DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY
ASSESSMENT DESCRIPTION 2019/20

UNIVERSITY OF HULL

MODULE DETAILS:

Module Number:	600084	Trimester:	2
Module Title:	Visualization		
Lecturer:	Dr Xinhui Ma		

COURSEWORK DETAILS:

Assessment Number:	1	of	1		
Title of Assessment:	Visualization Practical Course Work				
Format:	Program	Demonstration	Report		
Method of Working:	Individual				
Workload Guidance:	Typically, you should expect to spend between	80	and	90	hours on this assessment
Length of Submission:	This assessment should be **no** more than: *(over length submissions **will be** penalised as per University policy)*	200 **words** *(excluding diagrams, appendices, references, code)*			

PUBLICATION:

Date of issue:	17 February 2020

SUBMISSION:

ONE copy of this assessment should be handed in via:	Canvas		If Other (state method)	
Time and date for submission:	**Time**	2:00pm	**Date**	24th April 2020
If **multiple hand–ins** please provide details*:*	Individual demos, week commence 27th April 2020			
Will submission be scanned via TurnitinUK?	NO	If submission is via TurnitinUK students MUST only submit Word, RTF or PDF files. Students MUST NOT submit ZIP or other archive formats. Students are reminded they can **ONLY** submit **ONE** file and must ensure they upload the correct file.		

The assessment must be submitted **no later** than the time and date shown above, unless an extension has been authorised on a *Request for an Extension for an Assessment* form which is available from: http://www2.hull.ac.uk/student/registryservices/currentstudents/usefulforms.aspx.

If submission is via TurnitinUK within Canvas staff must set resubmission as standard, allowing students to resubmit their work, though only the last assessment submitted will be marked and if submitted after the coursework deadline late penalties will be applied.

MARKING:

Marking will be by:	Student Name

ASSESSMENT:

The assessment is marked out of:	100	and is worth	60	% of the module marks
N.B If multiple hand-ins please indicate the marks and % apportioned to each stage above (i.e. Stage 1 – 50, Stage 2 – 50). It is these marks that will be presented to the exam board.				

ASSESSMENT STRATEGY AND LEARNING OUTCOMES:

The overall assessment strategy is designed to evaluate the student's achievement of the module learning outcomes, and is subdivided as follows:

LO	Learning Outcome	Method of Assessment
4	*Use a visualization package to implement appropriate representations of a pre-determined set of data*	Program Demonstration

Assessment Criteria	Contributes to LO	Mark
Obtain and communicate insight through appropriate and effective application of visualization to data	4	100

FEEDBACK

Feedback will be given via:	Verbal (via demonstration)	Feedback will be given via:	Marking sheet
Exemption			
Feedback will be provided no later than 4 'teaching weeks' after the submission date.			

This assessment is set in the context of the learning outcomes for the module and does not by itself constitute a definitive specification of the assessment. If you are in any doubt as to the relationship between what you have been asked to do and the module content you should take this matter up with the member of staff who set the assessment as soon as possible.

You are advised to read the **NOTES** regarding late penalties, over-length assignments, unfair means and quality assurance in your student handbook, which is available on Canvas - https://canvas.hull.ac.uk/courses/17835/files/folder/Student-Handbooks-and-Guides.

In particular, please be aware that:

- Your work has a 10% penalty applied if submitted up to 24 hours late
- Your work has a 10% penalty applied and is capped to 40 (50 for level 7 modules) if submitted more than 24 hours late and up to and including 7 days after the deadline
- Your work will be awarded zero if submitted more than 7 days after the published deadline.
- The overlength penalty applies to your written report (which includes bullet points, and lists of text you have disguised as a table. It does not include contents page, graphs, data tables and appendices). Your mark will be awarded zero if you exceed the word count by more than 10%.

Please be reminded that you are responsible for reading the University Code of Practice on the use of Unfair means (http://www2.hull.ac.uk/student/studenthandbook/academic/unfairmeans.aspx) and must understand that unfair means is defined as any conduct by a candidate which may gain an illegitimate advantage or benefit for him/herself or another which may create a disadvantage or loss for another. You must therefore be certain that the work you are submitting contains no section copied in whole or in part from any other source unless where explicitly acknowledged by means of proper citation. In addition, **please note** that if one student gives their solution to another student who submits it as their own work, **BOTH** students are breaking the unfair means regulations, and will be investigated.

In case of any subsequent dispute, query, or appeal regarding your coursework, you are reminded that it is your responsibility, not the Department's, to produce the assignment in question.

600084 Visualization - Assessed Coursework

0 Preamble

There are three exercises to be submitted electronically, including one scientific visualization exercise and two information exercises. Students can use the given data sets in Canvas and the practiced software tools in the Labs. Students also have the opportunities to make his/her own choice in part of the data sets and any software tools, as given in the following table:

	Data sets	Software tools
1 SciViz exercises	Use the given data sets	Use the practiced software, or choose your own software tools
2 InfoViz exercises	Use the given data sets, or choose your own data sets	Use the practiced software D3js, or choose your own software tools

A zip file of code (or state file) and a short report are required to be summited to the Canvas. The report just gives the names of the features and corresponding visualization images. No detailed description is required.

Assessment demonstrations will take place in the days following the submission, to a specified schedule. Anyone not attending the demonstration will have their course work mark capped at 40%, in line with the Faculty's policy on professionalism. One purpose of the demonstration is to check the work submitted is yours, so you should do each exercise on your own, and draw your own conclusions.

1 Scientific Visualization

1.1 SciViz exercise: 3D Volume Visualization

Demonstrate 3D visualization features using the software 'ParaView' to visualize the provided 3D data set 'disk_out_ref.ex2' in the field of aerospace and automotive engineering. The required features and marks are given in the following table:

Feature	Mark
Creating a Visualization Pipeline	3
Scalar visualization	3
Vector streamlines	3
Making Streamlines Fancy	3
Volume Rendering	3
Clip	3
Slice	3
Threshold	3
Discusses the findings	3

In the above SciViz exercise, you can choose your own software or you can use the practiced software 'ParaView', but the required features should be demonstrated with the provided datasets.

2 Information Visualization

2.1 InfoViz exercise 1: 2D/3D/Multidimensional

Generate a star plot (radar chart) using ‘D3.js’ or other tools (excluding simple tools, e.g. Excel) to visualize a given data set of running costs of hospitals with various number of beds, nurses and consultants. Identify and explain the relationship between the running costs and the variables.

2.2 InfoViz exercise 2: Temporal/Interaction

Generate a time series Candlestick Chart of Dow Jones Industrial Average using the given one month data set and ‘D3.js’ or other tools (excluding simple tools, e.g. Excel). The time series chart shows the daily low, high, open and close of Dow Jones stock. Each “candle” represents a single trading day.

For each of the above two InfoViz exercises, the required features and marks are given in the following table:

Feature	Mark
Correct mapping the variable values?	3
Choose the suitable representation?	3
Good shape, area and color?	3
Visualization is truthful?	3
Memorability, aesthetics?	3
Amount of interactions for engagement?	3
How well the visualization answer the question?	3
Discusses the findings?	3
Choose your own data set or tool (optional)?	3

General requirements of submission and demonstration are given in the following table:

General	Mark
Report and code submission	9
Professionalism	10

2.3 Make your own choice (optional)

Students have the opportunities to choose your own data sets and your own software tools (excluding simple tools, e.g. Excel) to replace part or all of above two exercises on Information Visualization. The exercises will use two different representations from three different types: 2D/3D/Multidimensional, Temporal/Interaction and Tree/Hierarchical/Network as given in the following table:

Types	2D/3D/Multidimensional	Temporal/Interaction	Tree/Hierarchical/Network
Representations	Proportional symbol map, contour/isopleth/isarithmic map, surface and volume rendering, unordered bubble chart/bubble cloud, parallel coordinates/parallel sets, radar/spider chart, etc.	Time series, Gantt chart, stream graph/ThemeRiver, arc diagram, polar area/rose/circumplex chart, etc.	General tree visualization, radial tree, hyperbolic tree, tree map, matrix, node-link diagram, dependency graph/circular hierarchy, subway/tube map etc.

Start by formulating the question:

Step 1.Pick a domain that you are interested in.

Some good possibilities might be house price in England, crime in the UK, the human genome, health around the world. Feel free to use examples you are interested in and familiar with.

Step 2. Pose a question that you would like to answer.

For example: How does house price vary with time and location? How does crime rate vary with income and county? Are there different patterns in different regions in human DNA? How the nutrition, disease, and health vary with income and environment?

Step 3. Find a database that has the data you need to answer your question.

The following webs contain a lot of open datasets:

https://researchguides.ben.edu/data

https://bigdata-madesimple.com/70-amazing-and-free-data-sources-for-data-visualization/

You may need to iterate through above steps a few times. It may be challenging to find both an interesting question and a dataset that has the information that you need to answer that question.

Step 4. After you have a question and a dataset, construct a visualization that provides an answer to your question. Think of a way to make the point as clearly as possible and use visualization techniques that effectively present the data. In this coursework, you can choose your visualization tools:

https://en.wikipedia.org/wiki/List_of_information_graphics_software

http://selection.datavisualization.ch

Prepare a notebook for the explanation in your demonstration. Before starting, write down the question clearly. And, as you go, maintain the notebook of what you had to do to construct the visualization. Include in the notebook where you got the data, and documentation about the format of the dataset. Describe any transformations or rearrangements of the dataset that you needed to perform; in particular, describe how you got the data into the format needed by the visualization system. After you have constructed the visualization, write a caption and a paragraph describing the visualization, and how it answers the questions you posed.