

GGY 283  
Introductory GIS  
First Semester Test

9 March 2009

Time: 50 min

1. **BASIC CONCEPTS AND TERMINOLOGY**

- 1.1 Explain what a GIS is and how it differs from any other information system. (3)

A computer based system to aid in the collection, maintenance, storage, analysis, output and distribution of spatial data and information.  
GIS contains spatial information or a geographical component

- 1.2 Explain the difference between spatial and attribute data. (2)

Describe entities on the earth's surface or location of real world entities  
Attribute data describes spatial data.

- 1.3 Explain the difference between GIS and GIScience (2)

Future development of GIS depends on GIScience  
GIScience – theoretical foundation on which GIS is based  
GIS research – GIS implementation and application  
GIScience – conceptualisation of real world, collection, storage, analysis and presentation

- 1.4 Name the 5 functions that GIS software should be able to perform (5)

Data entry, Editing, Data Management, Analysis, Output

2. **DEFINE THE INFORMATION PRODUCT**

Scenario: A developer wants to find a property for the development of a new 5 star hotel in Durban. This new hotel must be within walking distance from the beach, close to cinemas and a shopping centre. The area of the property must be at least one hectare and the property should be further than 5 km from any other 5 star hotel.

- 2.1 Based on the above scenario define a research question and 4 decision making criteria (5)

*Based on research problem you can identify the RESEARCH QUESTION  
State it as specifically as possible  
Because we are working with a GIS we will expect questions relating to  
LOCATION  
Must be in the form of a question ending with a question mark*

*Helpful to identify the CRITERIA or rules for making the decision*

*In many cases these criteria exist but in other cases it must be determined by studying similar projects*

*These criteria will help you:*

*Describe the final information product*

*Identify information and data needs*

Make a list of spatial and attribute data needed for the project

(6)

### **SPATIAL AND ATTRIBUTE DATA**

*Data requirements to assist in solving the problem.*

*Data requirements is based on the project question and criteria.*

*(must include the decision values)*

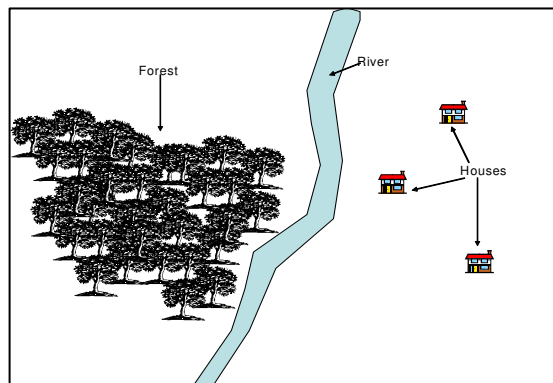
### **3. DESIGN THE GIS MODEL OF REALITY**

3.1 Name the different scales of measurements used to capture attribute data in a GIS.

(4)

Nominal, Ordinal, Interval, Ratio

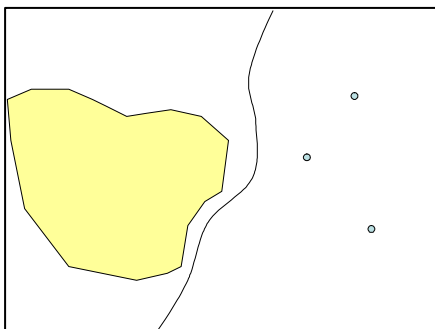
3.2 The following image represents the real world:



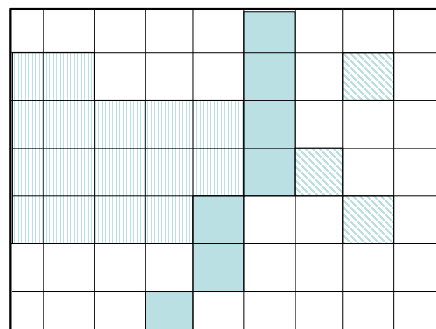
You are working on a scale 1:150 000. Illustrate how these world objects will be represented in a raster and vector data model.

(6)

Vector:



Raster:



3.3 Give two reasons why different places on the earth use different ellipsoids (2)

Different sets of measurements for each region or continent – historically surveys were isolated by large water bodies

Differences in the shape of the earth

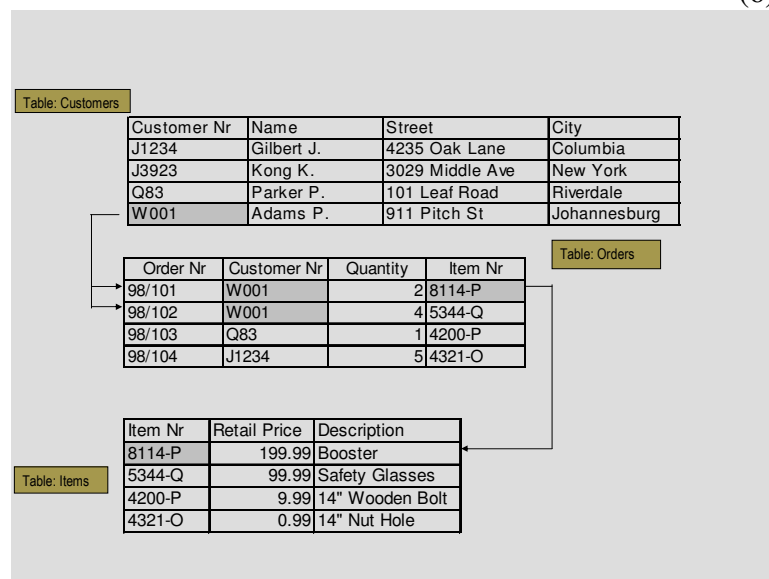
Differences in survey methods and data analyses employed

More recently – data from satellites, lasers and broadcast timing signals are used for precise analyses

3.4 Name the ellipsoid mostly used in South Africa (1)

WGS84

3.5 Explain the working of the relational database model by means of an example. (6)



#### 4. DATA ACQUISITION

4.1 Define the following terminology:

Generalisation – abstraction of reality (simplification of the real world)

Data stream - The whole process of data acquisition, data encoding and data editing is called the data stream.

Data encoding - The process of getting data into the computer

4.2 Explain the difference between a GNSS and a GPS (3)

GNSS - Global Navigation Satellite Systems, Is a satellite based technology (2)

GPS – widely used as term for GNSS, Actually refers to US NAVSTAR system

4.3 Name three advantages and/or disadvantages of satellite images as a source of data for the use in a GIS (3)

1. Effective for land use and geological surveys
2. High perspective which leads to less distortion
3. Cover large areas so if study area is small costs may be high
4. May require specialized image processing software
5. Data acquisition dates are set months ahead
6. Aerial photographs are available at reduced costs

Total (50)