Databases – DBAS6211

Practical Assignment 1

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THE INDEPENDENT INSTITUTE OF EDUCATION

MODULE NAME:	MODULE CODE:
DATABASES	DBAS6211/d

ASSESSMENT TYPE: ASSIGNMENT 1 (PAPER ONLY)

TOTAL MARK ALLOCATION: 100 MARKS

TOTAL HOURS: 10 HOURS

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I have correctly cited all my sources of information.	
My referencing is technically correct, consistent, and congruent.	
I have acted in an academically honest way in this assessment.	

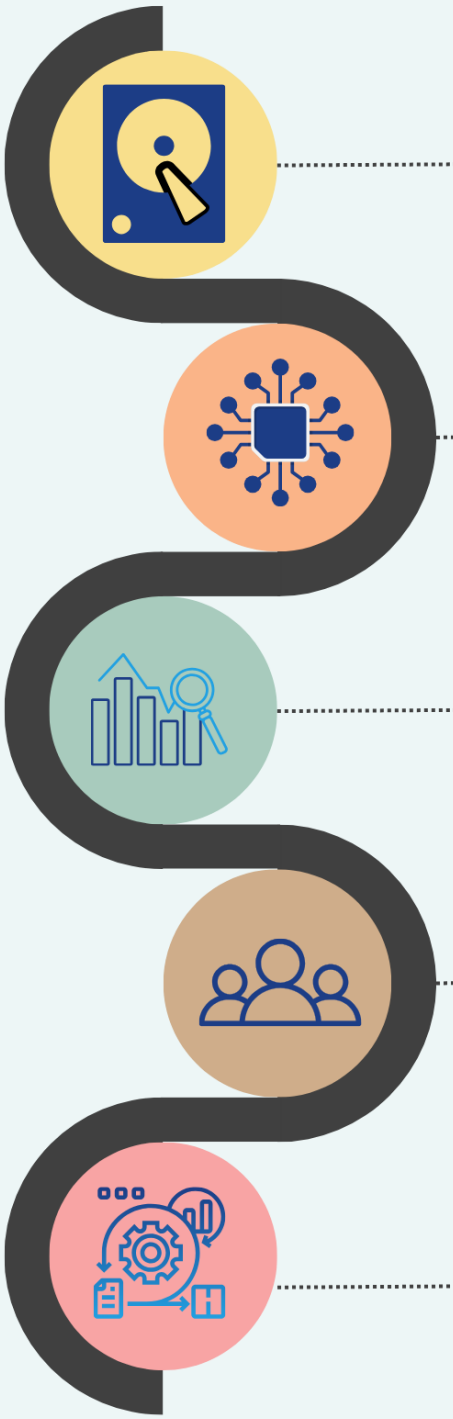
Question 1:

DATABASE MANAGMENT SYSTEM (DBMS)

What is a Database Management System?

A database management system is a type of system which is designed and used specifically to store, define, retrieve and manage data within a database. However, this system does not exist in isolation; rather it forms part of a larger ecosystem within an orginisation. This system can be useful in the management of the data associated with Thato's project by providing a centralised location for the retrieval and manipulation of all data related to his course marketplace website. Especially since he will be working with a large amount of data.

Five Elements of a Database Management System



HARDWARE

The software of the DBMS needs to be stored on and run off of physical components; these components make up our hardware. These include servers, storage devices, network infrastructure, and other physical components necessary for running the DBMS. The DBMS Thato plan's on using to manage the course marketplace's database needs to be installed on a physical device such as a server.

SOFTWARE

The software component is responsible for managing data storage, retrieval, and manipulation. It is also known as the database engine. It is the "logic" of the DBMS. Without it the DBMS would not exist. An example of a database engine that that Thato can use is MySQL.

DATA

Data refers to the raw, unprocessed information that will be stored in our DBMS and make up our database. Data falls into two categories user data or metadata (data about our data - defines how our user data will be stored as well as the data types.). Without any data our DBMS would be redundant. An example of data that can be stored in our DBMS is the name of courses, course info and user profile data.

PEOPLE

People are the component which will interact directly with our DBMS. Without people to give our DBMS commands to execute it would server no purpose. Different categories of people will interact differently with our DBMS, for example, the DBMS admin will interact with our DBMS to ensure it is running smoothly; where an end user will use our DBMS to retrieve the information of the courses stored in our database

PROCEDURES

This component refers to the rules that are responsible for outlining how a database should be managed. This is especially important for larger orginisations where multiple people have access to our DBMS. For example, procedures can define which data should be marked as sensitive and should be encrypted such as the personal details of a person enrolling for a course on the course marketplace website.

Question 2:

Q.2.1) A relational database is best suited for storing concise information such as course details. Relational databases are built upon tables which ensures the atomicity, consistency, isolation, and durability of the information being stored in the database. This can be achieved by establishing relationships between the different entities within our database and creating relationships between them.

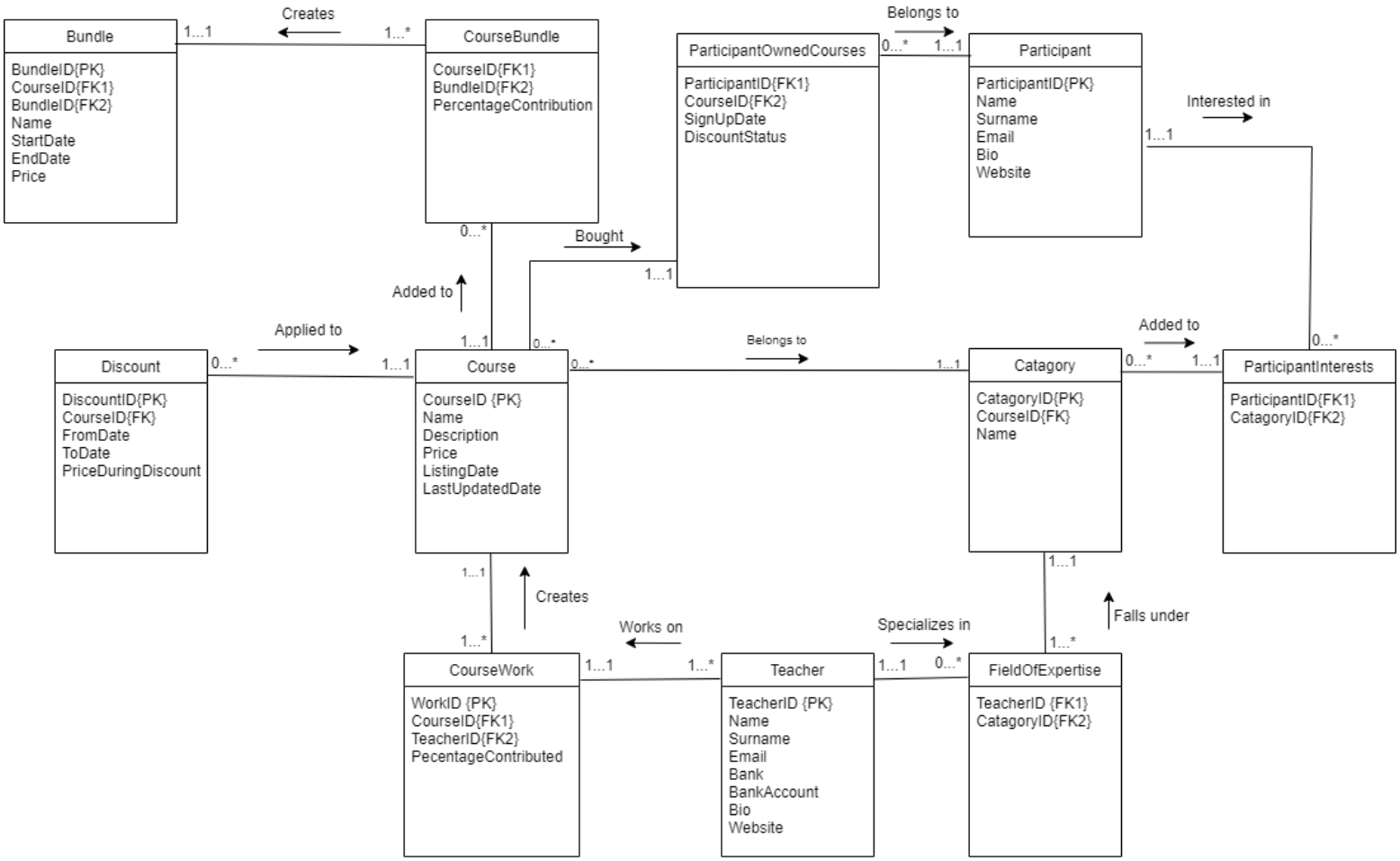
Furthermore, the course information we expect our database to encounter is inherently structured. Relational databases are best suited for handling large volumes of structured data.

Q.2.2) A NoSQL database is best suited for storing media files such as course videos, pictures and files. Non-relational databases, such as NoSQL, do away with table-based designs and utilize identification keys, in key-value pairs, to store data (Győrödi, et al., 2020). This design allows them to prioritise high performance, which improves data availability and the performance of the database.

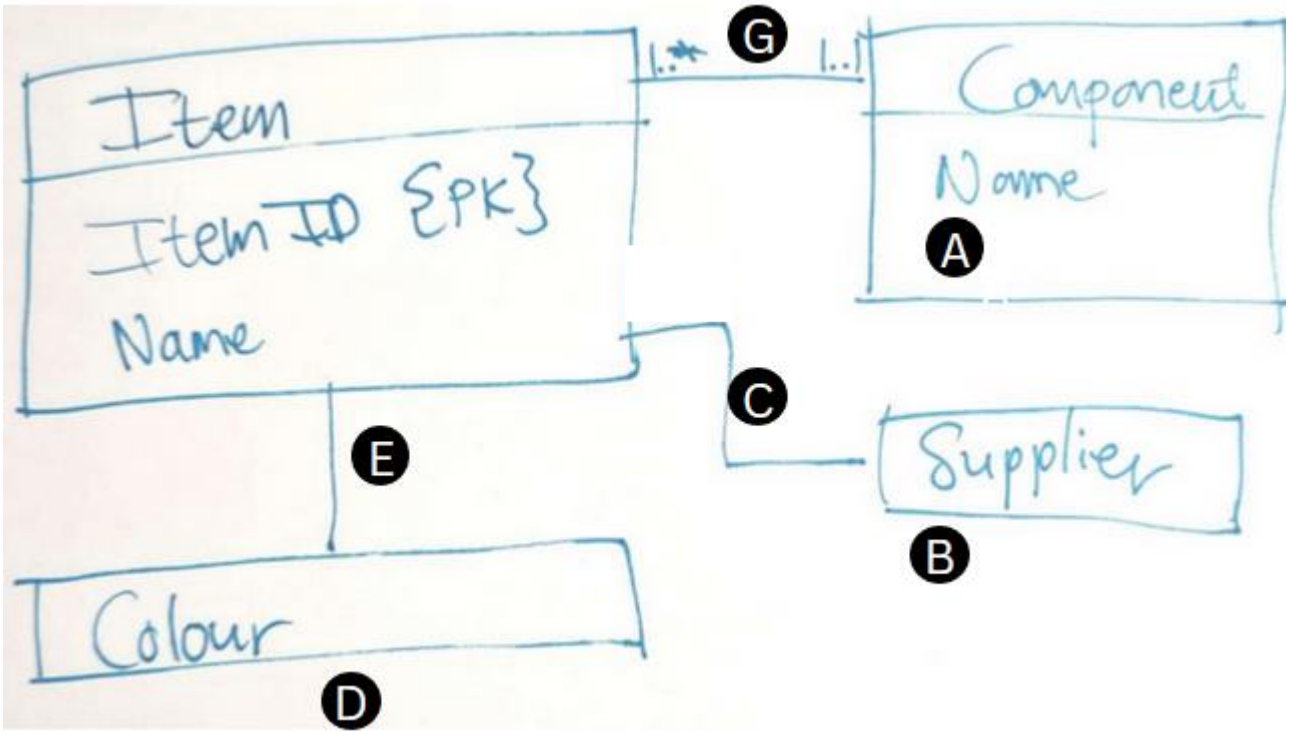
Non-relational databases were developed to handle large scale data, like the media files related to Thato's coursework marketplace, and they can scale well as the database increases while still being able to ensure high availability of content to end users.

Question 3:

Entity Relationship Diagram for Course Marketplace Website



Question 4:



1. Under the Component entity, at the point marked “A”, Thato needs to add a foreign key for ItemID.
2. Under Component entity, at the point marked "A”, Thato needs to add an attribute called “Quantity” to store the amount of each component that will be used to make a specific product.
3. At the point marked “G” Thato needs to add an arrow which shows the relationship between the two entities Item and Component. In this scenario, he can say “Creates” with an arrow pointing from Components to Items.
4. At point B Thato needs to add the attributes of the Supplier entity which are Name and Address
5. At point C Thato needs to redraw the line from the Supplier entity to the Component entity since there is only a relationship between Supplier and Component and not Supplier and Item.
6. From the newly drawn line linking Supplier and Component That needs to indicate the multiplicity of the relationship between the Component and Supplier entities.
7. At point B Thato needs to draw an arrow pointing from the Supplier entity to the Component entity and add “Bought from” next to the arrow.
8. At point E Thato needs to indicate the multiplicity of the relationship between the Item and Colour entities.
9. At point E Thato needs to add an arrow pointing from the Colour entity to the Item entity and “is allocated to” next to the arrow to indicate the nature of the relationship between the two entities.
10. At point D Thato needs to add a primary key under Colour named ColourID, then add the ColourID foreign key as an attribute under the Item entity.

Reference List:

- Győrödi, C., Dumşe-Burescu, D., Zmaranda, D., Győrödi, R., Gabor, G., & Percherle, G. (2020). Performance Analysis of NoSQL and Relational Databases with CouchDB and MySQL for Application's Data Storage. *Applied Sciences*, p.8524.