question 1.** Carry out the following steps using the given data set:

(a) Enter the given data in a file and store in 'My Documents' folder (Name the file as rainfall).

(b) Calculate the standard deviation and mean for the given data set using Function Wizard in Excel spreadsheet.

(c) Compute coefficient of variation using the results derived in step (b)

(d) Analyse the results.

**Answer:** Do yourself.

**Question 2.** Represent the data given below using a suitable technique with the help of a computer and analyze the graph.

Year 80s	Cl 80s	Year 90s	Cl 90s
1980-81	123.3	1990-91	129.9
1981-82	124.5	1991-92	128.7
1982-83	123.2	1992-93	130.1
1983-84	125.7	1993-94	131.1
1984-85	125.2	1994-95	131.5
1985-86	126.7	1995-96	131.8
1986-87	126.4	1996-97	132.8
1987-88	127.3	1997-98	134.1
1988-89	128.5	1998-99	135.4
1989-90	128.1	1999-00	134.9

**Answer:** Do yourself.