

School of Computing

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Date Issued	2nd December 2020
Code	DMAN
Title	Data Management



Schedule and Deliverables

Item	Value	Format	Deadline	Late deadline Ecf deadline
Coursework	50%	<ul style="list-style-type: none">- One report file (.pdf)- A single .pdf file containing the output from tasks 1 - 3	5th February 2021 23:00 [GMT]	19th February 2021 23:00 [GMT]

Notes and Advice

- The [Extenuating Circumstances procedure](#) is there to support you if you have had any circumstances (problems) that have been serious or significant enough to prevent you from attending, completing or submitting an assessment on time.
- Late work: Work submitted after the deadline, but within 20 working days will be capped at 40% for that task unless there are exceptional circumstances. (See MyPort for the exceptional circumstances procedure). Any submissions made after this time will receive 0% for that task.
- [ASDAC](#) are available to any students who disclose a disability or require additional support for their academic studies with a good set of resources on the [ASDAC moodle site](#)
- The University takes plagiarism seriously. Please ensure you adhere to best practice to prevent [plagiarism](#).

- Any material included in your coursework should be fully cited and referenced in APA format (seventh edition). Detailed advice on referencing is available from <http://referencing.port.ac.uk/>
- Any material submitted that does not meet format or submission guidelines, or falls outside of the submission deadline could be subject to a cap on your overall result or disqualification entirely.
- If you need additional assistance, you can ask your personal tutor, student engagement officer ana.baker@port.ac.uk , academic tutor xia.han@port.ac.uk or your lecturers.

Coursework Overview

The module is being assessed by coursework only, there will be two submissions. The dates will be published on Moodle. Both submissions will be electronic via a dropbox link on Moodle.

Tasks

You have been asked to develop the database that you developed as part of coursework 1 as a NoSQL system, specifically a MongoDB database. Using a document store database is a perfect way of storing this type of data as there is no set number of ingredients and no set number of steps required to create the dishes. (See the following example recipes to see what we mean by this).

You will be using MongoDB to provide the backend database for this service. You can use either the system on your Google virtual machines or another system such as your own installation of MongoDB or on the cloud such as AWS.

Example recipes

(All recipes have been obtained from BBC Good Food,
<https://www.bbcgoodfood.com/>)

Name

Ginger & caramel apple puddings

Description

Quintessentially British ingredients make up Frances Auger's comforting puds, impressing the judges of Britain's Best Pud

Time

Prep: 30 mins

Cook: 20 mins

Serves: 6

Nutrition

Kcal 470 fat 28g saturates 17g carbs 53g sugars 39g fibre 1g protein 4g salt 1.07g

Ingredients

For the caramel apples

50g butter, plus extra for the ramekins
1 large cooking apple, peeled, cored and finely chopped
75g light brown muscovado sugar

For the puddings

140g butter, softened
100g light brown muscovado sugar
1 egg
125ml buttermilk
2 balls preserved stem ginger, finely chopped, plus 1 tbsp syrup from jar
100g plain flour, plus extra for dusting
1½ tbsp ground ginger
½ tsp baking powder
½ tsp bicarbonate of soda
icing sugar, for dusting
cream or custard, to serve

Method

1. Heat oven to 180C/160C fan/gas 4. Lightly butter and flour 6 x 8cm deep ramekins, tapping out excess flour. Heat the butter in a pan until foaming, add the apple and cook for 1 min on a medium heat. Toss in the sugar and cook until dissolved. Divide between the ramekins.
2. For the puddings, beat the butter and sugar together with an electric whisk until fully combined. In a separate bowl, mix together the egg, buttermilk, chopped ginger and ginger syrup, then stir this into the butter mixture. Fold in the flour, ground ginger, baking powder, bicarbonate of soda and a pinch of salt. Divide between the ramekins so they are filled to 1 cm below the top. Place them on a baking tray and bake for 20 mins, until golden and risen.
3. Serve warm, dusted with icing sugar. Accompany with cream or custard.

Name

Cottage Pie

Description

This great-value family favourite freezes beautifully and is a guaranteed crowd-pleaser

Time

Prep: 35 mins

Cook: 1hr 50 mins

Serves: 10

Nutrition

Kcal 600 fat 34g saturates 16g carbs 40g sugars 7g fibre 4g protein 37g salt 1.15g

Ingredients

3 tbsp olive oil
1¼kg beef mince
2 onions, finely chopped
3 carrots, chopped
3 celery sticks, chopped
2 garlic cloves, finely chopped
3 tbsp plain flour
1 tbsp tomato purée
large glass red wine (optional)
850 ml beef stock
4 tbsp Worcestershire sauce
few thyme sprigs
2 bay leaves

For the mash

1.8kg potatoes, chopped
225 ml milk
25g butter
200g strong cheddar, grated
freshly grated nutmeg

Method

1. Heat 1 tbsp olive oil in a large saucepan and fry 1¼ kg beef mince until browned – you may need to do this in batches. Set aside as it browns.

2. Put the other 2 tbsp olive oil into the pan, add 2 finely chopped onions, 3 chopped carrots and 3 chopped celery sticks and cook on a gentle heat until soft, about 20 mins.
3. Add 2 finely chopped garlic cloves, 3 tbsp plain flour and 1 tbsp tomato purée, increase the heat and cook for a few mins, then return the beef to the pan.
4. Pour over a large glass of red wine, if using, and boil to reduce it slightly before adding the 850 ml beef stock, 4 tbsp Worcestershire sauce, a few thyme sprigs and 2 bay leaves.
5. Bring to a simmer and cook, uncovered, for 45 mins. By this time the gravy should be thick and coating the meat. Check after about 30 mins – if a lot of liquid remains, increase the heat slightly to reduce the gravy a little. Season well, then discard the bay leaves and thyme stalks.
6. Meanwhile, make the mash. In a large saucepan, cover the 1.8kg potatoes which you've peeled and chopped, in salted cold water, bring to the boil and simmer until tender.
7. Drain well, then allow to steam-dry for a few mins. Mash well with the 225 ml milk, 25g butter, and three-quarters of the 200g strong cheddar cheese, then season with freshly grated nutmeg and some salt and pepper.
8. Spoon the meat into 2 ovenproof dishes. Pipe or spoon on the mash to cover. Sprinkle on the remaining cheese.
9. If eating straight away, heat oven to 220C/200C fan/gas 7 and cook for 25-30 mins, or until the topping is golden.
10. If you want to use a slow cooker, brown your mince in batches then tip into your slow cooker and stir in the vegetables, flour, purée, wine, stock, Worcestershire sauce and herbs with some seasoning. Cover and cook on High for 4-5 hours. Make the mash following the previous steps, and then oven cook in the same way to finish.

So, as you can see, we have different numbers of ingredients and different numbers of steps involved in assembling the dishes. Therefore, this type of project lends itself to the use of a NoSQL system, especially a document store system such as MongoDB.

Task 1

Create a NoSQL database that will store recipes. You can either download recipes from the internet, from a book or you can create your own recipes. (Family favourites can be used.) You will need a minimum of 10 recipes in your database. Each recipe will need to be stored as a single record in a single collection in the database. You will need to provide the code that you used to create the database and store the records. You need to provide a minimum of 10 recipes. This will allow you to create the 5 queries needed for task 2.

Task 2

Write 5 queries that will retrieve recipe information from your database. Think of the sort of things that a user will want to be able to do. For example a user might:

- Look in the fridge and find that they have some raw chicken and need a recipe that uses chicken.
- Need a recipe for a main meal.
- Need a recipe that takes less than 60 minutes of preparation and cooking time.
- Want to find a recipe that will be suitable for a person who has a food intolerance or has certain preferences about the ingredients, for example a vegetarian menu.
- Need to look for a recipe or set of recipes that go well together. For example you may want to create a meal that is based on recipes from one part of the world such as a 3 course Chinese meal.

Provide the code that you used to create the queries and a screenshot of each query when it is run.

Task 3

Write a reflective report discussing how you developed the database, the record structure and how you chose the queries. [300 - 500 words]

Further information

- ☐ We do not need to consider the technology that may be used to provide the front end. There is another team working on this part of the project.
- ☐ We do not need to consider the networking required to get data requests and responses to and from the database.

Marking Guide

Database / record development 20 marks

16 - 20 marks: Sensible record structure that provides a good understanding of the JSON structures. Consistent use of a suitable structure for each record

7 - 15 marks: Some consideration of the JSON structure used but some inconsistencies across the records in the database.

0 - 6 marks: Little consideration of JSON structures.

Queries 25 marks

For each query (5 x 5 marks) depending on:

- The level of complexity of the query.
- The query use of the query to an end user.
- Good differentiation from other queries.

Reflective report 5 marks

3–5 marks: a good reflection, relating the development of the coursework and the student's learning.

0–2 marks: trite, weak or no reflection.

Things to consider

- Remember that a document store such as MongoDB allows for embedded documents and arrays. This allows the data to be structured into multi-layer documents.
- Each record can be created in such a way as to make it unique; each record can be structured to look like no other record in the same collection. (This is possibly the greatest strength of NoSQL databases.)
- Create a range of different types of recipes to make it easier to create different queries
- Your coursework must be submitted as a PDF file by the deadline shown on the front sheet.
- We need to see the code you used to