

The University of Melbourne

Semester 1 Assessment, 2003

**COPY**

**Faculty:** Architecture, Building and Planning  
**Subject Number:** 705-411  
**Subject Title:** GIS for Planning and Management A  
**Common Content:** 705-611  
**Exam Duration:** 2 hours  
**Reading Time:** 15 minutes

This paper has 3 pages including the cover sheet

**Authorised Materials:**

Student are **NOT** permitted to use electronic calculators in the examination.

**Instructions to Invigilators:**

Students **MAY** take the examination from the examination room.

**Instruction to Students:**

Students should answer only **FOUR** of the following six questions. Diagrams should be used wherever possible to illustrate answers and concepts. Candidates are not required to include formulae or calculations in their answers. Candidates are encouraged to draw on examples from laboratory exercises, reading and lectures.

**Paper to be held by Baillieu Library:** Yes

**Instructions to Students:**

Student should answer only **FOUR** of the following six questions.  
Diagrams should be used wherever possible to illustrate answers and concepts.  
Candidates are not required to include formulae or calculations in their answers.  
Candidates are encouraged to draw on examples from laboratory exercises, reading and course lecturing materials.

1. Scales of measurement are critical for Geographic analysis and the types of spatial operations we can perform. Describe the five different types of measurement scales used with Spatial Information. Illustrate each with an example.  

(10 Marks)
2. Describe the difference between vector and raster data. What are the advantages and disadvantages of each data type ? Give an example of when it is preferable to store spatial information in a vector format and an example of when it is preferable to use a raster format.  

(10 Marks)
3. Define neighbourhood operations in GIS. In your answer you should make reference to the following terms: scanning cell, neighbourhood, statistic. Describe three different statistics that can be calculated with a neighbourhood operator and an example application of each statistic.  

(10 Marks)
4. Explain how scale influences accuracy in spatial data. What impact does the scale at which data was captured have on accuracy ? How do the concepts of accuracy, uncertainty and scale affect the choice of map display and reproduction ?  

(10 Marks)

5. You have been commissioned to find the best location for a new winery and vineyard. You have collected the following spatial information:

Roads, Rivers, Soil Type, February average monthly Summer Rainfall Map,  
February average daily maximum Temperature Map

You have been given a number of criteria to find suitable locations for a winery / vineyard:

- a) Areas that are within 200 metres of major roads are highly suitable. Areas that between 200 and 500 metres of major roads have a medium suitability. Areas more than 500 metres from roads are unsuitable.
- b) Soil types 1 and 2 drain well and are suitable for grape vines. All other soil types are unsuitable
- c) Ideal grape growing average daily February temperature is between 20 degree Celsius and 25 degree Celsius. Temperatures between 25-30 are moderate suitability and all other temperatures are not suitable
- d) Locations must have a minimum average February rainfall of 30 mm

Additionally a local winemaker has told you that the temperature criteria should be given double the weight of all other criteria in your analysis. Describe an analytical process with a flow diagram that finds suitable locations. Describe the GIS operations you would use to combine and reclassify the maps. Describe the measurement scale of your final map, and any possible limitation of your approach.

(10 Marks)

6. Explain any **three** of the following concepts:

- a) Non Euclidean Distance
- b) Precision and Accuracy
- c) Rules of Combination
- d) Zonal Operations

(10 Marks)

**END OF EXAM**