SGO1910 Skoleeksamen Høst 2013

The students were given the following instruction during the review lecture on 4 November 2013:

> *Your written answers can be as long as you like. Longer is not always better, however, for a couple of reasons. One, of course, is that you have limited time in the exam. The second is that coherent and effective answers are usually concise. So avoid running on interminably.*
>
> *You should write in complete sentences. I encourage you to use headings and subheadings to organize your answers. You may also use bullet points—clear, coherent ones—in your answer, though these should be used judiciously.*

The exam should be graded according to the following criteria:

- Answering the actual question asked
- Clear, organized and thoughtful writing
- Demonstrated knowledge of the readings
  - Evidence and examples from the readings, including explicit references to authors
  - Critical analysis reflecting deep, well-reasoned and logical thinking
- Concision (*kortfattet og treffende*)

Keywords and main points to look for in the answers

I.   Korte svar (del I teller 25% av denne eksamen)

Beskriv de følgende begrepene kort:

1. Geographic problems: problems that involve an aspect of location, either in the information used to solve them or in the solutions themselves; see Longley et al. pp 4-7.
2. Choropleth map: a map constructed from values describing the properties of non-overlapping areas, such as counties or census tracts; see Longley et al. pp 110-111.
3. DBMS: database management systems, a software application designed to organize the efficient and effective storage and access of data; see Longley et al. p 252.
4. MAUP: modifiable areal unit problem, observed whenever data is geographically modified, either by changing the scale at which we look at the data (e.g., dissemination areas versus census tracts versus cities) or by changing how we aggregate the spatial units (e.g., grouping dissemination areas into census tracts, or grouping them into neighborhoods); see Longley et al. pp 172-174.
5. Spatial analysis: a set of methods whose results change when the locations of the objects being analyzed change; Longley et al. pp 352-353.

Del II. Essay-spørsmål (teller til sammen 75% av denne eksamen)

Besvar tre av følgende fire oppgaver, hvorav de tre oppgavene teller 25% hver. Les nøye spørsmålene på engelsk og bruk deretter de norske oversettelsene for avklaringer.

Engelsk: | *Norsk:*

1. Michael Goodchild's 1992 paper "Geographical information science" (*Int. J. Geographical Information Systems*, vol. 6, no. 1, pp. 31-45) is THE seminal paper defining the field of GIScience. What is GIScience and how did it evolve from GISystems?

1. Michael Goodchild sin artikkel fra 1992 "Geographical information science" (*Int. J. Geographical Information Systems*, vol. 6, no. 1, pp. 31-45) er DEN banebrytende artikkelen som definerer feltet GIScience. Hva er GIScience, og hvordan utviklet det seg fra GISystems?

GIScience defined: fundamental issues arising from the creation, handling, storage, and use of geographic information. Related terms include geomatics, geoinformatics, spatial information science, geoinformation engineering. Answers may reference Technical Box 1.7 in Longley et al. listing the UCGIS GIScience research agenda. The best answers will reference Goodchild (1992) directly, which identifies a set of generic questions having to do with 1) data collection and measurement, 2) data capture, 3) spatial statistics, 4) data modeling and theories of spatial data, 5) data structures, algorithms and processes, 6) display, 7) analytical tools, and 8) institutional, managerial and ethical issues.

2. Cartography is often described as both an art and a science. In the production of a map, when is it "art" and when is it a "science"?

2. Kartografi blir ofte beskrevet som både en kunst og en vitenskap. Ved fremstilling av et kart, når er det en "kunst", og når er det en "vitenskap"?

The "art" aspect of cartography refers to the creative process during which the cartographer tries to convey the message of the map's objective through a pleasing and interesting picture. The "science" aspect refers to the rules and conventions that have been developed to classify and represent data on paper and digital maps. Answers may refer to the principal components of map composition (Longley et al., section 12.3.1) and map symbolization (Longley et al., section 12.3.2). The best answers will bring in Roger Downs' article (1997) and discuss one or more of the characteristics of the geographic eye: 1) understanding the properties of space, 2) understanding continuous transforms within space, 3) understanding spatial operations, 4) understanding the scale continuum, 5) understanding coordinate systems, 6) developing sensitivity to patterns, 7) developing graphic literacy, and 8) being sensitive to place.

Engelsk:	*Norsk:*

3. Explain the difference between inductive and deductive research. Briefly describe each of the 10 stages of deductive research for *sociospatial* research identified by Steinberg and Steinberg (2006).

3. Forklar forskjellen mellom induktiv og deduktiv forskning. Beskriv kort hvert av de 10 stadier av deduktiv forskning innen *sociospatial* forskning identifisert av Steinberg og Steinberg (2006).

Inductive research is used to examine empirical evidence in the search for patterns that might support new theories or general principles. Deductive research focuses on the testing of known theories or principles against data. A satisfactory answer will summarize a deductive research method as starting with a review of the literature, generating a conceptual framework, developing a hypothesis, and then testing the hypothesis by gathering data. The 10 steps described by Steinberg and Steinberg are 1) choose a topic, 2) define the problem, 3) conduct a literature review, 4) develop a hypothesis, 5) develop a conceptual framework, 6) choose research methods, 7) collect and prepare data, 8) ground truth the data, 9) analyze the data, and 10) share results. Some students may be tempted to write about challenges associated with hypothesis tests on geographic data (Longley et al., section 15.5), but I am really looking for a demonstration that they have read Chapter 4 of Steinberg and Steinberg.

4. Explain what is meant by the term "ecological fallacy", how it arises, and why it can lead to false conclusions.

4. Forklar hva som menes med begrepet "økologisk feilslutning", hvordan det oppstår, og hvorfor det kan føre til falske konklusjoner.

Longley et al. discuss ecological fallacy in the context of uncertainty in the analysis of geographic phenomena as an effect of aggregation and scale (pp 170-172) and define it as the "inappropriate inference from aggregate data about the characteristics of individuals." Steinberg and Steinberg (p 70) discuss it the context of errors in human inquiry and define ecological fallacy as a spurious correlation, "an incorrect causal link that is born out statistically by the data." They make the point that it is easy to make unfounded causal links between phenomena or variables that may not be related at all when statistics become the focus of the analysis as opposed to the meaning of the actual data. Exceptional answers will make connections to spatial autocorrelation and how relationships typically grown stronger when based on larger geographic units.