Examination in GEOG3523, autumn 2013

It is expected that you answer all three questions. The weighting is given in the parentheses.

Question 1. Give short and concise answers. (20%)

1a) What is a Geodetic datum and what is a Projection. Why is it important to set up your GIS project in correct geodetic datum and projection?

1b) What does “Remote sensing” stand for? Which wavelength spectrums are normally used in optical remote sensing applications?

1c) Give brief explanations of spatial resolution, spectral resolution, radiometric resolution and temporal resolution. How does spatial resolution and spectral resolution differ between a Landsat image and an aerial photograph?

1d) What is orthorectification of aerial photographs? Why is it important to use orthorectified images in a mapping project?
Question 2 - Cartography (40%)

The maps below show the distribution of Internet users in Europe. Assess the maps and give brief reflections on the merits and disadvantages of each map (A & B). Compare map A with B - which of the maps is the most efficient in communicate the data?

A)

**Number of Internet Users**

*Europe*

B)
Question 3 - Essay (40%)
You work as mapper and GIS specialist at a consultancy company. You have been contracted to map and assess the risk of snow avalanches in a steep, alpine catchment in west-central Norway. Your GIS data will be used in technical avalanche models where frequency and run-out of future avalanches will be calculated.

You interview geologists and specialists and they tell you that the best way to map avalanches is to look at;

1. *Vegetation* - because avalanches knock down trees it is relatively easy to map avalanche pathways based on knocked down and killed tress. It would be a bonus if you could map forest volume or tree heights because this influence how long the avalanches can continue into forest.

2. *Avalanche deposits* – These are a special type of soil that can be quite easily mapped on the ground and tell you how where avalanches have been in the past.

You need to map these features (vegetation, tree volume/height and soil) in great detail and precision to provide precise input to the avalanche models. You thus need high-resolution data. The area is 400 km$^2$ large so you cannot check the whole area by foot in the field - remote sensing data is necessary. Your budget allows you to buy any type of remote sensing data that you might need, and fieldwork cost for you and assistants. You have access to GIS workstations in your office and GPS tablet computers for fieldwork.

Describe how you would tackle the problem. Which data do you need? How do you design the database, interpret remote sensing data, field check, and finally cartographic layout. Discuss potential errors in the data capture and how to communicate those errors in your map. Sketch a map layout (dummy map) showing how you would present the data and include the sketch in your essay.