CASA0017: Web Architecture

Assessment Guidelines

You are required, as part of a group, to develop and produce an interactive website which showcases the skills you have acquired on this module. The website should be designed with contemporary web development tools and frameworks, be interactive accepting various user inputs and reacting to these inputs, and have a backend supported by a data driven backend or API written in Node.JS. The website should be easy to use, well designed and be tested on a small user base for. The theme, agenda and research vision of the website is left to the group's discretion but the website should tackle an issue and include a research question that the group is exploring. The website could be delivering a policy and agenda to inform the wider public on a theme that interests the group or presents information or data that is generated through interaction.

The assessment projects will be completed in groups of three to four students. Groups will be required to submit a website describing the analysis and visualisation of a dataset chosen by the group. Individuals are required to submit a short justification of their contributions to the group work, and the relative contributions of fellow group members.

Final grades will be awarded individually for this coursework. We expect all members of the group to contribute to the project and where groups are observed to have contributed equally, each member will receive the same mark for the website and report. Where it is clear that a group member has contributed less than their colleagues (as reported by team members), that individual's mark will be reduced accordingly through the peer review process.

Assessment Weighting

This coursework represents 100% of the overall module assessment.

Stages of Assessment

Group project pitch - (unassessed but required)
Group website - Interactive website with source submitted on GitHub - **60%**
Group report - 3,000 - 4,000 words (+/- 10%) - **40%**

Key Dates

Group pitches of project idea – **See Moodle**
Website submission – **See Moodle**
Group report submission via Moodle – **See Moodle**

Assessment Outline

Group Pitches – unassessed but required

5 min presentation with 3 minutes for questions

This presentation is a rough overview of the group work, with wireframes and storyboarding of the user experience, the identification of a relevant dataset, how they attempt to visualise the data and what the group aims to achieve at the end of the project. It is important to note that groups will not be held to what they present, and amendments can be made later on. The aim of this informal presentation is to ensure sure students have an achievable goal within the time frame and to source valuable feedback from tutors and the rest of the class.

This pitch is **not assessed but is a required element of the coursework**. Due to time constraints, we expect at least **2 people from each group to present** but we expect all members of the team to contribute to the presentation (i.e. be present at the presentation and able to answer question from the group).

Group Website – 60%
5000 equiv. word count

This website is the main component of the assessed group work for this course. Groups are required to create a website, with multiple pages that convey a story about a dataset or generate a live interactive visualisation that has been sourced by the group. As a bare minimum, this website should contain an interactive visualisation, a graph or map of data, a description of the analysis, a link to the source data, and a short explanation of the project.

The website should be interactive and pull data from a database linked to a server side component (through an API, MQTT or related technology). Analysis results may be pre-processed and results recorded in the database, then visualised on the website in the form of graphs, maps etc. You are expected to demonstrate the full extent of knowledge of frontend and backend website design and interactive visualisation skills you have been taught during this module. You are furthermore expected to make use of those tools taught on the course in completing the web and visualisation work (e.g. MySQL, Python, JavaScript).

Students are encouraged to use HTML/JavaScript frameworks (such as Bootstrap, Leaflet, Google Maps, ThreeJs etc.) to improve the functionality of the website. Students are reminded that the course is assessed on the skills and techniques learnt during the course, as such, we therefore expect all analysis to be performed using Python, extending to libraries beyond those taught during the course if necessary.

The source of the website and supporting backend service should be submitted through a GitHub repository showing the commit history of the members of the group.

Students are reminded that they should not download, purchase or use a commercial website theme as they are expected to write the HTML, Javascript and Node.JS within the group work as part of the assessment.

The website will be assessed by the following criteria:

- User Interface and Experience - **20%**
- Use of compelling and appropriate visualisation or interactive elements / methods - **30%**
- Exploratory, ‘storytelling’ nature of website - **20%**
- Design and Technical Reporting of API and Database Backend - **30%**

Group Report – 30%
3000 word written report (+/- 10%)

Each group must write a report about the design, development, and execution of the project. The reports should include a case of where the project fits in the wider context of research (with relevant references given) and data visualisation available on the web. The report should describe how the entire website was put together, including the collection and handling of data, user experience journey through storyboarding and wireframes design (UX), development of site, and design of the data visualisation, interactivity and API, databases used within the project. A conclusion should detail how, if given more time, they would improve the project.

A breakdown of how the report will be marked is as follows:

- Project context and aims (incl. reference to relevant literature and projects) - **20%**
- Design Rationale - **70%**
    - Design, storyboarding, outline of website
    - Data collection, handling, cleaning and management of dataset
    - Interactivity of site
    - Data visualisations
    - Technical integration between frontend and backend services
- Presentation and style of report - **10%**

Individual Personal Reflection
500 word written report (+/- 10%)

Each student is required to submit a personal reflection of their contribution to the group work, and provide an indication of the relative contributions of their team members. This part of the work is unassessed, but will be used in judging the participation of all team members in executing the group work. Although this work is unassessed, it is a required submission from all students.

The personal reflection should cover the aspects of the group work that you have contributed, both with respect to the website (including technical contributions) and report. You should also describe the contributions of all other team members in similar detail.

Alongside the descriptive aspect, you should provide a score out of 10 for each group member, reflecting how much you think they have contributed to the project. If you feel each team member contributed equally then give all of your peers 10 out of 10. If you feel two members have contributed equally to yourself, and one less so, assign two peers 10, and the other a lower mark indicating their relative effort. These marks will contribute towards the assigning of marks to your team members.

The reflection should be personal, and should not be a collaborative effort conducted with some or all other members of the group.

If you have any major issues within your team you should contact the module leader Steven Gray - steven.gray@ucl.ac.uk.

Design Inspiration

Examples of Good Web Design

Here are a few examples to get your minds working and in the right mindset. We do not expect the level of quality or detail that some of these projects go into. However, this list should serve as a guide of the types of websites we are looking to the groups to create and types of visualisation we are looking for:

- How Americans get to Work - http://flowingdata.com/2015/01/20/how-americans-get-to-work

Web Frameworks

Here are a few frameworks we expect students to take advantage of to help create their websites:

- Bootstrap - https://getbootstrap.com
- Yeoman - https://yeoman.io
- Bower - https://bower.io
- Webpack - https://webpack.js.org
- npm - https://www.npmjs.com
- Angular - https://angular.io
- jQuery - https://jquery.com
- Express - https://expressjs.com

API Design

- API Design Guide - https://apiguide.readthedocs.io/en/latest/build_and_publish/documentation.html
- Swagger - https://medium.com/bb-tutorials-and-thoughts/how-to-add-swagger-to-nodejs
- Best Practises - https://stackoverflow.blog/2020/03/02/best-practices-for-rest-api-design

Datasets

We would encourage groups to find an interesting dataset that you all want to work on and use the following examples of good website design. Here are a few examples in case you are struggling to find one.

Data Sets

- Awesome Public Datasets - https://github.com/awesomedata/awesome-public-datasets
- NYC GPS taxi data - http://chriswhong.com/open-data/foil_nyc_taxi
- Carbon Intensity API - https://api.carbonintensity.org.uk
- Yelp dataset - https://www.yelp.com/dataset
- UK Land Registry house sales data - http://landregistry.data.gov.uk
- Stop and Search Data by US State - https://openpolicing.stanford.edu/data
- Traffic Accident and Traffic Flow data for 16 years - https://www.kaggle.com/daveianhickey/2000-16-traffic-flow-england-scotland-wales/settings
- Real-time crime data in Seattle - https://data.seattle.gov/Public-Safety/Seattle-PoliceDepartment-911-Incident-Response/3k2p-39jp
- Various FOI data releases can be found on WhatDoTheyKnow - https://www.whatdotheyknow.com/list/successful
- Crime Data in Buenos Aires - https://github.com/ramadis/delitos-caba
- Lots of open data for Bahrain - https://datasource.kapsarc.org/pages/home
- City Cellular Traffic Map - https://github.com/caesar0301/city-cellular-traffic-map
- Flight data (requires Google account) - https://bigquery.cloud.google.com/table/bigquery-samples:airline_ontime_data.flights

- Beijing GPS taxi data - http://research.microsoft.com/apps/pubs/?id=152883
- International Migration data -http://www.global-migration.info
- Plant Diversity in American National Parks Biodiversity - https://www.kaggle.com/nationalparkservice/park-biodiversity/data
- Wildlife Trade Database - https://www.kaggle.com/residentmario/cites-wildlife-trade-database/data
- H1-B Visa Petitions - https://www.kaggle.com/nsharan/h-1b-visa/data
- Baltimore Crime Data - https://www.kaggle.com/sohier/crime-in-baltimore
- Chicago Crime Data - https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present/ijzp-q8t2
- AWS Honeypot Cyber Attack Data (with originating locations) - https://www.kaggle.com/casimian2000/aws-honeypot-attack-data/data
- Vancouver Crime Data - http://data.vancouver.ca/datacatalogue/crime-data.htm

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Steven Gray, September 2024