



Logical Database Design

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ABSTRACT

The design, development and implementation of every database are mainly to serve as an information hub for organisations. The database is a key factor to the success of most organisations. The process of designing a database usually takes numerous steps which involves the use of various tools and techniques during the design so as to ensure that the database provides data that is of good quality and correct at the same time. This write up is going to contain a reflection on an assignment submitted for the design of a database for a company called courtesy active mobile phones. Various database design tools such as class diagrams use case models and Entity relational diagram were used for the design of the database.

INTRODUCTION

Database developers are mostly focus on the data quality in order to use it in a high performance. Usually a good data will better executed this is why database users are trying to correct those data that they use. On the other hand, using tools and techniques is another feature that a user concentrates during work on that database especially design it. Because this design will determine about the process of which data will be used. Entity relationship diagram is an example of those techniques which acts as a blueprint for designing and maintaining the database. As well as, regarding some methods users can evaluate the databases such as, the behaviours of the databases, quality of the Data derived from the database, and the quality of the process in which the database operates.

This report is going to contain analysis of how the tools used for the design of the database would help enhance the quality and correctness of the data in the database. The write up would analyse the quality and correctness in database and to understand how it would add to the integrity of data from the database.

THE DESIGN OF A DATABASE

The use of file based traditional way of keeping information by organisations was usually accompanied by lots of problem and inconsistencies. The traditional way of storing information usually takes long time to store and retrieve data which involves lots of duplications and inconsistencies. The use of Entity relational Database by the present day organisations has eliminated most of the problems caused by the traditional database system (Vitalie, 2012).

The database system that is being used in the present day by most organisations has overcome some of the fundamental issues that arise as a result of using the traditional based system. The new database been used provides a relationship between logical aspect of when the database is designed as well as the physical aspects of the database when it is been designed.

The design of a database usually consists of conceptual design which is used to define a database schema. The conceptual design is also used in an Entity relational model with the use of Entity relational model through the use of entities and attributes. The entities in the database are what is being transforms into various tables in the database, these processes occurs in the logical design phase of the database system

The conceptual design of a database is used to define a database schema and it is used in an entity relational model using entities and attributes to develop a high level of abstract representation. The entities become tables in the database in the logical design process before moving to the physical design of the database which determine the structure and method in which information can be accessed from the computer (Teorey et al ,2006)

The structure and behaviour of a database is determined during the design process. Designing a database can become complex, especially if the database belongs to a large organization. To design a system that will take care of the information need of the organization a good database need to be designed which would start with a set of data that would be included in the database and the problems you would want to use the database to solve (Ceri al ,1983).

QUALITY OF A DATABASE

A Database is used by most organisations as a very critical tool to keep a record of all transactions and activities that take place in their organisations so as to assist the organisation in reaching its vision, therefore the quality of a database cannot be overemphasized and the data must be of high integrity all the time.

The major goal of developing a database in an organisation is for the easy storing and retrieval of data in an orderly, consistent and efficient way. The database also has to be designed well so that the data from the database would be correct and of high quality when used.

For the design of the database for courtesy active mobile phones, Use case models, class diagrams and Entity relationship diagram were used so as to improve the quality and integrity of the data from the database. The overall quality does not depend on the data quality alone, but also on the behaviour of the database and the process in which the database is accessed and retrieved.



According to Hoxmeier (1997) so many factors are to be considered when determining database quality. Some of the qualities are mentioned that have to be met for a database quality are performance and normalization, integrity of the data and quality of the data from the database.

DATABASE EVALUATION

Every database is designed so that the data stored and retrieved are consistent, correct a deficient at all times. The Design of a database usually concentrates on two factors, those two factors are the data and the process in which the data is been used. The introduction of new methods in which database would be designed and the fact that the data from the database would continue to increase has brought about the introduction of more frame works for the evaluation of the data in the database (Elizabeth,1985). Below are some of the factors that can be used for evaluating the quality of a database

THE BEHAVIOUR OF THE DATABASE

The database has evolved over the years as not just a tool for storing data, but also used for complex analytics and analysis which decisions carried in organizations are based on. The behaviour of the database is done with conformance to the requirements of the client. The knowledge of the organization which the database is been designed for using rules and models that would enhance the quality of the database.

The design process of the database that involves the use of tools, such as Data flow diagrams, Entity relationship techniques so that what and how the database would work, and function could be seen. This would give a pictorial view of the database and understand how it would work and function before it is even developed and implemented.

QUALITY OF THE DATA DERIVED FROM THE DATABASE

Easy retrieval and storage of a data from the database is one of the reason why database is been designed. The data in the database has to be trustworthy, accurate and easily accessible Terry, (john and Jeff 2004). These are qualities that every data coming out from a database.

The quality of data in the database is very important during the process of its design so that those using the database would trust and have confidence in the data they are using

QUALITY OF THE PROCESS IN WHICH THE DATABASE OPERATES

The database is used by the majority of organisations to make vital decisions that affects the growth and sustenance of their organisations. The process that is involved with the easy use of the database is very vital to the database because it promotes efficiency and effectiveness in the database. The quality of processes in the database depends on the user requirements. The quality process in the database focuses on the effective functionality of the database and that the data value in the database are usually identified.

BENEFITS OF USING ENTITY RELATIONAL DIAGRAM, USE CASE MODELS AND CLASS DIAGRAMS IN THE DESIGN OF A DATABASE SYSTEM

ENTITY RELATIONSHIP DIAGRAM

Entity relationship diagram is a technique that is used in capturing all the information to be presented and needed for the successful and good operations in organizations.

The design of an entity relational model is carried out during the conceptual phase of the database design and it is where the potential users of the system can be involved and contribute in the designing of the system.

The Entity relationship model is important because it gives a good account of the information need of the organisation. It acts as a blueprint for designing and maintaining the database and makes it easier to upgrade of the system in the future.

The Entity relationship model is supported by good standards which aids communication and transfer of data in the organisation. The Entity relationship diagram has been in use for a very long time and it can be used to make sure that the data from the database is correct and of high quality.

Entity relation diagram ensures that there is no duplication of data in the database and also shows how the various entities in the database communicate with one another and the relationship between them (Connolly and Begg ,2010). During the design of our database for our assignment, the Entity relational diagram helped us in identifying the necessary entities for our database and the relationships between them. The Entity relational diagram also shows how complex and simple transactions would be done in the system and also where ambiguities would happen it was easy to resolve it

A good database has to be accurate, consistent, fast and easily accessible. All these factors that play an important role for a database could be ensured using an Entity relational diagram (Batini et al, 1989).

The Entity relational diagram consists of entities which are real objects and the entities consists of attributes. The attributes in the database are the properties that describe the entities. The Entity relational diagram makes the entities in the database participate through the attributes that are in the database.



The Entity Relational diagram gives a visual view of how operations in the database are going to communicate with one another when the final implementation is done. This is done through the entities and their attributes which are explicitly represented in the database.

CLASS DIAGRAM

The class diagram is used in the design of a database to ensure that the data in the database is correct and of high quality. It is used to represent how the system is going to interact with one another when fully designed and implemented (Riordan, 2005)

According to Bruegge and Dutoit (2004) the class diagram is an important tool for Object Oriented analysis and is used to represent real world objects. The Class diagram represents the proposed systems and their relationships and the objects that are in the classes. The use of Class diagram in the design of a database is done so that the process quality of the database is ensured as it is used to design the data that is going to be accessed and stored. A Class Diagram classifies classes of objects with the same attributes so as to model the structure and behaviour of the database.

Colpoys et al (2001) said that the class diagram consists of a super class and a subclass. This hierarchy is very important because it reduces complexities in the database. It also makes searching and querying through the database much easier to do it. The class diagram is a very important tool in the database design because it ensures that the database is performing efficiently with no ambiguity. The class diagram ensures that the process of using the database is done consistently and effectively.

USE CASE

A use case diagram is used to represent all the functions of the system that is to be designed. It helps in pointing out the functionality of the system and those who are going to perform those roles in the system when developed.

The use case diagram ensures that changes could be made easier as developer use it to understand what would happen if something was to go wrong and the role responsible for that (Hendrickson et al, 2006)

The use case diagram in the design of the database help determines the functionalities in the database and the stakeholders that would be using those functionalities. It is a very important tool in the design of the database because the developers design the system with the use case in mind and they have to ensure that the database does exactly what is on the use case (Sengupta and Bhattacharya, 2006).

The use case diagram allows easy update of information in the database in a very easy and efficient manner. The use case diagram ensures that the quality of the database is correct and the information accessed and retrieved are correct

ANALYSIS ON DATABASE QUALITY AND DATABASE CORRECTNESS

The databases in organizations have gone beyond just a tool for the easy storing and retrieval of information. Organizations use their database as a tool for making key decision that affects their organizations and therefore, the need to make the database correct and the quality of data from the database must be emphasized during the design process.

The Quality and correctness of information from the database are very important but are two different things. The correctness of information from a database is part of the factors that ensures that data from the database is of high quality. Storey and Wang (1996) said that factors that make up a database with high quality include no, ambiguity, must be complete, meaningful, correct and non-redundant. For a database to be of good quality, that data comes out of it has to be correct and of good integrity.

The Quality of the database is not concerned about the data that is in the database alone, but it also has to do with the process in which the database operates and navigated, this ensures consistence in the database.

Vidgen (2003) reported that the opinion that quality of a database is determined by how it meets the requirements of the clients and its suitability for use. The database has to meet all the specification of the clients who they are designing the database

Database correctness is part of the factors that make up a quality database also mentioned factors such as completeness, extensibility and reliability as some of the factors that make up a quality database as well as correctness (Keng and Lihyunn, 2004).

The Entity relational diagram, use case and class diagrams are some of the tools used for designing the database in this paper and they are used to ensure quality and correctness in the database.

Conclusion

It is obvious that the database is an integral and important part of organizations. The database needs to be of high quality so that the users of the database would have confidence in using it. The design of the database should be done with emphasis on each of the design phase. The conceptual design of the database has to be done accurately because the successful design and implementation of the system depends on the conceptual phase of the database.

There are lots of tools, frameworks and methodologies that guides the design and implementation of a database. These tools if properly used ensure that the database is of good quality. The database has to be designed correctly putting in mind the intended requirements. The database has to be consistent, non-redundant correct and of high quality at all time so that



it would serve as not just a tool for easy storage and retrieval of information but also as a tool that would act as a trusted and reliable tool that would help the organization achieve their vision.

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