DEPARTMENT OF GEOGRAPHY, GEOINFORMATICS & METEOROLOGY
FACULTY OF SCIENCE
GGY221 INTRODUCTORY GIS
FIRST SEMESTER TEST

10 August 2010 TIME: 50 min

1. BASIC CONCEPTS AND TERMINOLOGY

1.1 Name the five main steps that should be followed when doing a GIS project.

(5)

1. Define the information product – find out what should be researched.

2. Design the GIS model of reality – create a representation of the real world based on the needs of the user.

3. Acquire the data – This means the collection of data , data storage and quality assurance.

4. Analyse the data – this means to answer your project questions

5. Communicate the results – this means to communicate and to display the results to other people.

1.2 Explain how spatial and attribute data are used to describe real world entities on computer

(2)

Spatial Data – use to describe location
Attribute data – describe spatial data

1.3 Explain the difference between GIS and GIScience.

(2)

- GIS – to abbreviate Geographical Information Systems, theoretical foundation on which GIS is based
- GIScience to abbreviate the science, theoretical foundation on which GIS is based, – conceptualisation of real world, collection, storage, analysis and presentation
- Future development of GIS depends on GIScience

1.4 Name and discuss the components of a GIS.

(10)

Application Area
Humans
Hardware and Software
Organizational Protocols
DATA

1.5 Name the basic functions that GIS software must be able to perform to process geographic data.

(5)

- Data entry
- Editing
- Data Management
- Analysis
- Output

2. DEFINE THE INFORMATION PRODUCT

2.1 Explain the difference between a research problem and a research question.

(2)

Research problem: – Define the problem that has initiated the study

- Goal is to:
  - describe the conditions and circumstances that are causing the problem
  - reasons for undertaking the research
- FRAMEWORK for determining the information needs and the stages for the rest of the research
- If problems are complex break it down into sub problems.
- Consider the PURPOSE and AUDIENCE of the final result

Research Question – based on research problem

- State it as specifically as possible
- Crucial because it helps to focus the search for information needed to address the problem
- The Research question is always in the form of a question ending with a question mark!
- Because we are focusing on GIS as a DSS one would expect questions relating to location

3. DESINING THE GIS MODEL OF REALITY

3.1 Discuss the statement 'GIS is a model of the real world'.

(4)

- Real world too complicated to put on computer – therefore GIS is only a model of the real world.
- GIS (any map) is a simplification of entities of the real world.
- A GIS includes the information on the physical location and extent of the entities and non spatial entities (attribute data)
- Each real world entity is represented by a spatial feature
- Computer systems has limits – only a subset is represented
- Essential characteristics are defined by the person, group or organizations
- Subjectively chosen
- Objects: abstractions of reality that we store in a database.
- They are imperfect representations because it is only a subset of reality
- No one abstraction is universally better than the other

3.2 Name and define the different scales of measurements that can be used to record attribute data in a GIS. Give a practical example to illustrate when you will use each scale.

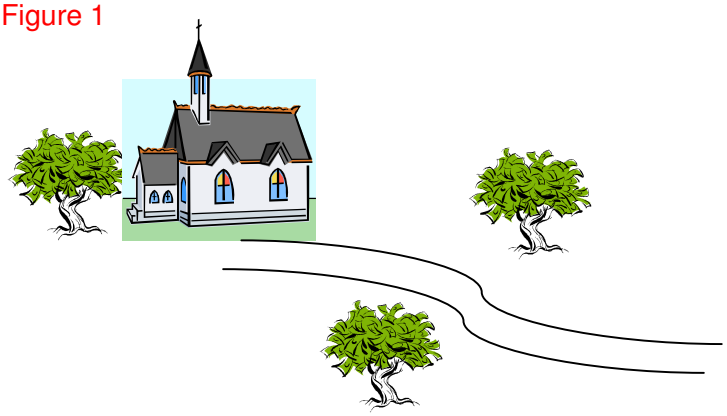
(12)

MEASUREMENT SCALE	PROPERTIES	EXAMPLES
NOMINAL	Descriptive information No implied order, size or quantitative information. May also be an image or video clip	Soil type Owner of a property Acceptable/ Unacceptable
ORDINAL	Used to establish order	standard of living League position
INTERVAL	No absolute zero No real origin Negative values are possible	Date Elevation above sea level Degrees Celsius
RATIO	Have an absolute zero No negative values	Income Length Height Area Population Degrees Kelvin

3.3 Two main conceptualizations are used to represent real world entities as objects in a GIS. Name and illustrate how the real world entities in Figure 1 can be represented in GIS using these models.

(8)

Figure 1



TOTAL [50]