CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 2 Examinations 2017/18

Module Title: Interactive Data Visualisation

Module Code:	COMP8054
School:	Science & Informatics
Programme Title:	BSC in Web Development
Programme Code:	CR_KWEBD_8_Y4
External Examiner(s):	?
Internal Examiner(s):	Dr Ruairi O'Reilly
Instructions:	Answer all questions. Q1 & Q2 are worth 35 marks each, Q3 is worth 30 marks. Answer all questions.
Duration:	2 hours
Sitting:	Sample 2018

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper. If in doubt please contact an Invigilator.

Question 1 – Introduction to Interactive Data Visualisation **[35 marks]**

i) What is interactive data visualisation? [5 marks]

Answer:

ii) In 1983 Edward Tufte wrote "Induce the viewer to think about the substance rather than about methodology, graphic design, the tech of graphic production, or something else." Would you agree or disagree with this idea? Articulate your rationale and provide examples where appropriate.

[10 marks]

Answer:

iii) In Scalar Vector graphics, can event handlers be assigned to graphical object? [4 marks]

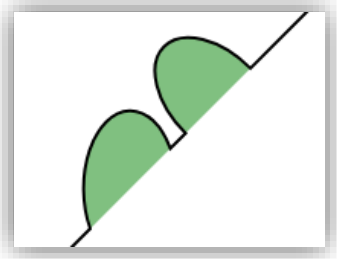
Answer:

iv) Draw the output that is generated by the code snippet below (indicate styling using textual labels in parentheses "()"). Discuss the elements used to generate this: [8 marks]

```
HTML ▼

1 <svg width="320" height="320" xmlns="http://www.w3.org/2000/svg">
2   <path d="M10 315
3            L 110 215
4            A 30 50 0 0 1 162.55 162.45
5            L 172.55 152.45
6            A 30 50 -45 0 1 215.1 109.9
7            L 315 10" stroke="black" fill="green" stroke-width="2" fill-
  opacity="0.5"/>
8 </svg>
```

Answer: Include a written description, demonstrating an understanding of SVG.



v) Missing question [8 marks]

Question 2 - D3.js and data visualisation **[35 marks]**

i) What does D3 stand for? [3 marks]

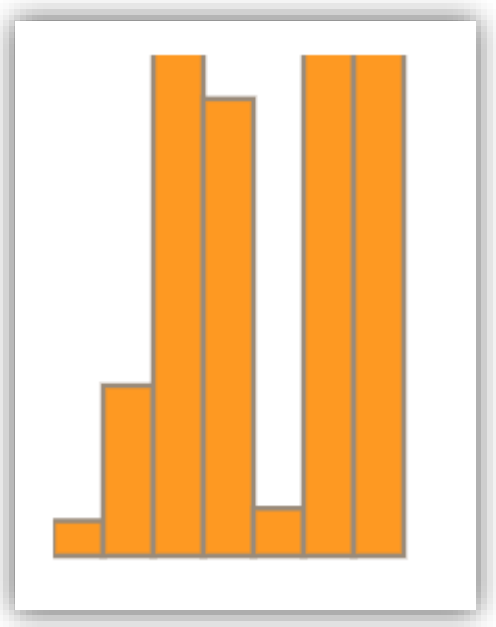
Answer:

ii) The creator of D3, Mike Bostock, stated that D3 is intended to "avoid proprietary representation and afford extraordinary flexibility, exposing the full capabilities of web standards such as CSS3, HTML5, and SVG". Expand on this statement? [6 marks]

Answer: Expand on this statement taking advantage of emerging web standards etc.

iii) The below snippets depicts a basic "Hello World" equivalent in D3. Draw a depiction of what the client will render and discuss the main statements from the code that generated it. [8 marks]

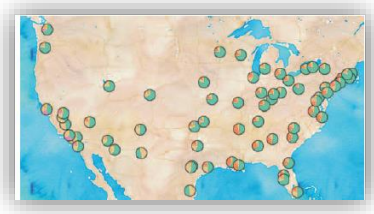
```
<!doctype html>
<html>
  <head><script src="d3.min.js" type="text/JavaScript"></script></head>
  <body>
    <svg style="width:500px;height:500px;">
    </svg>
    <script>
      var yScale = d3.scaleLinear().domain([0,100,500]).range([0,50,100]);
      d3.select("svg")
        .selectAll("rect")
        .data([14, 68, 24500, 430, 19, 1000, 5555])
        .enter()
        .append("rect")
          .attr("x", (d,i) => i * 10)
          .attr("width", 10)
          .attr("height", d => yScale(d))
          .attr("y", d => 100 - yScale(d))
          .style("fill", "#FE9922")
          .style("stroke", "#9A8B7A")
          .style("stroke-width", "1px");
    </script>
  </body>
</html>
```

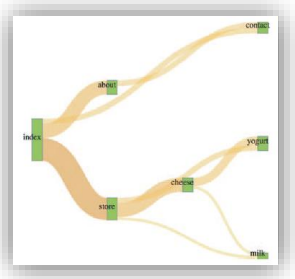


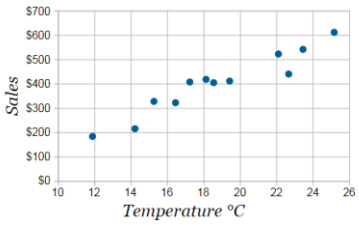
Answer: Detailing of shapes, positioning of shapes and description of individual statements, reading of data etc.

iv) Identify the type of visualisations depicted, for each discuss where and when their utilisation is appropriate:

[9 marks]



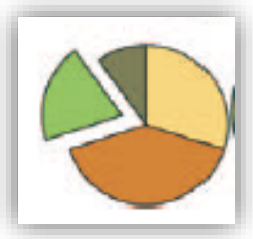




Answer: Map, Sanskey, Scatterplot – answer approx. two line statement for each (3x3)

v) The following is often used as a visual representation for data. Name the visualisation, discussing the features it incorporates, where it is commonly used and its suitability as a visualisation technique.

[9 marks]



Answer: Exploding Pie Chart - expand

Question 3 – Data Visualisation Use Case **[30 marks]**

Trump Has Spent a Fraction of What Clinton Has on Ads

(Note – see visualisation on following page)

"I started this piece thinking I'd remake Alicia's classic stacked area chart showing residential ad buys by state. Graphing the 2016 data presented a problem though - Trump spent several weeks during the summer spending little or no money on television ads. Rather than using a smaller time scale or visualizing the percentage allocation of a small amount of money, I decided focus more on the total amount of money spent. A _____ let me do that while still showing part of each campaign's state by state strategy. To smooth over variations in spending between different days of the week and reduce the data sent to the client, I aggregated spending y week and used the d3.curveMonotoneX interpolater to stop neighbouring curves from overlapping each other."

i) Identify and discuss the underlying data visualisation technique and principles being employed.

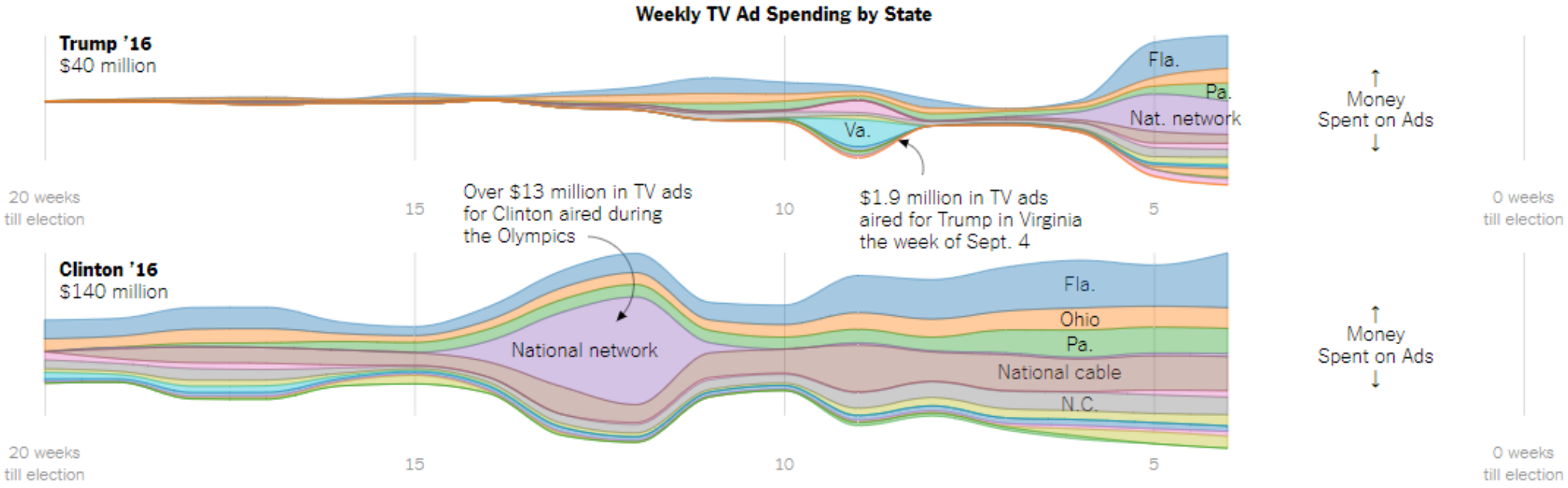
[10 marks]

ii) Appraise the suitability of the visualisation technique for the web. [7 marks]

iii) How is the data visualisation technique being applied to its data source. [5 marks]

iv) What interactive functionality, if any, could be incorporated into this visualisation technique? Evaluate its suitability or unsuitability.

[8 marks]


Weekly TV Ad Spending by State
Trump '16
$40 million
Fla.
Pa.
Nat. network
Va.
Money Spent on Ads
20 weeks till election
15
10
5
0 weeks till election
Over $13 million in TV ads for Clinton aired during the Olympics
$1.9 million in TV ads aired for Trump in Virginia the week of Sept. 4
Clinton '16
$140 million
Fla.
Ohio
Pa.
National network
National cable
N.C.
Money Spent on Ads
20 weeks till election
15
10
5
0 weeks till election