COMP30110 SPRING TRIMESTER ASSESSMENT (2021-2022)

Module Coordinator: Dr. Michela Bertolotto

Answer any 4 out of the following 6 questions. Each answer should be approximately 500 words but no longer than 600 words. All questions carry equal weight. Only 4 answers per student will be graded.

1. Compare and contrast vector and raster spatial data in terms of data models, storage and manipulation strategies, and possible applications. NOTE: This questions covers many aspects of the module. Therefore, one of the skills you are asked to show here is the ability to summarise the topic into a complete (i.e., it contains all relevant information) but concise answer.
2. Discuss topological data structures for plane subdivisions. Highlight the advantages and disadvantages of using topological data structures versus non-topological data structures for storing and querying vector datasets.
3. Highlight the differences between the loosely coupled and the integrated approach for storing and manipulating spatial data. Discuss what are the main advantages and disadvantages of each approach. Explain how the integrated approach is implemented in Oracle Spatial.
4. Discuss the application of computational geometry algorithms in the context of spatial applications. Research and discuss one computational geometry algorithm that we did not cover in the module and explain how such an algorithm can be applied to solve a spatial problem (i.e., how it could be used to answer one of the spatial queries discussed in the module).
5. Introduce triangulations as particular cases of plane subdivisions. Discuss the applications of triangulations in the context of spatial information systems as covered in the module. Research and explain one application of triangulations that we did not cover in the module.
6. Discuss spatial indexing for vector data. Provide an example of a vector dataset and explain how a point query would be resolved using one of the indexing approaches we studied. Explain how in your example the query is supported by the use of the index.

Your set of answers should demonstrate:

- your familiarity and knowledge of the topics involved;
- the ability to organise, analyse and present arguments fluently and to support them with evidence and examples;
- the ability to summarise a topic into a complete (i.e., it contains all relevant information) but concise answer;
- the ability to critically analyse issues;
- any additional reading you have done (please include references where appropriate).

NOTE: any examples you propose should be different from all examples provided in this module, and should not be plagiarised from any other source (plagiarism detection software will be applied).

Please upload a document in .pdf format.

Submission deadline: 11:59pm on Friday April 22nd, 2022.