THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

COMP4462: Data Visualization

Final Examination – Part 1

Spring 2020
Instructor: Huamin Qu
Monday, 25 May 2020, **1:30PM - 2:50PM**

Instructions:

1. This is an open-book, open-notes examination. Part I has totally 4 pages and 3 questions.
2. Write your name and student ID on each page

1. Multiple Choice Questions *[20 marks]*

Some questions may have multiple correct answers. 2 marks for each question.

1. Which of the followings is (are) the principles suggested by Edward Tufte?
   A. Resolution beats immersion
   B. Consistent, linear scale
   C. Eyes beat memory
   D. Avoid area, volume encoding

   Answer: _____

2. Regarding using color in visualization, which of the followings is (are) NOT recommended?
   A. Using 7 colors to encode the 7 different departments in the HKUST School of Engineering
   B. Using red font over a blue background
   C. Using rainbow color to encode temperature change
   D. Using complementary color combination to achieve color harmonization

   Answer: _____

3. Which color scheme should be used to encode the GDP of different countries in map?
   A. Sequential scheme
   B. Diverging scheme
   C. Qualitative scheme
   D. Rainbow scheme

   Answer: _____

4. Which of the following statement is true regarding the following visualization?

   A. The visualization encodes 2 visual channels. They are fully separable.
   B. The visualization encodes 2 visual channels. They are not fully separable.
   C. The visualization encodes 3 visual channels. They are fully separable.
   D. The visualization encodes 3 visual channels. They are not fully separable.

   Answer: _____

5. Which of the following visualizations is (are) often used to reduce visual clutter in graphs?
   A. Edge bundling
   B. Node clustering
   C. Graph Splatting
   D. Volume rendering

   Answer: _____

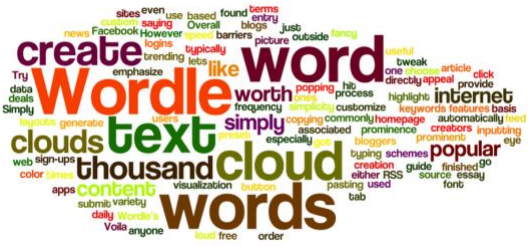
6. Which of the following statements is (are) are true for Chernoff faces?
   A. They encode data values with properties of a face
   B. They are often used to show the hierarchical structure of data
   C. They are glyphs
   D. They are well understood and appropriate to complex data effectively

   Answer: _____

7. Which of the following statements is (are) true for parallel coordinates?
   A. The ordering of the axes influences the visibility of relations between two data dimensions
   B. It is better suited to visualize complex relations between two dimensions than scatter plots
   C. It is suited to represent multiple dimensions
   D. It represents each data item by a polygonal line

   Answer: _____

8. Which of the following statements is (are) true for Wordle?



   A. It is useful for browsing or non-specific information discovery
   B. It is useful to visualize terms in their context
   C. It does not support the in-depth exploration of the textual structure
   D. Long words and short words are treated equally

   Answer: _____

9. Which of the following tactics can be used for visual narrative?
   A. Flicker
   B. Animated transition
   C. Camera movement
   D. Progress bar

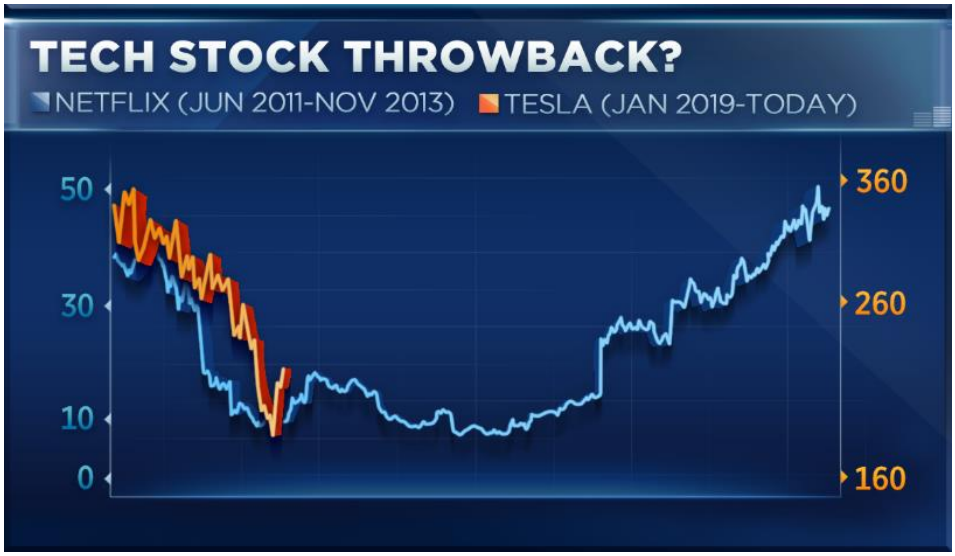
   Answer: _____

10. The visualization design can be evaluated by?
   A. Controlled experiment
   B. Subjective assessment
   C. Document analysis
   D. Expert review

   Answer: _____

2. Problem Solving *[5 marks]*

Please identify and write down the problem(s) in the following visualization [5 marks]



3. Visualization Design *[25 marks]*

QS World University Rankings is an annual publication of university rankings by Quacquarelli Symonds (QS). It collects a lot of information from many universities and then releases the global overall and subject rankings each year. Suppose you are given the following numerical attributes for each university over 10 years:

- Student/Faculty Ratio
- International Faculty Ratio
- Exchange In Students
- Exchange Out Students
- Total Academic Faculty
- Total UG Students
- Total PG Students
- Total International Faculty
- Academic Reputation
- Employer Reputation
- Citations Per Faculty

a. Please design a visualization (or multiple visualizations) to compare the top 3 Hong Kong universities (i.e., HKU, CUHK, HKUST). Your visualization(s) should reveal the similarity/difference of these universities in multiple dimensions as well as their trends. [10 marks]

b. Please design a visual analytics system to summarize and analyze all the data collected for about 1000 universities over 20 years. Your system should consist of multiple visualizations that are linked together to solve multiple tasks. Please describe your system. Please write down up to 5 tasks that can be conducted with your system and the visualization(s) to use and interaction(s) to perform for each task. Will your system encounter any visual clutter problem? If yes, please describe how the problem can be resolved. [15 marks]