PHYSICS PRACTICAL SHEETS

Date: ..... CAMPUS
Class: .....
Roll No.: .....
Shift: .....
Object of the Experiment (Block Letter) Chapter-4

Experiment No.: .....
Group: .....
Sub.: .....
Set: .....

1. What are different methods of data capture?

Data capture is the process of acquiring the data necessary for the GIS system about geographical phenomena of interest.

Two methods:-

i. primary data capture
ii. secondary data capture

Primary data capture:-

This method captures data specifically for use in GIS. The raster data are captured through remote sensing. Vector data are captured through Gps measurement and surveying.

Secondary data capture:-

This method captures data from data that are collected for other purposes. The raster data are collected by scanning the existing maps or aerial photographs. Vector data are collected through digitizing and photography.

Methods of Data Input

1. Manual:-

Manual data entry is done if the data are collected or measured data manually. The data exists as a text file or a binary files.

2. Digitizing:

It is process of capturing data on a map and putting into a compa file. It can be manual or automatic. Manual digitizing allows geo-referencing during the digitization process. Automatic digitizing requires geo-referenced in later stages.

iii) Scanning :-
A digital image of map is produced by moving an electronic detector across the surface of the map. The output is a digital image.

iv) Remote Sensing :-
It is the science of making measurements of the earth using sensors on satellites or airplanes. The sensors collect data in the form of images and provide capabilities to manipulate, analyze and view the images.

v) photogrammetric compilation :-
The primary source used in the process of photogrammetric compilation is aerial photography. Generally, the process involves using specialized equipment (a stereoplotter) to project overlapping aerial photos so that a viewer can see a 3 dimensional picture of terrain.

vii) Satelliate data :-
Earth Resources satellites have become a source of huge amount of data for GIS applications. The data obtained from the satellites are in digital form, which can be directly imported to GIS

2. What is georeferencing? Why it is important?
Georeferencing is the method of assigning the real-world coordinates to each pixel of the raster. Usually, these coordinates are obtained by doing proper fields surveys and collecting coordinates with a Gps devices for few easily identifiable features in the image or the map. It is basically a means to associates something with locations in the physical space or the process of associating a physical map or raster image of a map with spatial locations.
The importance of Georeferencing lies in its ability to turn non-spatial imagery into spatial raster data for use in a variety of circumstances. spatialized air photos can be used

for GIS land cover analysis. It makes the different imagery required for mapping. It explains how other data, such as the above GPS points, relate to the imagery.

Importances:-

(i) Necessary information may be contained in data or images produced at a different point in time. It can be used to compare this data with that currently available.

(ii) Different maps may use different projection systems. The tools of Georeferencing contain methods that combine and overlay these maps with minimum distortion.

iii) Data obtained from surveying may be given a point of references from topological/topographic maps by application of Georeferencing

iv) It may be required to establish the significant relationship between social survey results which have been coded with postal codes or street address.

3. Explain Digitizing with importance.

Digitizing in GIS is the process of converting geographic data either from a hardcopy or a scanned copy/image into vector data by tracing the features. During the digitizing process, features from the traced map or image are captured as coordinates in either point, line or polygon format. Digitizing increases efficiency, it protects your record no matter what natural disaster, theft or loss happens and it makes record retrieval painless while modernizing your organization to current market standards.

Importance:-

(i) one of the most important qualities of information in digital form is that by its nature, it is not fixed in a way that texts are printed on paper.

(ii) Digital text are neither final nor finite and are fixed

neither in the essence nor in the form except when a hard copy is printed out, for they can be changed easily and without trace of erasures or emendation.

iii) Flexibility is one of the chief assets of digital information and precisely what we like about text poured into a word process program.

iv) Easy to audit and reformat

v) We can create an endless no of copies from digital files.

4. Explain the process of data preparation, conversion and integration.

Data preparation :-

Spatial data preparation aims to make the acquired spatial data fit for use. Images may require enhancements and corrections of the classification schema of the data. vector data also may require editing such as the trimming of overshoots of lines at intersections deleting duplicate lines, closing gaps in lines, ~~closing~~ and generating polygons. Data may need to be converted to either vector format or raster format to match other datasets

Pricision refers to the level of measurement and exactness of description in its database. precise location data may measure position to a fraction of a unit. precise attribute information may specify the characteristics of feature in great detail.

Conversion / Transformation :-

In virtually all mapping applications it becomes necessary to convert from one cartographic data structure to another The ability to perform these object-to-object transformations often is the single most critical determinant of a maping system's flexibility.

Format change : Raster to vector and vice versa.

Data integration:-
process of combining data of different themes, content, scale or spatial extent, projections, acquisition methods, format-schema or even levels of uncertainty so they can be understood and analyzed.

Benefits:-
(i) Data integration saves time
(ii) Through data integration, company departments and s/w system work better together
(iii) It leads to fewer errors
iv) It enhances data

5. Explain spatial data quality and accuracy.
Data quality is the degree of data excellency that satisfy the given objective. In other words, completeness of attribute in order to achieve the given task can be termed as data quality.
Data created from different channels with different techniques can have discrepancies in terms of resolution, orientation and displacements. Data quality is a pillar in any GIS implementation and application as reliable data are indispensable to allow the user obtaining meaningful results.
spatial data can be categorized into
(i) Data completeness:- measure of totality of features.
(ii) Data precision :- degree of details that are displayed on uniform space
(iii) Data Accuracy :- discrepancy between actual attributes value and coded attribute value
iv) Data consistency:- absence of conflicts in a particular database.

Data quality improvement Technique

(i) choice of relevant data from a relavent source
(ii) Derive precisions in origin itself
(iii) Data quality testing in each phase of data capture
iv) Assesment mode of data uses and user
v) Determining mapelements like scale, visualization and feature orientation

6. Write short notes on GNSS:

Global Navigation satellite system (GNSS) is the standard generic term for all navigation satellites system like Gps. GLONASS, NAVIC. satellite based augmentation system are used to augment GNSS Data. It provides higher security, integrity, continuity and availability. Some correction data like satellite clock and atmospheric data are broadcasted from communication satellites.

- GNSS needs a common time system
- Each GNSS satellite has atomic clocks
- Signal transmission time has to be measurable.
- Each GNSS satellite transmits a unique digital signature
- Each satellite sends its orbit data using navigation message

7. Short note on Remote sensing.

Remote sensing is the science and art of acquiring information about material objects, area or phenomena without coming into physical contact with the objects or area or phenomena under investigation. In remote sensing, information transfer is accomplished by use of electromagnetic radiation (EMR). EMR is a form of energy that reveals its presense by observable effects it produces when it strikes the matter.

Remote sensing is the process of detecting and monitoring the physical characteristics of an area ~~or phenomena~~ by measuring its reflected and emitted radiation at a distance.

eg: Cameras on satellites and airplanes take images of large areas on the Earth's surface allowing us to see much more than we see when standing on ground.

8. Explain ~~the~~ ~~rate~~ how can you integration of Rs and GNSS data into GIS!

GIS, RS and GNSS offers oversize opportunities for monitoring and managing many facets of our vulnerable world.

GNSS Role in GIS

- Navigating to locations or features
- collecting vector spatial data (point, line & polygons)
- Adding a fourth dimension to GIS data (time)
- verifying locations of features
- Evaluating accuracy of existing data.

RS Roles in GIS :-

- Significantly promoted the ability to handle geo-information.
- high benefits and producing and updating maps with proposed system.
- Retrieves information rapidly
- facilities to do repetitive task without complaining Sort things fast.