DEPARTMENT OF GEOGRAPHY, GEOINFORMATICS & METEOROLOGY
FACULTY OF SCIENCE
GGY221 INTRODUCTORY GIS
FIRST OPEN BOOK CLASS TEST
23 August 2010   TIME: 40 min

1. BASIC CONCEPTS AND TERMINOLOGY

Use your own example to explain in a short paragraph how GIS can be applied in any field of study to assist you in decision making.

Any PRACTICAL example – not a general definition or explanation.

0 or 3

(3)

2. DEFINE THE INFORMATION PRODUCT

2.1 The following research question and criteria are given to you:

Research question: Where is the best route for the new railway line?

The best route for the new railway line is where the following conditions apply:

- It must pass through the Industrial and business area.
- It must be further than 5km from the residential area.
- The underlying geology type must not be dolomite.
- It should not go through any indigenous forest.
- The total cost of the properties that will be affected should not exceed more than R100 million.

Make a list of spatial and attribute data needed for completion of the project. Give your answer in a tabular form.

Must be applicable on above

Spatial data	Attribute Data
Properties or Land Use	Land Use Type Unique Identifier
Land Use or Properties	Land Use types Unique Identifier
Geology	Geology types
Forest areas	Unique Identifier
Properties	Property value
Orientation data e.g. Rivers Roads Townships	Names Names Names

(10)

3. DESINING THE GIS MODEL OF REALITY

3.1 Based on your answer in 2.1, state how the real world entities will be represented as objects in a vector data model.

Points, Lines and Polygons

(4)

3.2 Name the scale of measurements that will be used to record the following attribute data sets in a GIS.

       3.2.1 Population numbers – Ratio (not ratio/interval)

       3.2.2 Population density – Ratio (not ratio/interval)

       3.2.3 Population growth – Interval (not ratio/interval)

3.2.4 Ethnic diversity - Nominal

(4)

3.3 Explain what is meant by a Lambert Conformal Conic map projection
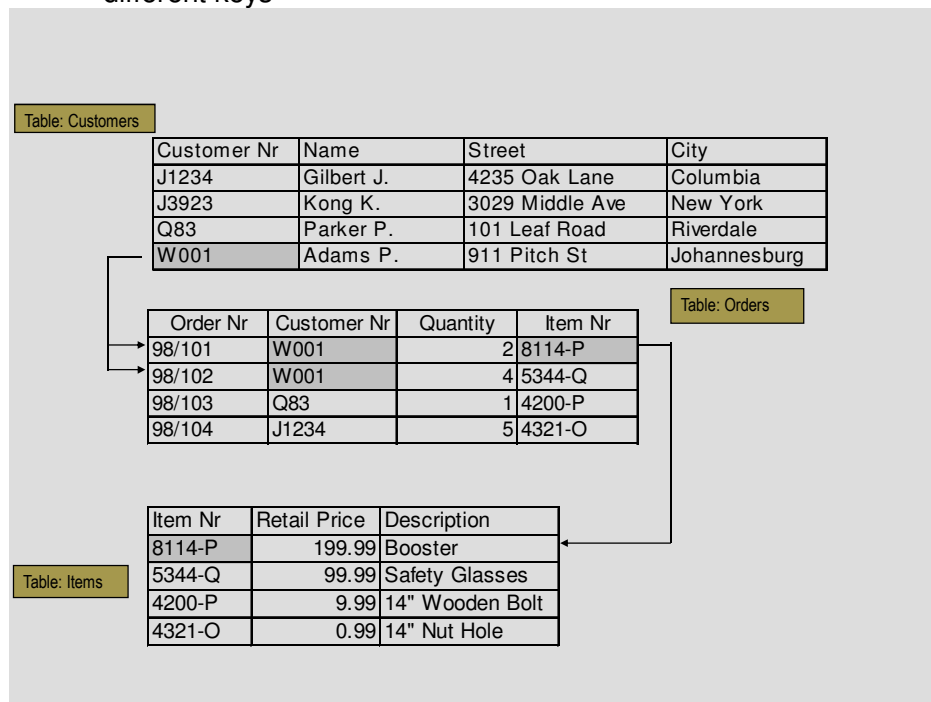Conical projection
Conformal – angles are preserved

(2)

3.4 Name the model that is mostly used in GIS to build an attribute data model. Explain how this model works by means of an example.
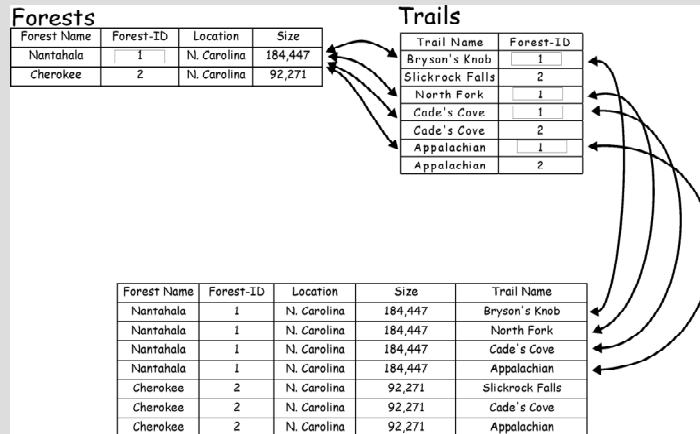
Relational database model

Practical example and not just general description. Can also illustrate with tables.
- Represents data in tables – called relations
- Tables are related through keys
- Related data are represented in a table and linked to other tables by means of different keys

Table: Customers

Customer Nr	Name	Street	City
J1234	Gilbert J.	4235 Oak Lane	Columbia
J3923	Kong K.	3029 Middle Ave	New York
Q83	Parker P.	101 Leaf Road	Riverdale
W001	Adams P.	911 Pitch St	Johannesburg

Table: Orders

Order Nr	Customer Nr	Quantity	Item Nr
98/101	W001	2	8114-P
98/102	W001	4	5344-Q
98/103	Q83	1	4200-P
98/104	J1234	5	4321-O

Table: Items

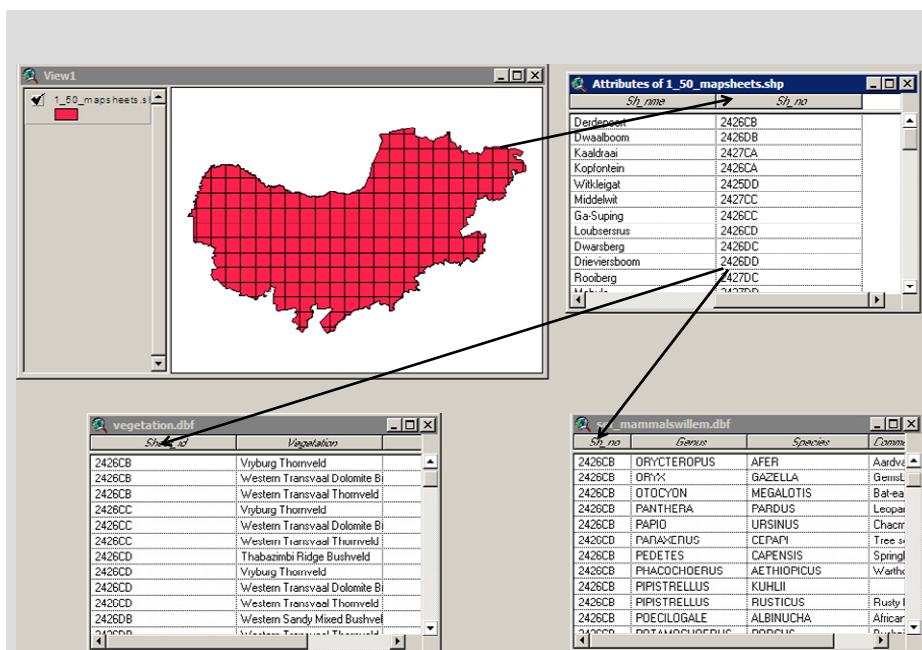| Item Nr	Retail Price	Description
8114-P	199.99	Booster
5344-Q	99.99	Safety Glasses
4200-P	9.99	14" Wooden Bolt
4321-O	0.99	14" Nut Hole

Relational Databases (Continues)

- Tables are related through keys or primary keys (Keys must be absolutely unique for one to one relationship)

Forests

Forest Name	Forest-ID	Location	Size
Nantahala	1	N. Carolina	184,447
Cherokee	2	N. Carolina	92,271

Trails

Trail Name	Forest-ID
Bryson's Knob	1
Slickrock Falls	2
North Fork	1
Cade's Cove	1
Cade's Cove	2
Appalachian	1
Appalachian	2

Forest Name	Forest-ID	Location	Size	Trail Name
Nantahala	1	N. Carolina	184,447	Bryson's Knob
Nantahala	1	N. Carolina	184,447	North Fork
Nantahala	1	N. Carolina	184,447	Cade's Cove
Nantahala	1	N. Carolina	184,447	Appalachian
Cherokee	2	N. Carolina	92,271	Slickrock Falls
Cherokee	2	N. Carolina	92,271	Cade's Cove
Cherokee	2	N. Carolina	92,271	Appalachian

(7)

TOTAL [30]