

## FIT3179 Data Visualisation

## Sample Exam Questions

**Overview**

This practice exam is made up of questions from previous exams. Please note that this practice isn't necessarily illustrative of the questions you'll need to answer in your exam, rather it shows the level of knowledge that we'll expect you to be able to reach.

You can either work through these as a class, in small groups or as individuals.

Please complete each section, then once everyone has answered each section the tutor will go through and discuss the correct answers. Check off your own answers and see what kind of mark you would have gotten!

1. Which statement is correct?



- A. This is a qualitative area map.
- B. This is quantitative choropleth map without classification.
- C. Saturation is the main visual channel used in this map.
- D. This map is misleading, because data is not normalised.

Solution: (b) is correct. (a) is false, because the map is showing quantitative data. (c) is false because luminance is the main visual channel used in this map. (d) Data (population counts) is normalised by area.

2. Which statement is correct?

- A. When visualising quantitative data, luminance can varied, but luminance is less effective than other visual channels.
- B. The human visual system is better at comparing areas than distances.
- C. Volumes and areas can be estimated with similar accuracy.
- D. Shapes are a good choice for showing different quantities.

Solution: (A) is correct. Distances are easier to compare than areas (b), volumes are more difficult to compare than areas (c), shapes can only be used for qualitative data.

3. The map of the London Underground (shown below) is considered a very good



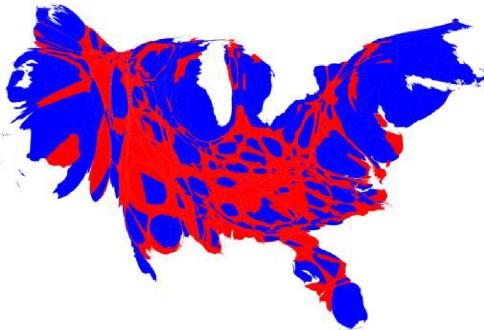
information visualisation. Which statement about this map is true?



- A. The map allows the user to understand the spatial relationship between stations, helping them to estimate travel time.
- B. The map provides knowledge discovery, allowing the passengers to compare trip distances.
- C. The map reduces cognitive load, using colour and stylised lines to simplify navigation
- D. All of the above are true about the London Underground map

Solution: (C) is correct. The spatial relationship and distances between stations in the map aren't accurate. Although there is a danger that student's aren't that familiar with the map, it should be implicit in the picture (the stations are all equally spaced so distance isn't accurate; they are all in a straight line so placement isn't accurate).

4. The visualisation shown below is showing election outcomes in America. What kind of information visualisation is this?

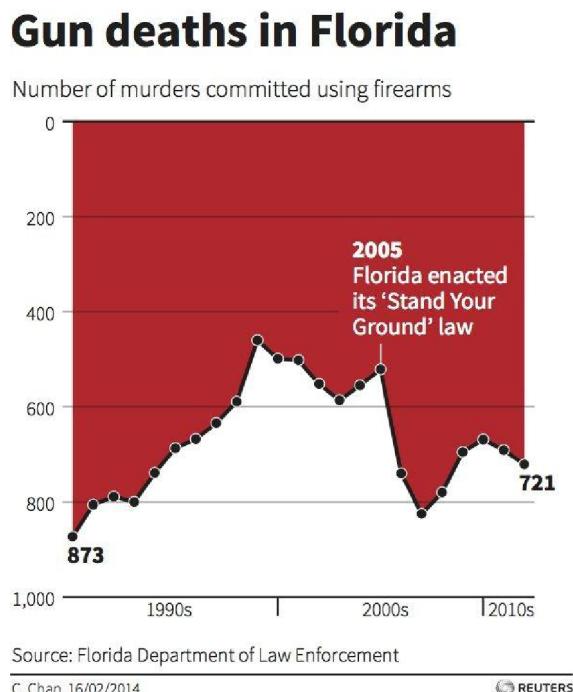


- A. Choropleth map
- B. A Flow map
- C. A topographic map
- D. This information visualisation is none of the above types

Solution: (A) is correct. It is also a cartogram in that the shapes are distorted to represent quantities. Choropleth maps are use colour to represent something. Flow maps show movement. Topographic maps are general reference maps.

## Critical Analysis and Discussion:

- Analyse and critique the visualisation below. What kind of visualisation is this? Is the visualisation easy to understand? Which aspects are easy to follow? Which aspects are difficult? Provide insight into how it could be improved with using a different type of infoviz and with interactivity.



- Highlight the use of colour [2 marks]
- Discussion of why the image is not accurate and lying (upsidedown scale) [2 marks]
- Discuss solutions to the problem [2 marks]
- discuss interactivity improvements [2 marks]

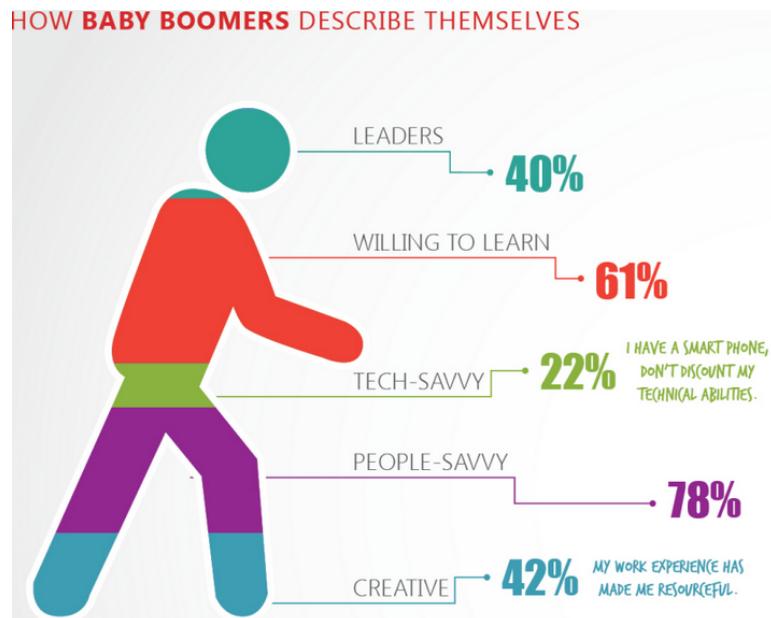
- Consider the following visualisation.

What is the visualisation technique called (*1 mark*)?

In what ways could this visualisation be said to be effective (*2 marks*)?

In what ways could it be said to be ineffective (*4 marks*)?

Which of Munzner's <action><target> pairs are supported by this visualisation (*1 mark*)?



Infographic

- Engaging
- shows classifications well with hue
- big letters for percentages
- inappropriate metaphors (tech savvy linked waist)
- hard to compare area
- percentages go over 100%
- text colour (grey on grey)
- hues are somewhat similar for the blues
- some have description others don't
- description font hard to read
- <action, target>
  - Present, features
  - compares, distribution

3. The image below shows connections between users of the social media site Facebook. Apart from the obvious display of links between users, what general inferences might be deduced from this image? In other words what else might be indicated by the visualisation?



Themes to discuss... should highlight what the feature is, and how successful it is [3 marks per well discussed theme to max of 10 marks]

- Shows the adoption of Facebook (no China!)
- Shows relationships/links between countries (Aus and NZ for example)
- Can highlight developed/undeveloped countries (dark spots in Africa)
- Population density (as evidenced by the east coast of Australia)

**Visualisation of Data:**

1. Your employer wants a visualisation of the crime across Australia. You find a data set that lists the number of physical assaults for each state, as shown below.

	<b>2008</b> '000	<b>2009</b> '000	<b>2010</b> '000	<b>2011</b> '000	<b>2012</b> '000	<b>2013</b> '000
<b>PHYSICAL ASSAULT</b>						
New South Wales	153.8	135.9	164.4	158.2	133.5	119.5
Victoria	142.5	115.6	90.4	134.9	122.2	93.6
Queensland	100.7	120.4	109.1	111.7	114.5	85.1
South Australia	35.5	42.8	31.6	36.8	34.9	36.5
Western Australia	64.5	69.0	61.9	62.1	68.3	58.2
Tasmania	16.0	11.6	12.6	16.4	10.5	13.5
Northern Territory	7.1	6.8	7.4	6.3	6.4	7.1
Australian Capital Territory	7.5	7.4	9.2	13.6	7.7	7.8

Sketch up a visualisation to show ideas... you are not required to provide a finished or perfect, visualisation.

Annotate your visualisation to highlight the narrative you are telling and the techniques you are using. Also indicate any interaction strategies you would use to help data exploration if applicable. Be sure to consider good visualisation design principles.

**Marking Guide:**

- Purpose or message should be highlighted... what they are trying to say. This must be made clear! User Macro and micro readings [5 marks]
- Discussion of the data and how it will be analysed and used. Challenge of multivariate data should be considered. [3 marks]
- Discussion of good info vis techniques being used (colour, etc) Tie the design to cognitive load, focus/zoom/filter, knowledge discovery [6 marks]
- Sketch of what it will look like, annotated to make sense. Interactivity can be included in here [6 marks]

2. Provided is a basic data set of power and water usage data for four buildings on the Caulfield campus. You are to plan a visualisation of this data for your manager, who is the head of the campus. They need you to provide an insight into the habits of the campus.

***Power Usage by Building (On and Off Peak)***

		<b>Power (kW)</b>	<b>Water (ML)</b>
Building A	On Peak	33826	12343
	Off Peak	15067	549
	TOTAL	48893	12892
Building B	On Peak	17612	10924
	Off Peak	4880	3333
	TOTAL	22492	14257
Building C	On Peak	10815	11140
	Off Peak	6613	3197
	TOTAL	17428	14337
Building D	On Peak	3287	6106
	Off Peak	3320	1162
	TOTAL	6607	7268
Summary	On Peak	65540	40513
	Off Peak	29880	8241
	TOTAL	95420	48754

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