IGR 204 Information Visualization Spring 2016-2017 (S2P4)

Final exam

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Your name: Example

Instructions:
- You have 1 hour 30 minutes to complete this exam.
- No notes and no electronic devices are authorized.
- Exception: paper dictionaries are permitted.
- All work should be yours and yours alone.
- Answers should be short and clear. They should fit in the space provided.
- You may respond in either English or French.
- There are 54 points total.

True/False (12 points, +2 per correct response, -1 per incorrect)

F 1. The axes of a chart should always start at zero.

T 2. Selections in D3 are useful for associating data to visual attributes.

T 3. Three important things in visualization are: tasks, representations, and interaction.

F 4. Tree-maps are good for showing edge attributes in a hierarchy.

F 5. In a matrix drawing of a graph, a fully-connected subcomponent (clique) looks like a plus.

F 6. Visualization, machine learning, and statistical methods are in competition with each other.

Short Answer Questions

a) b)

7. Give an example of a nominal dataset, a dataset that is ordinal but not quantitative, and a c) quantitative dataset. (3 points, 1 point each)

a) Star Trek captains

b) Star Trek captains

Kirk > Sisko > Picard > Janeway > Archer

c) Vessel top speed

8. You are given a dataset crew members lost for ~~each~~ under of the Star Trek captains and commanders: James T. Kirk, Jean-Luc Picard, Benjamin Sisko, Kathryn Janeway, and Jonathan Archer. It contains the attributes: the commander, the episode number, and the color of each crew member's uniform (red, blue, gold/yellow). Define a spatial mapping for these data and how you would encode these three dimensions. What tasks does your mapping help satisfy? Justify your response. (6 points)

Using small multiples helps to compare across captains.

Using same axes w/ common color scheme conveys progression over episodes, shows deadly episodes, seasons and what shirts are dangerous.

9. Edward Tufte argues that a visualization should not lie about the data. What are three ways that we have seen for a visualization to lie? (3 points)

1) Using misleading axes
2) Not showing context
3) Using misleading encodings (e.g. width/area)

10. Describe one advantage and one problem with using a greyscale encoding (e.g. ■■■■□). (2 points)

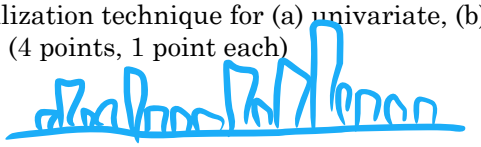
+ Perceived smoothly across the entire range

- Susceptible to interference from surroundings

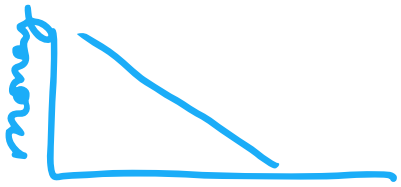
FIXME: Give an example of a visualization technique … . For each example, give its name and a drawing.

11. Give an example of a visualization technique for (a) univariate, (b) bivariate, (c) trivariate, and (d) hypervariate data. (4 points, 1 point each)

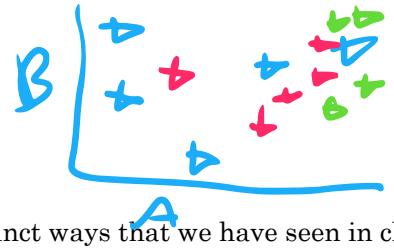
a) histogram



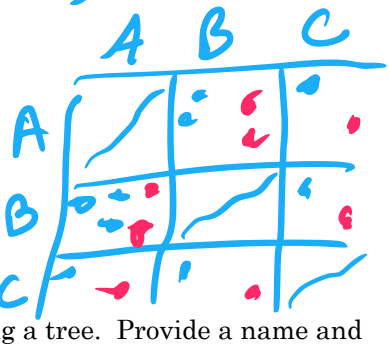
b) line chart



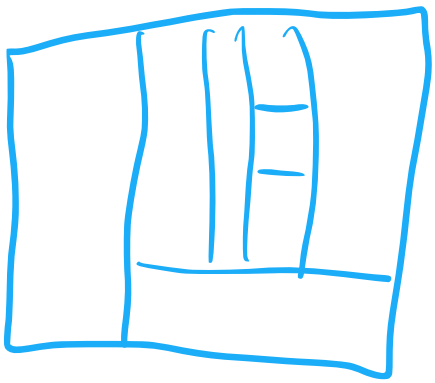
c) scatterplot + color



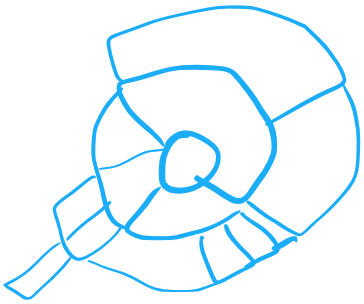
d) scatterplot matrix



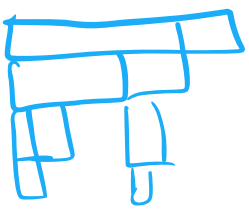
12. Identify two distinct ways that we have seen in class for drawing a tree. Provide a name and a drawing of each. (4 points)



tree map



sunburst



icicle tree

radial node-link

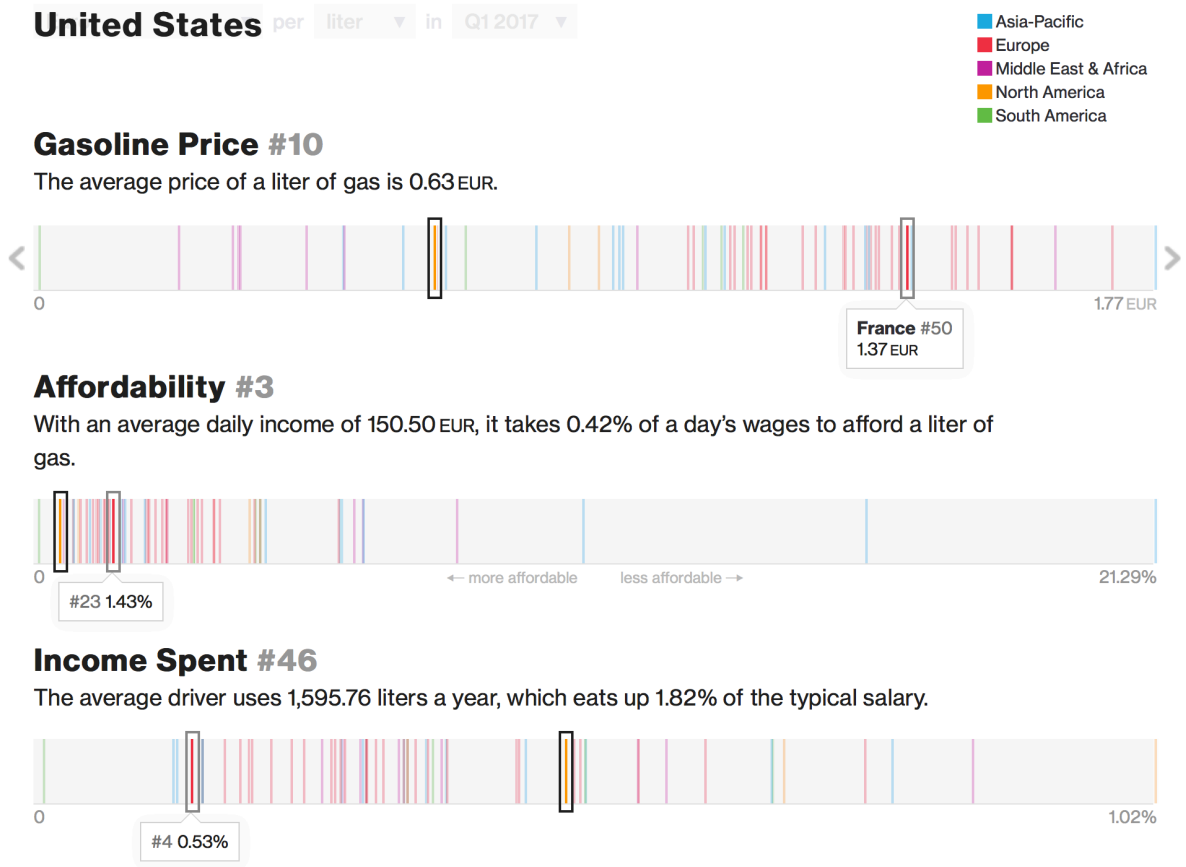
node-link

13. Critique the visualization shown on the following page. a) Identify one pertinent task for which it is well-suited and one pertinent task for which it is ill-suited. b) Describe two problems with this visualization and, for each problem, how you would fix it. (6 points)

a) Shows distribution of each attribute across data set. Helps see selected item relative to others.
Does not help user find values for a particular country by name, map.
Hard to compare specific countries over time.

b) Hard to find a given country:
① Add a linked view of a map

② Faded colors are hard to distinguish:
use more dominant colors or more distinct palette or reinforce color with shape.



Source: Bloomberg