1. What is GIS? List out its components.

Geographical information system (GIS) is a computer system for capturing, storing, querying, analyzing, managing and displaying geospatial data. A GIS is a computer based system that facilitates the phases of data entry, data analysis and data representation especially in cases when we are dealing with georeferenced data. GIS is working on the principles of geography.

Components of GIS :-

i) Hardware :-

H/w is the computer on which GIS operates. Today, GIS s/w runson wide range of h/w.

ii) Software :-

GIS s/w provides the functions and tools needed to store, analyze and display geographic information eg dbms, GUI

iii) Data :-

Geographical data and related tabular data can be collected in house or purchased from commercial data provider A GIS data will integrate spatial data with other data resources.

iv) people :-

GIS technology is limited value without the people who manages system and develop plans for applying it to real world problems.

v) Methods :-
A successful GIS operates according to a well designed plan and business rules which are models and operating practices unique to each organizations.

2. What is Geospatial technology? What are the different technologies included in Geospatial technology?

Geospatial technologies is term used to describes the range of modern tools contributing to geographic mapping and analysis of earth and human societies.

Geospatial technologies includes following.

i) Remote sensing :-
Imagery and data collected from space or airborne cameras and sensor platforms

ii) GIS :-
a suite of s/w tools for mapping and analyzing data which is georeferenced.

iii) Global positioning system (GPS) :-
Use to give precise coordinate location to civilian and military user with proper receiving equipment developed by US Department of Defense satellites

iv) Internet mapping technologies :-
S/w program like Google earth and web features like Microsoft Virtual Earth are changing the way geospatial is viewed and shared.

3. What are the functions and benefits of GIS.

Functions:-

i) Data collection and capture:-
GIS is used to collect data and capture data which are required for input source for digitization process

ii) Data storage and mngt:-
Databases created through GIS can be stored into different media such as harddisk and spatial database are regularly updates

iii) Data Integration:-
GIS makes it possible to link or integrate information collected from various source.

iv) Data conversion:-
GIS helps to convert data from one format to another i'e. raster to vector

v) Data analysis:-
Data can be analyzed by applying appropriate mathematical or statistical algorithms.

Benefits:-

(i) cost saving resulting from greater efficiency by using automatic machines

(ii) Better decisions making
It is used to make better decision about locations

iii) improved communication:-
GIS based maps and ~~virtual~~ visualizations greatly

assists in understanding situations

iv) Better geographic information record keeping :-
It helps to maintaining authoritative record keeping of geography

v) faster and efficient and requires less persons

vi) more robust and resistant to change

4. Write the scope and application areas of GIS.

GIS in recent times has transformed into Geoinformation technology with the integration of mapping techniques, ~~surv~~ surveying, Remote sensing and satellite imagery, photogrammetry, Geography, Geology, Cartography and Global positioning system. GIS can be applied in every sectors. GIS can designed in a proper manner has the capacity of providing quick and easy access to large volume of data of these geographical features

Application of GIS :-

(i) precision agriculture :-
precise plowing, seeding, watering spraying
Automated tractor control

(ii) open pit mining :-
Enhanced mngt of assets, equipment, work progress tracked in real time, remotely

iii) Timing applications:-
communication n/w synchronization and mngt
power grid mngt and fault location

iv) other civilian applications
public safety, scientific research etc.

5. Differentiate between DBMS and GIS.

In geographic information system large amount of data are stored and must be available to multiple users. DBMS were designed to facilitate storage and retrieval of large data collections
DBMS is an interface between users and their databases
Spatial database include locations. It has geometry as point, lines and polygon. GIS combines spatial data from many sources with many different people.
GIS includes database mngt features but dbms not included GIS features.
GIS is the computer system for capturing storing, checking and displaying data related to earth's surface.
whereas DBMS is s/w creating and managing databases
Example of DBMS is mysql and eg of GIS is geospatial database.

6. Differentiate between Spatial and Attribute data.

Spatial Data	Attribute data
(I) spatial data are longitude and latitude	(I) Attribute data are monument
(II) Describes absolute and relative location of a geographic features	(II) Describes the characteristics of geographic features
(III) All types of data objects or elements that are present in a geographical space or horizon	(III) Characteristics of geographical features are qualitative and quantative in nature
(IV) Stored in dominant database	(IV) Stored in conventional db
V) ~~It can be used to describe~~ It is the entity type which has attribute data	V) It can be used to describe spatial data

PHYSICS PRACTICAL SHEETS

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VARIETY PRODUCT

1. Define map? Describe the different map elements

Marks on a paper that stands for definable things on the earth's surface. It is a representation usually on a flat surface of whole or a part of it. It is usually refers to a geographic representation.

Different map elements are:-

i) Main map body:-
This is map itself. All other elements provide supplementary information meant to clarify it.

ii) Legend:-
Legend explains any symbols used on map. It also include short description of what that symbol indicates.

iii) Title:-
Map title reflect subject of map.

iv) Inset map:-
smaller map featured off to side or in corner of your main map. It show a specific area of main map on larger scale

v) Orientation indicator.
map's orientation is the relationship between the direction shown on map vs compass directions in reality.

vi) Scale indicator:-
The scale is typically a ratio that relates a single map distance unit to a corresponding distance in real world.

vii) Source not:-
It shows viewer where the information displayed on map came from.

2. Describe the Geographic features and attributes.

Geographic features are components of a planet that can be referred to as location, sites, areas or regions. There are natural geographic features, abstract geographic features and artifical geographic features.

Natural geographic features

It includes landforms and ecosystem. Landforms are terrain types and bodies of water. Ecosystems are natural units consisting of all plants, animal and microorganism in an area functioning together with all non living physical factors of environment

Abstract geographic features:- It includes politically designed areas and cartographic features like equator

Artifical geographic features:- It include settlements and engineered constructs eg dams, building.

An attribute a a data value associated with a particular feature in a GIS layer eg name associated with a particular street. Attributes are non spatial characteristics that describes spatial data model. each object have multiple attribute to describe objects.

3. Short note on ~~map~~ Thematic map.

A Thematic map is a type of map that portays the geographical pattern of a particular subject matter in a geographic area. It illustrate spatial relationships focusing on a specific theme or subject. This usually involve the use of map ~~of~~ symbols to visualize selected properties of geographic features that are not naturally visible such as temperature, language or population. Alternative name have been

suggested for this class such as special subject or special purpose maps, statistical maps or distribution maps.
It is used to illustrate relationship between theme and physical space.

4. Define term map layers, map resolution and Map scale and representation.
A map layer is a GIS database containing group of point, line or polygon features representing a particular class or types of real-world entities such as customer, street or postal codes. Layer can also be of raster images such as those taken by satellites. A layer contains both visual representation of each features and a link from feature to its database attribute.

Map resolution refers to how accurately the location and shape of map features can be depicted for a given map scale. In large-scale maps the resolution is greater because the reduction factors used to put real-world features on a map is less. As a map scale decreases, features are simplified smoothed or not represent at all.

Map scale and representation:
Naturally it is impossible for real world features to be drawn on map as large as their true size. So, inorder to represent real world, maps are made to the specific scale. Map scale is defined as the ratio of distance between points on map to corresponding distance on ground. Maps comes on variety of scales including fraction, bar, verbal and fraction.

1:50000 represents the mapscale as mathematical Ratio Here one unit of measurement on map is equal to 50000 of same unit on ground.

5. Describe the process of layout a map.
Five step process for creating an effective map layout.

① Define a problem:-
map should be the visual representation of answer to a question so first define the questions.

2. choose a map type:-
Maps aren't one sized fits all. Different map types are better suited to displaying different types of information. According to your question choose the map whether thematic or reference.

3. consider your map elements:-
Apply the appropriate map elements which one required to describe map

4. Establish a visual hierarchy:-
put most important element on top and less important in base/bottom.

5. Decide on design element:-
Use appropriate colors, fonts, outlines, border etc.

6. How can you design your map?

Map making is both science and art. A beautiful map becomes more popular even if it is less accurate than a plain map.

(I) Generalization :-

Maps contain certain level of details depending upon its scale and purpose. Large scale maps usually contains more details than small maps. The process of reducing the amount of detail in a map in a meaningful way is called generalization. Generalization is done normally when map scale has to be reduced.

(II) Graphic variables :-

Differing graphic character of symbol gives different perceptions to map reader. These graphic characteristics are termed as graphic variables which can be summarized as size, color, shape etc.

a) color :-

colors should complement the intent of your map adding another level of clarity. Use appropriate color to show the objects

b. outlines, borders and stroke widths :-

When adding outlines and ~~bro~~ borders or adjusting stroke widths - be sure it fits within the context of map.

c. Fonts :-

Serif / sans serif are map standards. Always use bold or normal fonts as opposed to italic or cursive.

7. What is map projection? Describes its types.

Map projections are attempts to portray the surface of the earth or a portion of earth on flat surface. Some distortions of conformality, distance, direction, scale and area always from this process. Map are flat by they represent curved surface. Transforming 3D space to 2D space map is called projection.

Basically there are three types of map projections.

(i) cylindrical projections:-
It is assumed to circumscribe a transparent globe (marked with meridians and parallels) so that cylinder touches the equator throughout its circumference. Assuming the light bulb is placed at the center of globe, the graticule of globe is projected on the cylinder. By cutting open the cylinder along a meridian and unfolding it, a rectangle shaped cylindrical projection is obtained. cylindrical are true at equator and distortion increases towards poles.

ii) conical projection:- A cone is placed over the globe in a such a way the ~~apex~~ apex of cone is exactly over the ~~to~~ polar axis. A cone must touch the globe along a parallel of latitude known as standard parallel which can be selected by cartographer. Along this standard parallel, scale is correct and distortion is the least. When cone is cut open along a meridian and laid flat, a fan shaped map is produced with meridians as straight line radiating from vertex at equal angles, while parallels are arcs of circles, all drawn using vertex as center.

iii) Planer or Azimuthal projection:-
A ~~pb~~ plane is placed so that it touches the globe at the north or south pole. This can be conceived as the core

becoming increasingle flattened until its vertex reaches the limit of 180°. The projection resulting is better known as ~~planer~~ polar azimuthal projection. It is circular in shape with meridians projected as straight lines radiating from center of circle, which is pole projection change a round world into a flat one.

8. Define coordinate system. Listout projected coordinate systems.

A coordinate system is a standardized method for assigning codes to locations so that location can be found using the codes alone. It is a model that maps the earth's surface to a plane. A reference system used to represent the locations of geographic features, imagery and observations such as GPS.

Some projected coordinates system:-

i) The universal Transverse Mercator Grid system:-
The UTM Grid system used worldwide, The UTM system divides the Earth's surface between 84°N to 80°S into 64 zones. Each zones covers 6° of longitude and is numbered sequentially with zone 1 beginning at 180° W.

ii) Military Grid Reference system (MGRS)
MGRS is extension of UTM. UTM zone number and zone character are used to identify an area of 6 degrees in east west extent and 8 degree in north south extent

iii) Universal polar stereographic Grid system:-
Ups grid system covers the polar areas. The stereographic projection is centered on the pole and is used for dividing the polar area into a series of 100,000 meter squares. The Ups grid can be used in conjection with UTM to locate position on entire earth's surface

iv) State plane coordinate system:-
SPC system was developed to permanently record original land survey monument location in US.

g. Listout common map projections.

① Transverse mercator:-
The TM projection, a secant cylindrical projection also known as Gauss-kruger, a well known projection for mapping the world. It a variation of mercator projection but two looks different. Mercator projection use standard parallel whereas TM use standard meridian. Both are conformal.

(ii) Lambert conformal conic:
LCC is a standard choice for mapping a mid latitude area of greater east-west than north-south extent such as the state of montana. It is defined by following parameters:-
first and second parallels, central meridian, latitude of projection's origin, false easting and false northing.

(iii) Albers-Equal area Conic.
It has some parameters as LCC. In fact, both are quite similar except one is equal area and other is conformal. It is for national land cover data for conterminous US.

iv) Equidistant conic :-
It is also called simple conic projection. It preserves the distance properties along all meridians and one or two standard parallels. It uses same parameter as LCC.

v) Web mercator :-
Web mercater is new invention by Googlemaps. It has since become the standard projection for online mapping. It is in sha sphere in shape which emplifies calculations. It preserves local angles and shape and has north on top of map.

10. How can you convert among coordinate system.
Coordinate system are framework that are uses to define unique position. In geometry, we use x (horizontal) and y (vertical) axis ~~to~~ cordinate to define points on 2D. The coordinate system that is most commonly used to define location on 3D earth is called geographic coordinate system (GCS).
The unit of GCS is degree and location can defined by longitude and latitude.
latitude and longitude can be expressed in degree-minute-second (DMS) or decimal degrees (DD) so we convert each other from DMS to DD
eg: $118^\circ 15$ minute $= 118 + \frac{15}{60} = 118.25^\circ$.

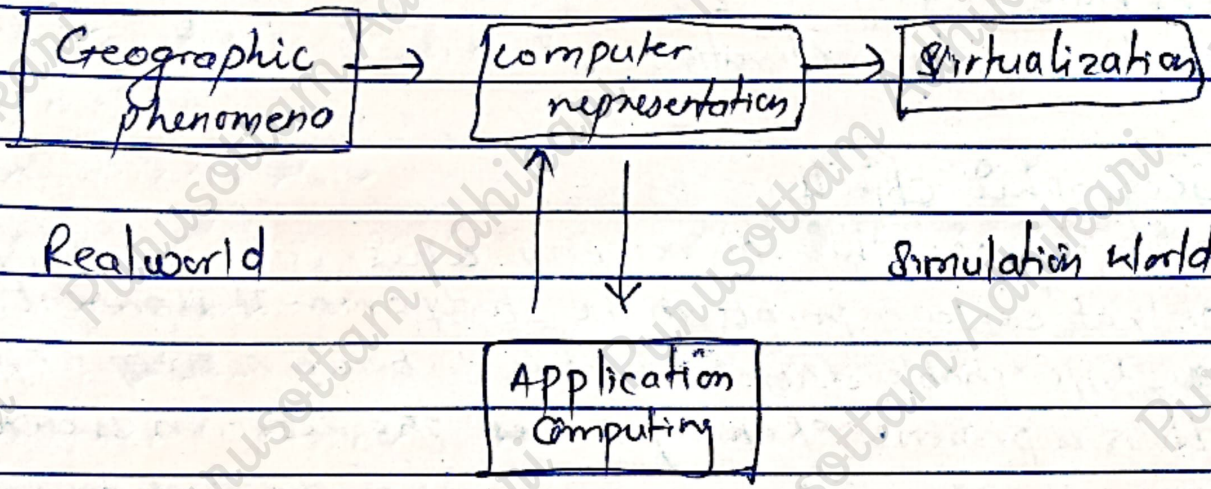
11. Short note on map output:-

The most common form of GIS is a map. Other non-cartographic forms of GIS output are tables and charts containing spatial and non-spatial information. Visualization is considered as the translation or conversion spatial data from a database into graphics. So we can visualize, analyzes the map. map output can be 2D, 3D, vector map, Hatch map etc.

Note:- This is the exam digest for more detail visit youtube channel CSC-TEACH

Thankyou.

1. What is Geographic phenomena? Describe with its types.



Geographic phenomena exist in real world. It is the events that take place in geographic space and time. It is defined as something which is of interest in GIS application that have following characteristics :-

(I) It can be named or described (II) It can be geo-referenced (III) It can be assigned a time interval at which it is present

It implies the computerized representation of the geographic data. The representation is based on types of available data and type of data manipulation needed.

eg: consider a water mngt system. The object of study can be river, ground water level, irrigation level and soon. These objects can be named geo-referenced and provided with time interval at which they exist. So these objects are termed as geographic phenomena.

Types of Geographic phenomena

(I) Geographic fields (II) Geographic objects

Geographic field:-
It is a geographic phenomena whose value at every point in the study area can be determined. If (x,y) represents the study area then f(x,y) represent the value of geographic field at that point. It can be discrete or continuous. Changes in the field is gradual. continuous field can be differentiated. The natural geographic phenomena are generally graphic fields eg temperature, elevation

Geographic objects :-
It is a geographic phenomena whose value is determined only at certain points in the study area. It represents well distinguishable discrete entities. In between geographic objects there a presence of empty spaces. The position is determined by combination of one or more parameter such as location, shape, size and orientation. Artifical geographic phenomena a generally geographic objects eg building, road

8. Write advantage and disadvantage of Raster data model.

Raster model makes use of raster data. It is based on pixels and consists of a regular grid structure of rows and columns. This model attempts to divide the real world into a regular grid of identically shaped cells.

Advantage:-
(i) Better for storing image data (ii) A powerful format for statistical and spatial analysis.
(iii) easy and efficient overlying iv) simple data storage structure
v) same Grid cells for several attributes

Disadvantages (i) Dataset can be large, storage space can be problem
(ii) N/w analysis is difficult iii) loss of info when using large cells
iv) Insufficient projection transformation.
v) Difficult in a representation of Topology connections.

3. Write down advantage and disadvantage of vector data model.

Vector is based on the objects like point, line and area. Every point has a unique location. An object shape is represented by data which have located at location where shape of object changes. Resolution is independent of details presented.

Advantages

(i) compact data structure - need less space for storing data
(ii) Accurate Graphic output
(iii) Since most information eg printed version maps is in vector form no data conversion is required.
(iv) Exact geographic location of data is maintained
(v) Easily make a connection between topology and n/w - efficient for n/w analysis.

Disadvantages

(i) location of each vertex needs to be stored explicitly
(ii) It has a complex data structure
(iii) difficult overlay operations.
(iv) high spatial variability is inefficiently represented
(v) Spatial analysis and filtering within polygons are impossible.

4. Explain the concept of spatial relationships and topology.

Topology deals with spatial properties that do not change under certain transformation. A simple example will illustrate what we mean. Assume you have some features that are drawn on sheet of rubber. Now take the sheet and pull on its edge, but do not tear or break it. The feature will change in shape and size. But some properties however do not change.

Topology refers to the spatial relationship between geographic element in data set that do not change

under continuous transformation. These relationships are invariant under continuous transformations. Such properties are called topological properties and the transformation is called a topological mapping.

5. How can you convert data in GIS.

Mechanism for converting GIS data from one format to another and is standard functionality in GIS package.

Two types of conversion

(i) Rasterization

(ii) vectorization

Rasterization:- conversion of vector data into Raster and is simple conversion method.

Basic steps:-

(i) Set up a raster with a specified cell size to cover area extent of vector data and assign value as 0 initially

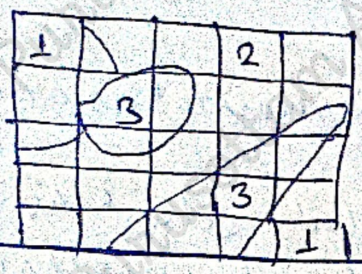
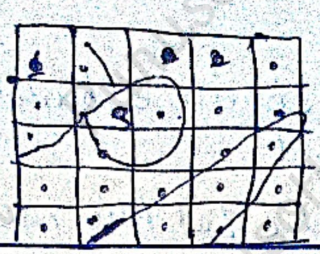
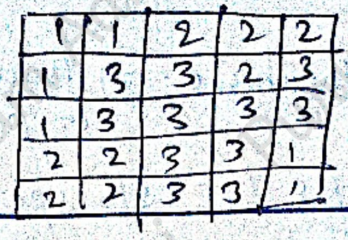
(ii) changes value of cell corresponds to its entity 1 for point, 2 for line and 3 for polygon

(iii) Fills interior of entity outline with entity value.

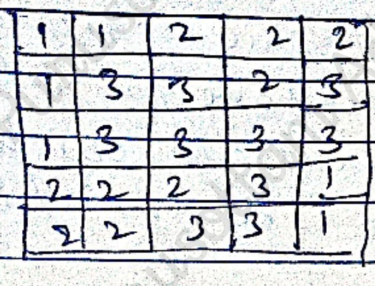
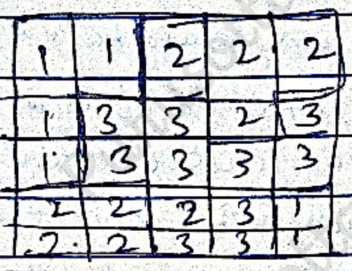
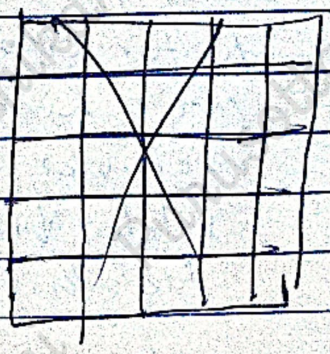
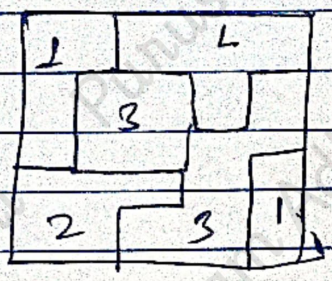
Formula for place coordinate define rules

$$col\ no = (X - X_{min} / X_{max} - X_{min}) N$$

$$Row\ no = (Y - Y_{min} / Y_{max} - Y_{min}) N$$

Vectorization :- conversion of raster data to vector.
3 basis elements : Line extraction, Line thining, Topological reconstructor

6. How can you design spatial database with geo-database.
A spatial database system may be defined as a database system that offers spatial data types in its data model and query language and support to spatial data types in its implementation providing at least spatial indexing and spatial join methods. A spatial database includes collections of information about spatial location, relationship and shape of topological geographic features and data in the form of attributes.

Step to design :-
① conceptual :- s/w & h/w independent, describes and define included entities, identifies how entities will be represented

in database. eg hoco should a building represented as an area or point.

Logical:- s/w specific but h/w independent, set out the logical structure of db element, determined by dbms used by s/w

Physical:- both h/w & s/w specific, requires consideration of how files will be structured for access from disk.

using geodatabase we includes objects and class, feature & feature class, feature database, geographic data is arrange into a hierarchy of data objects. object have properties & behavior and has unique identifier called OID. Objects are related via relationships. object class is represented by table that store non-spatial data.

7. Differences between Raster and vector data model.

Raster	Vector
i) Types of spatial data that consists of a matrix of cells organized into rows and columns in which each cell represent specific information	i) Types of spatial data used for storing data that has discrete boundaries
ii) continuous data	ii) Discrete data
iii) Represent data in cells or in a grid matrix	iii) Represents data using sequential points or vertices
iv) simple data	iv) complex data.
v) more space to store data	v) less pace to store data
vi) N/W analysis is difficult	vi) N/W analysis is easy

PHYSICS PRACTICAL SHEETS

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VARIETY PRODUCT

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 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 attribute 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 tasks without complaining sort things fast.

1. What is vector analysis? Why geoprocessing is important?
Vector analysis uses the geometric objects of point, line and polygon. The accuracy of analysis results depends upon the accuracy of these objects in terms of location and shape. Topology can also be the factor for some vector analysis such as buffering and overlay.

Geoprocessing is a GIS operation used to manipulate GIS data. A typical geoprocessing operation takes an ilp data set, performs an operation on the dataset and return the results of an operation as an output dataset. Geoprocessing is a framework and set of tools for processing geographic and related data. It is used to automate GIS tasks and for modeling and analysis. A typical geoprocessing tools performs an operation on datasets such as feature class, raster, or table and creates a resulting output dataset.

2. Define buffering with its applications.
Buffering is a GIS operation that creates zones consisting of an area within a specified distance of selected feature. Based on the concept of proximity, buffering creates two areas one area that is within a specified distance of selected feature and another area that is beyond.

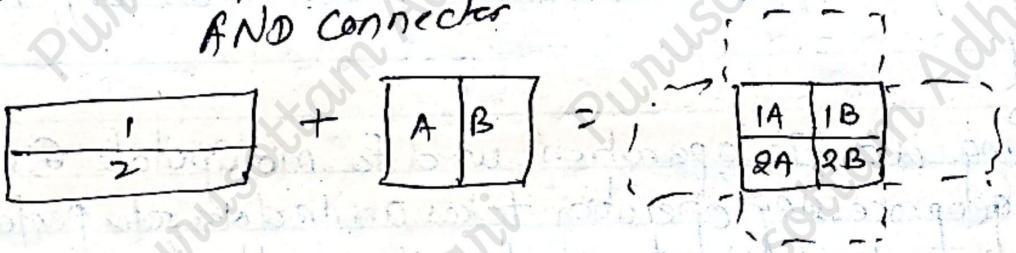
Application
(i) used in planning or regulatory purpose, as buffer zone is often treated as protected zone.
(ii) used in conflict resolution by treating buffer zone as neutral zone
(iii) used as object for analysis (iv) used as sampling method.

3. Define overlay and list out different methods.

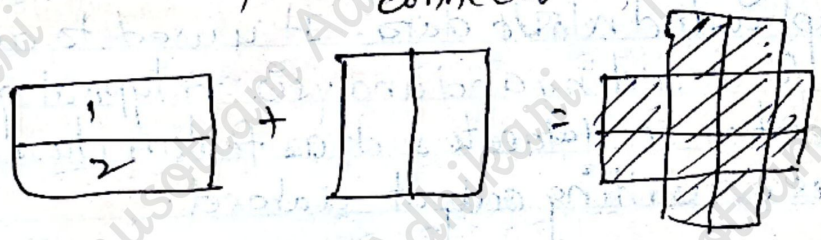
An overlay operation combines the geometric and attributes of two features from the input layer and create the output each feature on the o/p contains a combination of attributes from i/p layers and thus combination differs from its neighbours.

Methods

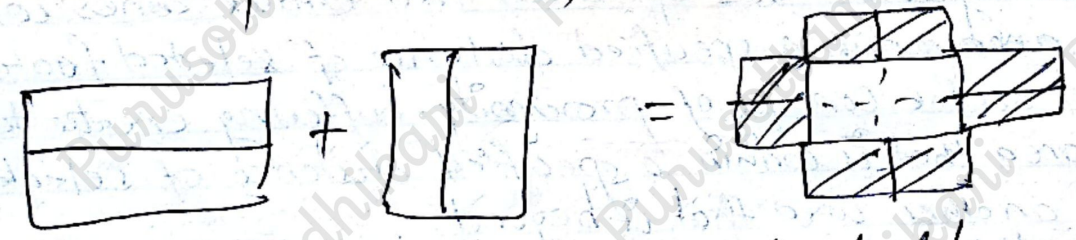
i) An overlay method/operation is called intersect if it uses AND connector



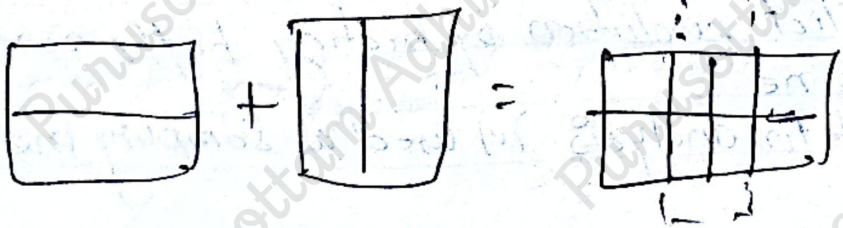
ii) An overlay operation is called union if it uses the OR connector



iii) An overlay operation that uses XOR connector is symmetrical difference



iv) An overlay operation is called identity or minus if it uses following expression: [(i/player) AND (identity)] OR (i/player)

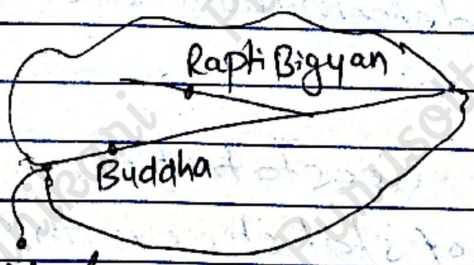


4. Explain different types of vector overlay operations.
See model question for answer.

5. Describe the steps to perform overlay analysis.
(I) Define problem
(II) Break problem into submodels
(III) Determine significant layer
(IV) Reclassify or transform data with a layer.
(V) weight i/p layer
(VI) combine layer
(VII) select best location
(VIII) Analyze.

6. Explain n/w analysis.
N/w analysis is commonly used for the analysis of moving resources from one location to another through a set of interconnected features. It includes determination of optimum paths using specified decision rules. The decision rules are likely based on minimum time or distance.

eg.



If there are two hospital located at Chorahi, Dang. If the accident happens at narayanpur area then it will be better to take patient to the buddha hospital if the condition is 'critical'.

6. for raster, ~~vector~~ analysis see model questions and youtube video because it needs explaination how to perform ~~vector~~ Raster analysis.

7. Short notes on spatial interpolation techniques.
Spatial interpolation is the process of using points with known values to estimate values at other points. In GIS applications, it is typically applied to a raster with estimates made for all cells. So, It is a means of creating surface data from sample points.
points with known values are control point

Types.
(I) It can be global or local
(II) It can be exact or inexact
(III) It can be deterministic or stochastic.

8. Short notes on Geostatistic :-
It is the study of statistics with a focus on spatial and temporal information. The aim is to model and find patterns of geographic phenomen.
The field of geostatistics covers a wide range of spatial statistical topics such as.

(i) semi-variogram to characterize the spatial pattern in data
(ii) kriging for spatial prediction
(iii) Standard error to measure uncertainty about ~~unsham~~ unsampled values.

eg:- What is forcasted amount of soil moisture at unsampled locations?

9- Define GIS modeling with its Role.
A model is a simplified representation of a phenomena or a system. It may be descriptive or prescriptive. It may be deterministic or stochastic. It may be static or dynamic.

Roles
(i) A GIS tools that can process, display and integrate different data source
(ii) It can be vector based or raster based
(iii) It provides algorithm to convert data
(iv) It helps to link GIS data with other program.
(v) It can validate & can be generally accepted

Thank you
Best wish for your exam.

PHYSICS PRACTICAL SHEETS

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

Experiment No.: .....
Group: .....
Sub.: .....
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1. Explain SDI concepts with its components.

The explosive growth of the internet continues to revolutionize the way modern day business is conducted and service provided In recent years geographical information systems (GIS) and enterprises have continued to evolve towards distributed models in order to better exploit the potentials presented by internet computing paradigm. SDI concept is emerged to advance spatial data sharing by taking advantages of the ubiquity of the internet and its case of use has matured and is evolving into an infrastructure Spatial Data infrastructure is used to denote the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data. It provides spatial data discovery evaluation and application for users and providers within all levels of government, commercial sector, non-profit sector, academia and by citizens in general.

Main aim:-

1. To link existing and upcomming database of the respective level. (product based model)
2. To define a framework to facilitate the management of information assets (process based)

Component of SDI

. Organizational components

Governance and monitoring, users, producers, Strategy/objectives

Functional components
Scope, contents, SDI features, Implementation

Technical components
data, services, applications, Technical infrastructure

Technical core components
Content repositories, geographical data catalogues for viewing and manipulate

Geoprocessing services
coordinate transformation - image classification, vectorial analyses.

2. How does a clearinghouse work?
A clearing house is a distributed n/w of spatial data producers managers and users that are linked electronically together. It is a system of n/w and institutions that are to facilitate the discovery, evaluation and downloading of digital spatial data and provides to inventory, document and data sharing

Working
The data providers are allowed to register their geographic data sets, quality of data and methods to access these data. The data providers also provides additional information about the data sets. Client consults server registry to get geographic data access. functions as a detailed catalogue service with support for links to spatial data and browsing capabilities The registry pass the distributed response in the form of headlines. Client request metadata entry. Metadata or data are downloaded or connection to data is made.

3. What is meta data? list its roles.

Metadata is defined as background information that describes the content, quality, condition and other appropriate characteristics of data. So metadata is a simple mechanism to inform others of the existence of the data sets, their purpose and scope. Metadata answers the W/H questions about all facets of the data made available.

Roles

Applicability :- Information needed to determine the data sets that exists for a geographic location

Fitness for use :- information needed to determine whether a data set meets a specified need.

Access :- information needed to acquire an identified dataset

Transfer :- information needed to process and use a data set

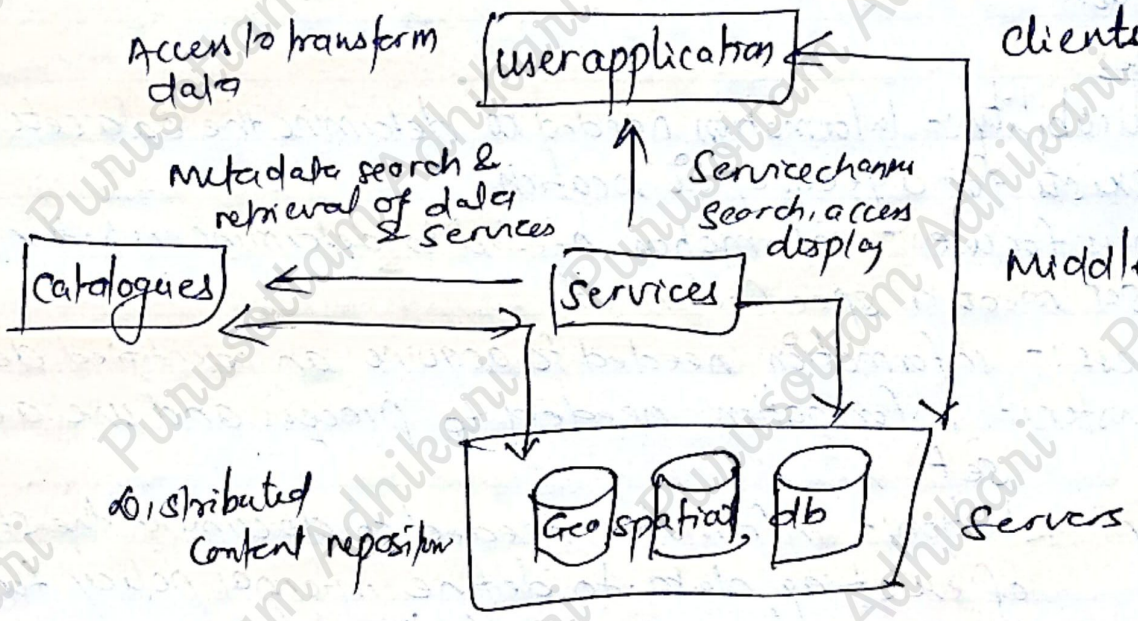
Administration :- information needed to document the status of existing data. to define internal policy for update operations from different data sources.

4. Explain the system Architecture for SDI interoperability.

For a domain, the system architecture view shows how multiple system link and interoperate and may describe the internal construction and operation of particular system within the architecture. For the individual system, the system architecture view includes the physical connection, location and identification of key nodes, circuits, n/w, workfights platform etc and specifies system and component performance parameters.

The primary purpose of a system arch is to enable or

facilitate operational tasks and activities through application of physical resources. It maps system with associated platforms, functions and characteristics back to operational architecture.



System architectures are based upon and constrained by technical architectures.

5. Explain the legal aspects of SDI

The main prerequisite for effective functioning of real estate market and as well for massive market with spatial data and information is harmonized legislation.

In Nepalese context, the existing Copyright Act 2002 provides the exclusive right to the creators on their creations.

copyright legal protection to the authors/creators of the work. ~~for the~~ Economic & Moral Rights of a creator/author shall be protected throughout the life and next fifty years after his death. Written aggreement with the right owner is necesary for the purpose of production and reproduction of copyright material. Promote the use of original goods and make goods available at the resonable prices. Use of proper business and negotiation skills with the complete and detail contracts for business transactions between right owner and users. It helps Public to access to geo-information.

1. What is openGis? Why its is necessary?

open source application by definition is s/w that you can freely access and modify the source code for. openGis is the full integration of geospatial data into mainstream information technology. openGis is the ability to share heterogenous geodata and geoprocessing resources transparently in a N/w environment.

It is necessary to use because of following:-

(I) Extend open system benefits to GIS
(II) Achieve interoperability between system, data and functionality.
(III) Establish common language and unfied model for geographic information

iv) It allows integration with computing standards
v) It avoids data transfer redundancies
vi) It provides quickond efficient development cycles.

2. List out different open source s/w for spatial data analysis.

(I) clustepy

It is non GUI opensource s/w for spatial analysis. The field of interest is spatial clustering and provides libraries to aggregate areas into regions.

(II) Google earth

The field of interest is 3D visualization. It provides easy to use dynamic graphics and historical maps with which user can create dynamic tours.

iii) QGis:-
The field of interest is visualization. It provides easy to use interface and geoprocessing functions.

iv) Grass:-
The field of interest is GIS. It provides extensive set of GIS tools for both raster and vector data, sql.

v) Flowmap:-
It is designed to analyze and ~~deploy~~ display flow data.

3. What is web based GIS system and write its advantages.
Web based GIS system is the system that allows dissemination sharing, displaying and processing spatial information on Internet. It provides a low cost and efficient way to deliver map products to the users. It is a way to access spatial data easily and efficiently for various GIS operations such as advanced mapping and spatial analysis over Internet.

Advantages:-
(I) planning and design support
(II) Export of existing base map data to CAD system
(III) performance analysis
IV) Adequate mngt of materials
V) efficient operation
VI) quick response to customer's ~~enquiry~~ inquiry.

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4. List out different opensource GIS data

(i) Natural Earth:- public domain vector and raster dataset

(ii) Global map:- provides consistent coverage of all earth's land cover area. It includes thematic maps such transportations, land cover, population and landuse

(iii) Open Topography:- It facilitates community access to high resolution, earth science-oriented, topography data and related tools.

iv) IRL/LDEO climate data library:-
collections of more than 300 datasets for various climate models and dataset

v) UNEP Environmental Data Explorer:-
includes forest covers, watersheds boundaries and much more.