UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Department of Computing

B. Sc. Examination 2016

IS53048A
Data Visualisation and the Web

Duration: 2 hours 15 minutes

Date and time:

This paper is in two parts: part A and part B. You should answer ALL questions from part A and TWO questions from part B. Part A carries 40 marks, and each question from part B carries 30 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.

There are 100 marks available on this paper.

**THIS PAPER MUST NOT BE REMOVED
FROM THE EXAMINATION ROOM**

Part A

Please answer all questions

Question 1   There are two types of data visualisations: one tells a story, the other one helps discover trends.

List the names of the two types, and list at least one characteristic of each type.   [4]

Question 2   Data visualisation transforms data into information, which guides our actions.

Discuss the steps required to turn data into actions   [4]

Question 3   Data visualisation can also be catergorised into informaiton visualisation and scientific visualisation.

What are the characteristics of information visualisation?   [4]

Question 4   When describing quantitative relationships, we need to understand the data types for our catergorical and quantitative data.

List the three different data types.   [4]

Question 5   List one example for each of the above three data types.

[4]

Question 6   In data collection, the first step is to understand what is our population and how to form our sample.

Give the definition of population and sample   [4]

Question 7   Write two examples of population and sample.

[4]

Question 8   We have learnt two different visual perception models proposed by psychologists: Gregory and Gibson.

Briefly describe the characteristics of each model.   [4]

Question 9   There are many tools available for data visualisation.

List four different tools presented in course work 1 and explain briefly how they work   [4]

Question 10   Time-series analysis

What type of relationship does time-series analysis desribe? What is the type of graphics that work particularly well to reflect this relationship? Explain what would be your x and y axes.   [4]

Part B

Question 11   Data and basic statistics

(a) One of the very first steps of data visualisation is to plot the distribution of each of your variables. For this, a box plot is often used. Draw an example of a box plot and explain in detail the statistical features used and how are they calculated. Explain the definition of a Tukey plot. Describe with an example of why a box plot could be useful [15]

(b) A correlation coefficient is used to describe the relationship between two variables. Discuss with graphs the meaning of five different values of correlation coefficients (three extremes). Give an example of each situation. [15]

Question 12   Human perception

(a) Explain the 3-stage visual perception model discussed in the lecture: what are the functions and characteristics of each stage? [10]

(b) What are Gestalt laws? Give 4 examples and explain how they work [10]

(c) Explain the research question and findings from your second course work (survey study) and discuss how your knowledge of human perception has helped in the data visualisation part of this course work. [10]

Question 13   Scientific Visualisation

(a) What are the characteristics of scientific visualisation? [5]

(b) Describe scalar field and vector field. Give two examples each. [10]

(c) Describe isoline (contour line) and isosurface and their applications. [10]

(d) Please list and give a brief description of 2 tools which can be used for scientific visualisation [5]