EXAMINATION

SGO 1910 GEOGRAPHICAL INFORMATION SYSTEMS

2 December 2008
(3 hours)

No aids are permitted during the exam.

Results will be posted on the StudentWeb on the 23 December 2008 at 2.00 p.m. and will be available to the candidate from approximately 3.00 p.m.

The results are considered official on publication in StudentWeb, and students are responsible for checking their result at this time. If you want an explantion regarding the grade you must apply **within one week** after the result is published in StudentWeb. If you regarding the grade must be lodged within three weeks after the grades are publsihed in StudentWeb.

This examination paper consists of **4 pages**, including this page.

The candidate must submit both the original and the copy of their answers to the examination.

NB! Make sure the copy is legible.

You must answer both parts. Part I is worth 25 % and Part II is worth 7 5 % of the total grade of the exam.

Part I. Short answers (this part is worth 25%)
Describe the following GIS concepts in no more than 3 or 4 sentences.

1. Spatial autocorrelation

2. Thematic maps

3. Georeferencing

4. Attributes

5. Discrete objects

Part II. Essay question (this part is worth a total of 75%, with each individual question worth 25%)

Using GIS to protect and manage buildings of cultural significance
The Norwegian Cultural Heritage Act was designed to protect archeological and architectural monuments and sites in all their variety and detail, both as part of Norwegian cultural heritage and identity, as well as an element in the overall environmental and resource management of landscapes. The Act mandates a national responsibility to safeguard these resources as scientific source material for study, and to provide the basis for personal experiences among present and future generations.

In compliance with the Act, the Ministry of Government Administration and Reform began compiling in 2003 an inventory of all government-owned properties in Norway. This inventory consists of fact sheets with geographically referenced data based on the GAB register and notations about building history, description, and conservation status. A sample fact sheet is attached. As of 1 January 2009 the completed inventory will be turned over to the Ministry of Environment to develop specific policies for the preservation and maintenance of buildings in the inventory that have a cultural significance.

You have recently accepted a position in the Department of Building, Monuments and Sites at the Directorate for Cultural Heritage. The department ensures that a representative selection of tangible heritage is preserved for future generations. Your boss is excited about the new inventory of government-owned buildings because it is the first of its kind, and she has asked everyone to suggest ways in which the inventory can be managed and stored for further development.

1. *Write a memo to your boss making an argument for why the department should use GIS for managing this inventory. In your memo, be sure to define what GIS is, emphasize the capabilities of GIS, and present the advantages of using GIS over other solutions for managing and storing data. Your memo should present a strong argument as to why the department should invest in GIS for this project.*

Congratulations, your memo was successful! There were more than 10,000 buildings listed in the inventory and after three months of effort you have finished transferring all the data recorded on the fact sheets and stored them in a GIS database. The department is now ready to start drafting proposals for the protection of some of the government-owned buildings described in the inventory.

One important factor to include in the proposals will be a discussion of the maintenance costs associated with buildings under consideration. Your task now is to mine the data you have available in order to estimate probable maintenance costs (in general terms, not in absolute kroner). The buildings most likely to be included in the various proposals being drafted are: those built before the year 1900; those being recommended for protection as Class 1 or Class 2; and those already with some kind of conservation status (protected or regulated).

> *2. Based on the sample fact sheet provided, describe a query (or search) that you would conduct in order to produce a list of buildings based on the criteria above. Which "attributes" can be used to construct the query? How will you estimate probable maintenance costs?*

Because formal protection of sites is intended to preserve cultural heritage for future generations, the Minister of Environment would like an assessment of how proposed sites in the inventory could be impacted over the long-term by the effects of climate change, especially sea level rise. The Bjerknes Centre for Climate Research has recently published data on flood zones associated with sea level rise and storm surges. They have just sent you shape files of vector data showing polygons of flood risk along the coast.

> *3. Describe how you would go about an analysis to identify the proposed heritage sites vulnerable to sea level rise, based on the Bjerknes data. Be sure to specify a) any additional data that you will need; and b) the kind of spatial analysis that you would use to identify vulnerable sites.*

Statens kulturhistoriske eiendommer: sample fact sheet

GAB number:	80471386	
Building name:	Y-blokka, Regjeringskvartalet	
Address:	Akersgata 42, Oslo kommune	
Owner:	STATSBYGG ØST	
Year built:	1969	
Architect:	Viksjøs arkitektkontor	
Contractor:	Staten v/Statens bygge- og eiendomsdirektorat	
Original function:	Regjeringskontorer	
Current function:	Regjeringskontorer	
Conservation status:	☑ None ☐ Regulated ☐ Protected	
Conservation recommendation:	☐ No cultural heritage ☐ Regulate (regional heritage) ☑ Protect (national heritage)	*Carl Nesjars relieff mot Akersgata*
Building description:	Y-blokken stod ferdig i 1969. Bygningen er oppført som en stjerneformet bygning i fem etasjer med fasade av frilagt sandblåst betong…	
Building history:	Det tok mer enn 50 år fra første til andre byggetrinn i regjeringskvartalet stod ferdig. Da høyblokken ble reist i 1958, etter en arkitektkonkurranse som ble vunnet av Erling Viksjø, forelå allerede planene for en videre utbygging…	
Proposed level of protection:	☐ Class 0 (no protection) ☑ Class 1 (full protection) ☐ Class 2 (conservation) ☐ Class 3 (local regulation)	
Extent of protection:	Eksteriør samt faste interiørelementer fra 1969.	
Justification for protection:	Verneklasse 1 er begrunnet ut i fra bygningens sentrale statlige rolle og bygningens arkitektoniske karakter isolert sett, og i sammenheng med tilstøtende regjeringsbygg…	
Propose of protection:	Fredningen av bygningenes eksteriør skal sikre bygningens opprinnelige arkitektur. Både hovedstrukturen i det arkitektoniske uttrykket og detaljering som fasadeløsning, eldre dører og vinduer, materialbruk, overflater og dekor skal opprettholdes…	
Physical/structural condition:	☑ TG0, no maintenance needed ☐ TG1, ordinary maintenance ☐ TG2, some repairs needed ☐ TG3, major repairs/improvements required	

Good luck!