

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

11 MAY 2006

TIME: 50 min

1. ACQUIRING THE DATA

1.1 Name the encoding methods that can be used to capture data from analogue and digital **maps**. Discuss how the encoding methods will influence the quality of the data sets. (Give your answer in a tabular form)

Source	Format	Encoding Method	Quality
1 Maps	Analogue	Manual data encoding	Can be of high quality if coordinates are typed correctly from General Land Surveyor maps or diagrams
		Scanning	Depends on source document
		Digitising	Depends on skills of operator and quality of source document
	Digital	Electronic data transfer	Depends on data stream followed

(8)

1.2 Name 5 possible sources of error in a GIS
Errors in understanding and modelling the reality
Errors in source data
Errors made during data encoding
Errors made when editing and converting data
Errors made during data processing and analysis

(5)

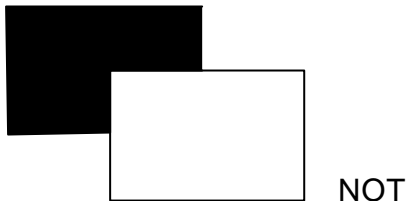
1.3 Define the following data integration methods:

- **Rubbersheeting** - The first step in rubber sheeting is to identify common locations on the two coverages concerned - the source coverage (the one to be re-projected) and the target coverage (that with which it is to be matched)
Readjust image to fit on vector data set.
- **Registration** - At the end of all these processes of data integration - editing and cleaning, projection conversion, and generalisation - it is still unlikely that the various data sets that you are collecting will match exactly – is corrected through the process of registration
- **Tiling** - It is the process by which the whole database is subdivided into spatial blocks (rather like map sheets).
- **Edge matching** - Where the area of study extends across several source map sheets, it is common for data to be stored initially as separate coverages for each map sheet. , it is often necessary to join the map sheets together so that the data can be used as a unified whole.

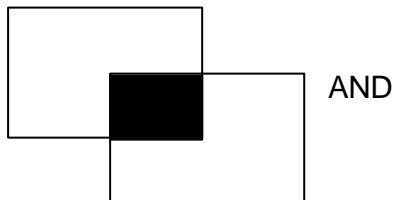
2. ANALYSING THE DATA

2.1. Name and illustrate the Boolean operator that will be used to combine the following multiple variables queries:

(a) Where are all stands with a business zoning that are not developed?



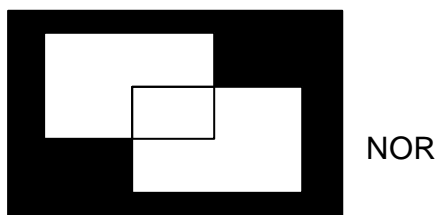
(b) Where are all quest houses with conference facilities located?



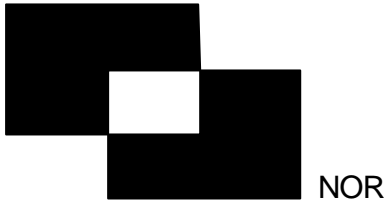
(c) Which townships have more than 2000 residents or have an area of more than 100 ha?



(d) Which hotels are not located close to the beach and do not have conference facilities?



(e) Which properties have either a residential zoning or have an area of more than 200m²?



(10)

2.2 Define the following terminology:

- Network Analysis - A network is a set of interconnected lines. A network can be used to indicate the flow of something for example traffic flow on a road network, storm water drainage etc.
- Topology - the 'term used to describe the characteristics of data that do not change under transformations such as stretching and bending and are independent of any coordinate system.' OR To find features according to its locations or relationships to other features is only possible if your spatial data has topology
- Spatial Interpolation - 'Procedure of estimating the values of properties at unsampled sites within an area covered by existing observations'
- Visibility Analysis - Identification of areas that can be seen from a specific point.

(4)

2.3 Name the analysis methods that will be used to analyse EACH of the following statements:

- (a) All farms within 500m from the river must be included in the study
Buffer, Overlay (or locate by location or locate according to relationship to other features) Can also be done without buffer
- (b) All farms containing clay or dolomite must be excluded.
Overlay (or locate by location or locate according to relationship to other features) Attribute Query (or locate by attributes or find features according to their attributes)
- (c) All farms with natural bush veld must be included.
Attribute Query, (or locate by attributes or find features according to their attributes) Overlay (or locate by location or locate according to relationship to other features)

Data sets available are as follows:

Spatial Data	Attribute Data
River	River Name
Farms	Farm Name and Number
Geology	Geology Types
Vegetation	Type of Vegetation

(6)

2.4 Name the classification methods that will be used to classify the following attribute data

- (a) Nominal data – Individual Values
- (b) Data that are unequally distributed or with natural groupings in the data set – Natural Breaks
- (c) If you want to classify your data equal ranges – Equal Interval
- (d) If you want to classify data so that each interval contains an equal number of features - Quantile

(4)

2.5 Name the steps that must be followed to develop an analysis model.

- 1. Identify the spatial data and attribute data sets that are required.
- 2. Use clear logic and natural language to develop the process of moving from the available data to a solution.
- 3. Set up a flow chart with steps to graphically represent the above process.
- 4. Annotate this flow chart with the commands necessary to perform these operations within the GIS you are using.

(4)

3. COMMUNICATING THE RESULTS

3.1 Name the map design elements that must be added to all map layouts.

- 1. A frame of reference, scale, north arrow
- 2. the projection used,
- 3. the features to be mapped,
- 4. the symbolism used (colours etc)
- 5. the annotation used (legend)
- 6. Title, subtitle

(5)

TOTAL/TOTAAL [50]