ITNPBD3 Assignment Spring 2024

University of Stirling

IMPORTANT!! **You must complete this assignment working entirely on your own. You must not discuss your work with your classmates or anybody else. Do not show your work to anybody. Sharing your work with another student or working together with another student on an assignment is considered academic misconduct and the penalties when you are caught can be severe. Furthermore, you must reference ALL the materials you use to complete the assignment. You may reference materials to justify your answers, but you should not look up a design online. Do not copy and paste from any other sources.**

Here is the assignment.

Choose a website that you use. It could be social media, or e-commerce, or entertainment, or anything you like. In this assignment, you will be asked to imagine the database design that is behind the website you choose, so read the following description carefully and make sure you pick a website that is suitable for all the questions. Be very specific about the website, and provide its URL. Do not just say "I chose an e-commerce site". Pick a specific one (for example: https://www.wiggle.co.uk/).

Imagine you are asked to design the database that drives the website you chose.

1 Relational Design

Describe the design process you would follow to start the database design process. Give examples from your chosen website to illustrate your points. Describe the decisions you would need to make and the things you would need to consider.

Now chose three entities that would need to be represented in your website's database and draw an ER diagram that illustrates their relationships. It doesn't matter if more entities would be needed, just include three of them for now.

Now convert your ER diagram into a database schema design. Use any representation you choose to describe the tables and constraints needed to represent your entity relationship design.

Finally, consider three interesting queries that would need to be executed by the database and explain what they need to do. Then write the SQL code required to run them.

2 NoSQL Design

If your website serves a large global market, it probably needs something more flexible than a relational database. Explain the limitations of a relational database and how the use of a distributed document store such as MongoDB would help you overcome those limitations. Make sure you refer to the website you chose to illustrate the points you are making.

Now provide a detailed document model for a MongoDB store for the data you identified in part 1. Give example documents and explain the possible solutions you would have when replacing the relational elements such as foreign keys and normalisation. Describe the decisions you would need to make when distributing the database across a cluster and give examples based on the website you have chosen.

Finally, as before, suggest three queries that might need to be made of the database and give the MongoDB syntax required to carry them out.

Submission

See the module page for submission details and dates. Look at the Turnitin score when you submit. It should be quite low. If it isn't, ask yourself why. Have you copied from the internet? Have you worked with a friend? These are both forms of academic misconduct and could cause you to fail your whole degree. It is better to get a low grade honestly than to cheat and get caught.

Marking

Your work will be marked against the University Common Marking Scheme, which you can find here

https://www.stir.ac.uk/about/professional-services/student-academic-and-corporate-services/academic-registry/academic-policy-and-practice/quality-handbook/assessment-policy-and-procedure/appendix-2-postgraduate-common-marking-scheme/

Note in particular, that you MUST illustrate your answers with reference to the specific website you have chosen. It is not enough to just give textbook definitions as your answers. You must show analysis and insight into how the textbook knowledge would be applied to build a solution for your chosen application,