DEPARTMENT OF GEOGRAPHY, GEOINFORMATICS & METEOROLOGY
FACULTY OF SCIENCE
GGY283 INTRODUCTORY GIS
FIRST SEMESTER TEST

29 August 2005   TIME: 1 HOUR

1. BASIC CONCEPTS AND TERMINOLOGY

1.1 Explain the information process that you will apply to change data into information.

(6)

To change data into information we apply an **information process (cycle)** that will typically consist of a number of stages (Figure 1.2):
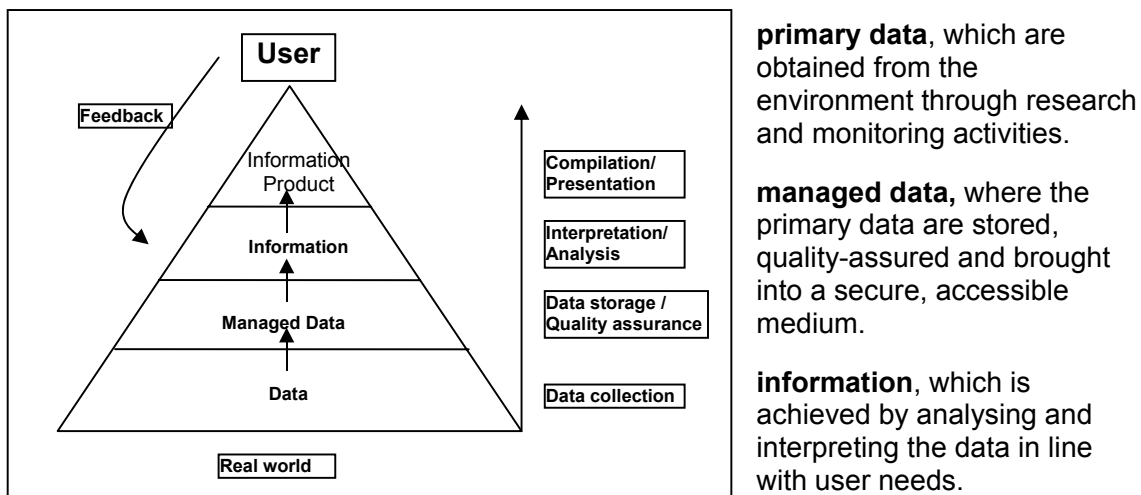

Figure 1.2 From reality to information

primary data, which are obtained from the environment through research and monitoring activities.

managed data, where the primary data are stored, quality-assured and brought into a secure, accessible medium.

information, which is achieved by analysing and interpreting the data in line with user needs.

information products compiled and delivered to the user at a specific time, for a specific purpose

feedback from users with respect to the value of the information they receive, and their future requirements, enables the provision of a progressively improving service.

1.2 Define a GIS.

(3)

definitions of a GIS are:
"A GIS is a computer system that can hold and use data describing places on the earth 's surface"(Rhind, 1989)
"A geographical information system is a group of procedures that provide data input, storage and retrieval, mapping and spatial analysis for both spatial and attribute data to support the decision-making activities of the organisation."(Grimshaw, 1994)

Definitions of a GIS

An organised activity by which people:
- **Measure aspects of geographic phenomena and processes**
- **Represent these measurements to emphasise spatial themes, entities and relationships**
- **Operate upon these representations to produce more measurements and to discover new relationships.**
- **Transform the representations to other frameworks (Chrisman)**
- **Produce information for decision-making**

"...a computerized system for the collection, storage, manipulation (analysis), and output of information that is spatially referenced."....

2. <u>BUILDING A GIS MODEL</u>

2.1 Steady projected growth has lead to increased household and commercial waste in the Knysna area and has placed a great deal of pressure on the existing landfill sites, most of which are at or near capacity. Your consortium has been hired by the regional council to find potential new landfill sites. The location of the new proposed site must take water drainage in account and must be in an area where natural forests will not be disturbed. Due to financial constraints the site must be easily accessible in terms of traveling distance.

(i)   Based on the above information, define a research question and 3 project criteria to be used in a GIS project.

Because we are focusing on GIS as a spatial decision support system one would expect questions **relating to location** (the most basic geographic concept) focusing on place, space and interactions. MUST BE IN THE FORM OF A QUESTION. It is also helpful to identify the **criteria** or rules for making the decision.

(ii)   Based on the research question and project criteria make a list of 4 spatial and attribute data sets needed for the project.

(12)

Must be based on research question and criteria. Can include orientation data.

Research question –   1
3 Criteria   3
Spatial data   4
Attribute data   4

3. <u>DESINING THE GIS MODEL OF REALITY</u>
3.1 **Explain what a map scale is.**

(2)

The scale of a map is the ratio between distances on the map and the distance on the real earth.

3.2 **Name the three ways that can be used to express a map scale.**

(3)

- Verbal scale

- Area scale

- Bar scale

- Representative Fraction

3.3 **Name the three basic spatial feature types that can be used to represent real world entities on computer.**

(3)

Point, Line, Polygon

3.4 **Name the scale of measurement that will be used to record the following data sets:**
- (i) Number of people living in an area. - Ration
- (ii) Temperature in degrees Celsius - Interval
- (iii) Population growth - Interval
- (iv) Soil Type - Nominal

(4)

3.5 **Name the 7 characteristics of a database that can be used to distinguish between a database and a spreadsheet.**

(7)

- A database consists of rows and columns.
- Each row is called a record, and has a distinct record number.
- Each column is called a field, and has a distinct field name.
- Each record is unique, meaning no duplicates in terms of the table "theme".
- The fields form the structure of the database.
- Each field may only have one entry.
- Each record is equal in status.

4. ACQUIRING THE DATA

Name 6 possible data sources for spatial and attribute data for the use in a GIS.

(6)

Maps, Remotely sensed data (Satellite images), Aerial photographs, Statistical Data, Surveying and GPS, Soft Data

Define the following terminology:
- Data Quality – indication of how good a data set is
- Data precision – degree of exactness (number of decimal places)
- Data Accuracy - the faithfulness with which a spatial entity is represented
- Analogue data - data is data available on paper and cannot be imported directly into the computer

(4)

TOTAL/TOTAAL [50]