# Exam 2

Due: 10pm, 4/24/2015 (EDT)

**IE 59000** – Data Visualization: Theory and Practice

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Spring 2015

Notes:

* General
  + Exam time: 10pm, 4/23/2015 (EDT) – 10pm, 4/24/2015 (EDT)
  + A late submission will not be graded **without any exception**.
  + If you need to make any assumptions, state them clearly.
* Answering Sheet
  + You have to use this document as the answering sheet.
  + **Remove all text in red** before submitting in order to prevent any unnecessary plagiarism alerts.
  + The answering sheet consists of the body section and the reference section. **The body section cannot exceed 3 pages**; the reference section does not have any page limitation.
  + Do not change any formats affecting the length of the contents (e.g., font size, font, margin, line spacing, etc.) to compress more contents within the page limit.
  + In the answer sheet, put your full name that is used on Blackboard Learn.
  + The references and citations should be in the APA format (zotero.org would help).
    - https://owl.english.purdue.edu/owl/resource/560/01/
  + When you use abbreviations, please define them first even for a very well known one (e.g., InfoVis, VA, and PC).
  + In order to clarify your descriptions in the answer sheet, you may embed illustrations or drawings. However, be careful. They also occupy space.
* Plagiarism
  + Double check the SafeAssign Report after your submission to prevent any potential plagiarism concerns.
  + Note that the plagiarism detection process of SafeAssign may take 10 to 20 minutes when many submit the responses at the same time. Thus, if you would like to check the SafeAssign Report before your final submission, you should submit your response sufficiently earlier.
  + Your code will be also compared with other students’ code and some relevant code on the web using moss (http://theory.stanford.edu/~aiken/moss/). Basically, do not copy others’ code. You must write down your own code by yourself. In addition, do not directly share your code with others. If you want to help, please just discuss the problem with other students.
  + Whenever you refer to other people’s code online (e.g., stackoverflow and examples/gallery on http://d3js.org/), please cite their work (i.e., add the URL of the cited work using comments). If there is no citation, I will assume that the code you submitted is written solely by you.

1. We have reviewed many visualization techniques through this class. Though different visualizations have different representations and interaction techniques, they sometimes share a common strategy. For example, the word count project (<http://www.wordcount.org/main.php)>, tag cloud (Viégas and Wattenberg, 2008), parallel tag cloud (Collins et al., 2009), and word tree (Wattenberg and Viégas, 2008) are different text visualizations with different pros and cons, but they use a common strategy: “bigger text for important text” (though the importance could be defined differently depend on each visualization). Another example would be one element of the famous Sheneiderman’s mantra: “details on demand” (Shneiderman, 1996). You can find numerous implementations of “details on demand”: from a commonly found tool tip feature on visualization, to expanding sub-trees of SpaceTree (Plaisant et al., 2002). Like these examples, I want you to find three additional strategies commonly found in multiple visualizations. The description of each strategy should have the following elements: a (catchy) strategy name, a description, at least four visualization examples using the strategy (a citation with a figure number or an URL is necessary). Your answer will be evaluated based on 1) whether the found three strategies are widely applicable; 2) whether the descriptions of strategies are clear and easy to understand; and 3) whether the cited examples are appropriate. (20 points)

Plaisant, C., Grosjean, J., & Bederson, B. B. (2002). SpaceTree: supporting exploration in large node link tree, design evolution and empirical evaluation. In IEEE Symposium on Information Visualization, 2002. INFOVIS 2002 (pp. 57–64). http://doi.org/10.1109/INFVIS.2002.1173148

Viégas, F. B., & Wattenberg, M. (2008). TIMELINES: Tag Clouds and the Case for Vernacular Visualization. Interactions, 15(4), 49–52. <http://doi.org/10.1145/1374489.1374501>

Collins, C., Viegas, F. B., & Wattenberg, M. (2009). Parallel Tag Clouds to explore and analyze faceted text corpora. In IEEE Symposium on Visual Analytics Science and Technology, 2009. VAST 2009 (pp. 91–98). http://doi.org/10.1109/VAST.2009.5333443

Wattenberg, M., & Viégas, F. B. (2008). The Word Tree, an Interactive Visual Concordance. IEEE Transactions on Visualization and Computer Graphics, 14(6), 1221–1228. <http://doi.org/10.1109/TVCG.2008.172>

Shneiderman, B. (1996). The eyes have it: a task by data type taxonomy for information visualizations. In IEEE Symposium on Visual Languages (pp. 336–343). http://doi.org/10.1109/VL.1996.545307

2. Please discuss the pros and cons of the following website, which includes some visualizations, using the concepts and guidelines discussed in our class (15 points). Any creative suggestions to overcome the identified cons will get additional points (5 points). Your answer will be evaluated based on 1) whether existing literature was properly understood and cited; 2) whether appropriate guidelines / theories were applied; and 3) whether proposed solutions were clearly explained and appropriate.

http://www.passportindex.org

3. Please implement a spreadsheet using the following dataset and D3.js. You will need to implement three different versions of a spreadsheet.

http://hivelab.org/static/exam2.json

3.1. Static Spreadsheet (Baseline). Implement a spreadsheet using D3 based on the given data set. The spreadsheet should include column headers and cells. A column header should be light grey and have a name of the column in black text (right-aligned). Each cell should be white and have value in black text (right-aligned). When a cell is hovered by a mouse cursor, the whole row should be highlighted in yellow until the row is un-hovered. When a cell is clicked, the whole row should be highlighted in green(darkgreen if also hovered) until another row is clicked. Refer to Figure 1(a) in (Hur et al., 2013) (30 points).

3.2. Spreadsheet with Typical Sorting. Add the one-column sorting feature on top of the spreadsheet implemented in Q3.1. When a column header is clicked, the column header should be highlighted in dark yellow and the whole spreadsheet should be sorted by the clicked column. Refer to Figure 1(b) in (Hur et al., 2013) (10 points).

3.3. Spreadsheet with SimulSort. According to the description of SimulSort in (Hur et al., 2013), please implement SimulSort. An example of SimulSort can be found at <http://goo.gl/k4ZpzX>, but it is implemented in Flash, so you cannot directly use the source code of it. Refer to Figure 1(c) in (Hur et al., 2013) (extra 20 points).

The implemented visualizations should be publicly available. You need to submit three URLs to the three HTML pages containing the three visualizations. Each HTML page should contain all the code you write (including JavaScript and CSS). Do not use separate .js or .css files (I know that this approach is cleaner and actually recommended in the real world, but in order to use moss, the plagiarism detection tool, it is better to have all the code in a single file). You still can refer to other js libraries (e.g., jQuery and D3) in separate files obviously.

Your answer will be evaluated based on 1) whether the visualizations were properly implemented; 2) whether components in D3 (e.g., data import, text, functions, animation, event handler, etc.) were properly used instead of being unnecessarily reinvented; and 3) resulting codes are easy to read.

Hur, I., Kim, S.-H., Samak, A., & Yi, J. S. (2013). A Comparative Study of Three Sorting Techniques in Performing Cognitive Tasks on a Tabular Representation. International Journal of Human-Computer Interaction, 29(6), 379–390. http://doi.org/10.1080/10447318.2012.713802

4. Out of all the visualizations we learned throughout this semester, please select one that is most impressive to you and explain why it is most impressive. You should provide the URL to the visualization or a citation and figure number of it if it is a part of a research paper, so that the graders can see the visualization that you are referring to (5 points). And, write down at least five questions that can measure whether a user understands the visualization or not. The questions should be multiple choice or true/false (15 points). Examples of such questions can be found in the following link, but note that you have to sign up to the website in order to see the sample questions:

<http://visualizationliteracy.org/platform/assessment/141/show>

Your answer will be evaluated based on 1) whether the selection and according justifications are reasonable; 2) whether the questions can accurately and comprehensively assess the understanding of the selected visualization.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total ( / 100 points)

1. ( / 20 points)

2. ( / 20 points)

3. ( / 40 points)

4. ( / 20 points)

References