DUBLIN INSTITUTE OF TECHNOLOGY

DT211C/4 BSc. (Honours) Degree in Computer Science (Infrastructure)

DT228/4 BSc. (Honours) Degree in Computer Science

DT228/4 BSc. (Honours) Degree in Computer Science (International)

SUMMER EXAMINATIONS 2017/2018

GEOGRAPHIC INFORMATION SYSTEMS [CMPU4032]

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MONDAY 21ST MAY 2.00 P.M. – 4.00 P.M.

TWO HOURS

ANSWER ***THREE*** QUESTIONS.

ALL QUESTIONS CARRY EQUAL MARKS.

1. (a) Why is it important to pay attention to Map Design? What are the common elements on a map for presentation?

(9 marks)

(b) What is visual hierarchy in Map Design? How is the hierarchy related to the map purpose?

(8 marks)

(c) How does a general reference map differ from a thematic map?

(8 marks)

(d) Mapmakers apply visual variables to map symbols. What are visual variables?

(8 marks)

2. (a) Explain the notion of *Spatial Interpolation*. Discuss *Inverse Distance Weighting* (IDW) as a method of spatial interpolation. Your answer should highlight the pros and cons of this method.

(12 marks)

(b) Describe the usefulness of *slope* and *aspect* measures from a *Digital Elevation Model* (DEM). How are these calculated?

(12 marks)

(c) Explain the difference between a global method and a local method of spatial interpolation.

(9 marks)

3. (a) Describe a *point-in-polygon* overlay operation.

(5 marks)

(b) A *line-in-polygon* operation produces a line layer, which typically has more records (features) than the input line layer. Why?

(5 marks)

(c) Define slivers from an overlay operation.

(5 marks)

(d) Describe a scenario in which *intersect* is preferrred over *union* for an overlay operation.

(9 marks)

(e) Suppose the input layer shows a county and the overlay shows a forest. Part of the county overlaps the forest. We can express the output of an *intersect* operation as `[county] AND [forest]`. How can you expres the outputs of a *union* operation and an *identity* operation?

(9 marks)

4. (a) Define *isopleth* and *choropleth* maps. Comment on their uses and how they might be constructed.

(12 marks)

(b) Describe the four basic classification schemes to divide interval and ratio data into categories. Comment on the difficulties in chosing one scheme over another.

(15 marks)

(c) It has been said that digital cartography and GIS free map-makers from many of the constraints inherent in traditional (non-GIS) paper mapping. Describe these constraints.

(6 marks)