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**COURSE: Bsc INFORMATION TECHNOLOGY**

**YEAR 4, SEMESTER** 2

### GEOGRAPHIC INFORMATION SYSTEMS ASSIGNMENT

1. Explain five advantages of raster image data.
   * + The geographic location of each cell is implied by its position in the cell matrix. Accordingly, other than an origin point, e.g. bottom left corner, no geographic coordinates are stored.
     + Due to the nature of the data storage technique data analysis is usually easy to program and quick to perform.
     + The inherent nature of raster maps, e.g. one attribute maps, is ideally suited for mathematical modeling and quantitative analysis.
     + Discrete data, e.g. forestry stands, is accommodated equally well as continuous data, e.g. elevation data, and facilitates the integrating of the two data types.
     + Grid-cell systems are very compatible with raster-based output devices, e.g. electrostatic plotters, graphic terminals.
2. Explain what data visualization is? Hence outline two benefits of the

same in GIS maps.

* + - Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data.

**Benefits**

* + - **Trends Over Time:**While this seems like an obvious use of data visualization, it is also one of the most valuable applications. It’s impossible to make predictions without having the necessary information from the past and present. Trends over time tell us where we were and where we can potentially go.
    - **Correlations in Relationships:**Without data visualization, it is challenging to identify the correlations between the relationship of independent variables. By making sense of those independent variables, we can make better business decisions.

1. With the help of sketches, explain three errors that can be experienced in geographic data capture.
   * Pseudo nodes (unwanted nodes)

Pseudo node

* Overshoots and undershoots (unwanted dangling arcs/nodes)

overshoot

undershoot

* Sliver polygons (unwanted overlapping polygons).

Sliver polygon

1. The fundamental idea behind the creation of any GIS database is the fact that every object present on the earth can be Geo-referenced. Explain any six commonly used systems of Geo-referencing.

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| --- | --- | --- | --- | --- |
|  | **System** | **Domain of uniqueness** | **Example** | **Spatial resolution** |
| Place-name | Varies |  | Varies by feature type |
| Postal address | Global | 972  meru,  Kenya | Size of one mailbox |
| Postal code | Country | 60200  Meru,  Kenya | Area occupied by a defined number of mailboxes |
| Telephone calling area | | Country | 254(Kenya) | Varies |  |
| Cadastral system | | Local authority | 10m x 30m (Dimensions of a land  parcel) | Area occupied by a single parcel of  land |  |
| Public  Land  Survey  System | | Western USA only, unique to  Prime  Meridian | Sec 5,  Township  6E, Range  4N | Defined by level of  subdivision |  |
| Latitude/ longitude | | Global | 6o23’15”N,  10o18’42”E | Infinitely fine |  |
| Universal  Transverse  Mercator | | Zones six degrees of longitude wide, and N or S hemisphere | 542500E,  327638N | Infinitely fine |  |
| State Plane  Coordinates | | Unique to state and to zone  within state | 55086.34E,  75210.76N | Infinitely fine |  |