DATABASE RESEARCH

SUBMISSION 1

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Contents

Describe the stages in database development including design, data-modelling techniques and implementation.

The stages for database design are:

Planning

This is where considerations are given towards what the goals of the database are, and whether or not it is feasible to actually put forward the resources to create a database.

Requirement gathering

This is to determine precisely what the database will be expected to do, excluding implementation details. It is helpful to conduct interviews and to come up with a mission statement to which can later be referred to, to help keep the project on focused on its original intentions.

Conceptual design

Begin data modelling and transferring requirements into a structure. It is here that an ER diagram will be created.

Logical design

Determine the rules and constraints that need to be applied to the conceptual design

Physical design

Begin actual development of the database within the chosen Database Management System (DBMS). Utilize the conceptual and logical designs.

Construction

Build the database components using the designs and structures that you have previously outlined.

Implementation & rollout

Deploy the database and provide training on how to use the system.

Ongoing support

Provide bug fixes and additional features.

Data modelling techniques include Entity Relationship (ER) Diagrams, UML Class diagrams and Database dictionaries.

Entity relationship diagrams are created by first defining which entities are going to become Tables. This is thought of in a similar way to creating classes and properties in a programming language. The table will be named reflecting the plural of whatever the entity is called. For example if we were modelling a group of different cats wearing hats, the entity is “cat with hat” and therefore the table would be named “CatsWithHats”.

The key attributes are separated from the non-key attributes within the square.

Once all tables have been defined, relationships between the different tables can begin to be established by connecting lines between each table and assigning cardinality to each end of the relationship. During this phase, there may be linking tables added to facilitate many to many relationships.

Once the diagram is completed, it is then put through the normalization process to find and fix redundant fields, and other problematic areas.

Discuss relational database management systems and naming conventions for database design.

Relational Database Management Systems (RDBMS) are programs that facilitate the user to create, update and read from a relational database. The most common language used for database access is Structured Query Language (SQL)

Naming conventions for database design are adhered to so that the creation and maintenance is kept consistent and prevent confusion when working with the database.

These conventions include maintaining consistent naming styles whether they are camel case or pascal case, refraining from the use of special characters or whitespace in the name and naming tables using a plural name reflecting the entity that the table represents.

Describe at least two procedures of creating entities and attributes to populate fields including SQL

Using SQL to create an entity can be done using the following code:

```
CREATE TABLE CatsWithHats (
        CatID int,
        CatName varchar(50,
        HatColour varchar(20),
        HatType varchar(50),
);
```

This will create a table named CatsWithHats with fields for CatID, CatName, HatColour and HatType.

To populate data into our new table CatsWithHats we could write the following SQL code:

```
INSERT INTO CatsWithHats
VALUES ('1', 'Mr Whiskers', 'Blue', 'Fedora'),
        ('2', 'Fuzzy Mcfuzzface', 'Green', 'Sombrero');
```

The above code will add the following 2 records to the CatsWithHats table;

CatID	CatName	HatColour	HatType
1	Mr Whiskers	Blue	Fedora
2	Fuzzy Mcfuzzface	Green	Sombrero

Using SQL Server Management Studio, a new entity can be added by navigating to the Tables folder in the correct database, right clicking on the Tables folder and selecting New Table. This will display a blank table, where fields, names, keys and data types can be defined.

By navigating inside the tables folder, right clicking on the new table and selecting “edit top 200 rows”, records can be added and manipulated.

Summarise open platforms focusing on browsers and databases, and discuss how the internet relates to web servers, security restrictions and clients.

Open platform software enables users and developers to utilize some functionality through the software API’s. This means that new software can be built and utilize the open platform software as third party functionality.

In the case of browsers and database software, in addition to being free to use, open platform software implies that a developer could extend the functionality and alter existing functionality.

The internet is a global network which facilitates the connectivity of all hardware and software systems connected to the internet. Web servers are computer systems which host data such as web pages. Clients are the computer systems which send a request via the internet to a particular web server, which will read the request and then possibly return the requested information (such as the data making up a web page).

Security is implemented in various ways; passwords at the server end can ensure that data is only returned if the password given matches, and two factor authentication is the combination of two passwords from different computer systems.

The database itself may be organized so that certain details are kept separate from more accessible database items. Encryption can also be employed so that the data can only be decrypted by the intended recipient.

At the client end, security is also implemented by using a firewall, which monitors incoming and outgoing data, and determines the legitimacy based on a set of predetermined rules.

Security is also enhanced by regular software updates, checks and backups.

What accessibility features can be provided for audiences with special needs when working with databases?

Microsoft offers the following programs for accessibility:

- Programs that enlarge or modify the colour of information for people with visual impairments
- Programs that describe information on the screen in Braille or that provide synthesized speech for people who are blind or have difficulty reading.
- Hardware and software utilities that modify the behaviour of the mouse and keyboard.
- Programs that enable people to type by using a mouse or their voice.
- Word or phrase prediction software that let people type more quickly and with fewer keystrokes.
- Alternative input devices, such as single switch or puff-and-sip devices, for people who cannot use a mouse or a keyboard.

It is important to consider the compatibility of these types of programs when building databases and websites so that they will function correctly.

Other things to consider for accessibility are things like alternatives for text, such as audio descriptions.

References

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