Assignment 3: Decision Making in GIS

- **Due date:** Sunday, May 3rd 2020, 11:59PM, via LMS.
- **Submission**: upload a single PDF report per group, with a filename as STUDENTNUMBER_A3.PDF, in A4 format. Maximum report length of 2000 words (**excluding** cover page, references, appendices, and any diagrams or images). The report should be submitted by any single person from the group, including a cover sheet clearly identifying the group members (names and student Ids).
- **Assessment:** This group assignment is worth **15 marks** in total. Assessment points are:
    - **Approach, synthesis and discussion**: Adequate technical soundness of the identified and documented approaches (choice of reviewed methods, parameters etc). The reviewed works clearly identify approaches of relevance for the documentation of the phenomenon of choice and provide a pathway for the realisation of the research to be undertaken. (4 marks)
    - **Academic integrity**: Where appropriate the words, graphics and ideas in the report are attributed to the original authors. Citations, references and bibliography consistent and technically correct. (3 marks)
    - **Graphics and Equations**: Figures, tables and/or equations are used to complement appropriate parts of the report. Graphics and equations are clearly cross-referenced in text, and attributed to the authors in referenced literature (3 marks)
    - **Report structure and overall quality**: Text is clearly readable, grammatically correct, concise, minimal spelling errors, overall of high technical quality and adequate length. (2 marks)
    - **Individual reflection:** Understanding of the individual contribution (individually marked), elaborated below. (3 marks)
- **Prepare your report neatly.** Grading is based on completeness, accuracy and the professional quality of your submission.

Learning objectives

This exercise introduces the power of GIS when dealing with spatial problems relevant to infrastructure developments. The exercise requires you to explore and find answers to problems using raster data and GIS functions to resolve a real-world problem. The learning objectives are:

- To work individually as well as in a team.
- You will understand how you can manipulate raster spatial data to isolate data of interest by space and attribute filters.
- You are able to translate simple analytical questions into attribute or spatial data queries.
- You are able to produce effective map visualizations supporting your analytical results.
- **Theoretical learning objective:** You will reflect on the influence of scale of representation, data accuracy, and data categorisation on the results you have produced.

Task Overview

Analyse proposed railway alignments in a way to judge both the technical and economic viability through the use of spatial reasoning and raster analysis. Give subsequent planning recommendations based on the most appropriate alignment (supported by map visualisations explaining this) to the key decision-makers in the relevant organisation.

Victorian Rail Authority (VRA) has come to you with a request to analyse their different proposed alignments for a subsection of their new highspeed rail which takes passengers from Melbourne to Sydney.

VRA requires detailed analysis of the alignments based upon the constraints discussed in their tender. In order the ensure that your results are based upon the most appropriate information they have provided you with some of the relevant spatial data (the alignment and a DEM).

1. You must individually analyse each alignment.
2. The alignments should be ranked based on these analyses to help the VRA make their own decision.
3. The VRA has requested that you provide academic reasoning for your analysis within the report in the form of a literature review section.
4. The analysis should include all of the prescribed factors that have been identified as important to the VRA, as well as any other factors discovered through research.

Individual Reflection

This project report includes individual reflection. In no more than one page, each member of the group describes their own contribution to the project, to be included in the Appendix section at the end of the assignment report. This will be followed by a critical reflection of the value of this contribution for the validity or success of this project. It should include:

1. What did you contribute to the project, and how you did this (workflow of your project).
2. A critical review and assessment of your individual contribution to the project.
3. A critical reflection on the project learning and outcomes.

Outcomes of this assessment

Your submission will consist of a written report. An ideal report would contain the following components:

- **Cover page:** With report title, subject title, assignment number, completion date, author name and student number.
- **Introduction:** Where you set the motivation, problem statement, and a brief summary of the approach and main findings.

- **Literature Review:** where you will discuss the existing literature in relation to the problem and subsequently how it will form your methodology/analysis.
- **Methodology**: Concise outline of the steps taken to address the problem and derive the results, with clear argument about the choice of methods and parameters (possibly organised into tables).
- **Results:** Any maps, graphs and tables to be included here.
- **Discussion:** A brief interpretation of the results presented above, limitations of the study and recommendations to address limitations.
- **Conclusion**: Summary of findings and recommendations.
- **References:** With a consistent citation style, referencing the main literature that supported your approach, tool choice and/or parameter choices.
- **Appendices:** Any subsidiary information and your Individual Reflections to be included here.

For citation style and reference type, you are recommended to use APA or Harvard. Pick one and make sure it is consistent throughout the report.

http://library.unimelb.edu.au/recite