Sample Essay on Data Analysis and Design

Introduction

Organizations aim at making profits and as such they must come up with effective strategies for attracting customers. The use of database technology is one of the most commonly utilized methods of conducting business operations using online purchases. An organization comes up with a data flow process model that allows customers to purchase and pay for goods and services online. The following paper represents a database analysis and design of an online DVD sales information system. The database design will consist of data flow diagrams showing customer details, DVD details and order details. The objective of this paper is to create a data flow model for online DVD sales.

Data analysis and design

Databases and data models have attracted the interest of many organizations globally. By definition, a database is an immense, constant and integrated collection of active data that offers some operations describing, establishing, manipulating, and accessing the data. Organizations, institutions, individuals and governments use database technology to organize, store, and retrieve data. Data forms the principal resource of an organization and is stored in a computer within the organization. It may be organized into bits, fields, records, files, or databases (Bergholt et al 10-?). Database technology plays a critical role in the information management field. This technology is applied using the World Wide Web (WWW). WWW has grown at a very high rate because of its simplicity (Lu & Zeng 1).

In order to ensure effective and efficient operations, organizations use data flow models. A Data Model is a documentation of existing processes and actions that take place during an application software design and development. Data models are represented in form of data flow diagrams (Donald 2). A data flow model is a representation of the processes involved in a business operation. The flow diagram represents business processes and data flowing between them (Fitzgerald & Dennis 209).

Benefits of implementing data analysis and design technology

On-line presence gives the business a benefit of exploring an external market. Through this, the business benefits in that, creation of new customers takes place and marketing of its goods and services occurs globally. In addition, the business benefits from the opportunity of knowledge sharing and global interaction. The 20th century has developed a remarkable change of technology advancement and adoption in most the key sectors of the economy. As such, all businesses need to embrace technology and exploit all the benefits inherent with technology change. Considering physical and on-line presence for the businesses, there is a need for all the businesses to incorporate these two factors in order to synchronize business operations effectively. The integration of the two factors in the business operations results in creation of the business reputation.

Integrated database environment versus the traditional file processing environment

Before the emergence of the integrated database environment, people used to work with the traditional file processing environment. An integrated database environment is a well organized collection of interrelated data that takes care of a number of applications in a system. The traditional file processing environment forms the first computer-based approach used in storage and transfer of information. These two methods of data management have their own similarities and differences as shown below.

Similarities

Firstly, both systems are used to store information. A company using the integrated database environment and the one that uses the traditional file processing environment both end up acquiring the same information. Secondly, both systems make use of computers in file processing operations (Coronel, Steven, & Peter 11).

Differences

The integrated database environment and the traditional file processing environment differ the following ways. Firstly, the integrated database environment uses the modern technologies hence making more convenient and fast compared to the traditional file processing that uses less advanced systems. Secondly, the traditional file processing environment cannot share data. An organization using this processing environment must have different systems with different data. On the other hand, the integrated database environment has the capacity of sharing different data in a single system. In addition, the traditional file processing environment has a problem in changing data from one system to the other, but the integrated database environment can change data and show consistency (Coronel, Steven & Peter 12-15).

Approaches to database design

Database design approaches may occur in two forms the top-down design method and the bottom-up method. These two approaches are different but share a common purpose of uniting systems through proper description of all interactions between processes (Unman 22-31).

The top-down design approach In this method, the database designer starts from the general and moves to the specific. Generally, general ideas needed for the system are put on top while working down to more specific details showing the interaction between processes in the system. The process involves identifying and defining different entity types.

Bottom-up design approach This approach is the opposite of the top-bottom approach. It begins with the specific details moving to the general details. Firstly, the designer starts by identifying the data items and, grouping them into data sets.

Data mining and data warehousing

A business strategic level of decision making never uses business information daily but, it uses cumulative and derivative data from specific period of time. In order to ensure everyone is satisfied with the quality of decision-making, an organization should consider large amounts of data. To achieve this, data mining and data warehouse concepts are proposed, which form a good base for business decision-making. Data warehouse is a modern technological concept that plays a great role in incorporating related data from essential functions of organizations in the most appropriate and effective form.

Data mining is the process of digging through massive amounts of data in order to find hidden patterns. Data mining provides some of the following results. Firstly, an individual can identify factors that are more associated with a target attribute. Secondly, one can predict individual behavior, and also find targeted things, people and their profiles. In addition, an organization will conduct data mining process in order to segment a population and determine the important relationships between the populations.

The following is a case study on data mining and data warehouse implementation on Fast Food industries in Summerwood. The Fast Food forms the most highly competitive sector in the business world today. A very small change in operations has a significant impact on the total operations of an organization. In order to

avoid serious effects, a quick access to comprehensive information is essential. Summerwood's data warehouse was designed to address various IT requirements. The data warehouse was implemented in Microsoft SQL Server 2000, incorporating data from two main sources.

1) Daily sales information automatically polled by the TACO system

2) Period based accounting information from dynamics accounting database.

The above data is always available whenever needed and is maintained over several years for comparative reasons.

The following figure shows an example of output from the data warehouse showing the daily report card. The management uses this information to identify daily transactions and how the store performed on a particular date. Daily sales, week-to-date sales, period-to-date sales and year-to-date sales are represented on the report card. It also contains the average check, which is an important aspect of cost control. The information shown on this report card is made available to all stores in the area, for easier comparison of different companies in terms of sales and profits. The card also records speed-of-service (SOS) at the counter and at the drive-thru (Exclusive Ore Inc. 1-4)

The Summerwood Fast Food industries implement data mining processes to extract hidden information concerning operations of various restaurants, their sales margins, and profit levels. The extracted information is stored in a data warehouse where managers can easily access it. The information assists managers in making comparisons of daily sales, monthly sales and yearly sales and makes the necessary adjustments. In addition, it assists in identifying the potential market by determining areas where more customers shop from.

The online DVD sales database

Before designing the data flow diagram, a database design is essential. The life cycle of our online DVD sales database design will falls under six stages. These stages must keep the customer informed and in control always.

1. Requirement analysis The store works closely with its customers using various analytical techniques in order to gather requirements for the intended solution. The intended solution is to come up with online DVD sales process that will ensure customers order for DVDs online.

2. Design and functionality specifications A detailed functional specification of the system is required from the agreed requirements. Detailed designs of all required components including their technology specifications are required on this stage.

3. Implementation On this stage, the system developers take the functional specifications and develop the database system. Customers will be given a chance to test prototypes during the application development process and provide feedback on its effectiveness.

4. Testing and acceptance Once the database system passes the quality assurance tests, it will be released to applicable stores for second testing including formal customer testing acceptance.

5. Deployment The customers will determine the best method of deployment for the system.

6. Support and maintenance Once the design gets to work, support and maintenance practices should be done on the system to ensure it works effectively and meets its requirements. Information Technology experts will be employed to ensure the system works according to the specifications.

Online DVD sales data flow model

Requirements

When developing a data flow model, it is important to analyze its requirements. Data flow model requirements is a set of descriptions of the system's constraints and services. A data flow diagram requires many essential operating systems for it to perform its intended use. In addition, the requirement catalogue provides a depth explanation of the process functional requirements (Spagnoletti 20).

There are two key entities in our database design of online DVD sales. These are the customer and the DVD.

Database designs are represented in form of Entity-Relationship (E-R) diagrams. They enable a designer to express an understanding of the intended database in terms of its functions and communication with other databases. Figure 4 (a) and 4(b) shows the relationship between these entities and their attributes. In figure 4 (a), an E-R of an entity class customer is shown. Entities are represented by triangles while attributes by ovals. This is a top-down design of a database as previously represented in figure 1. At the center of the diagram is an entity "customer" surrounded by single-valued attributes last name, first name, account No. and balance. The account No. is the key attribute on this E-R diagram.

The context diagram consists of the following external entities:

- DVD purchase system

- Provide information about DVD

- Management: requires management reports in marketing and decision making

- Accounting-cash acceptance

The top level diagram for online DVD sales has several basic operational processes:

- The function of the system

- Who is responsible for giving inputs

- Who received the outputs

Descriptions of process

Process 1: sold DVD items

This is the process where the customer buys a DVD from the store. In this process, the customer is provided with an online shopping basket selects the DVD of choice. The selection is made by either using an internet enabled phone or a computer. As each item is selected, it is placed on the shopping cart. The information is then sent to the cashier. Secondly, the cashier on the desk finds the customer records using the customer's DVD purchase card. The cashier then produces receipts for all DVDs bought by the customer. The customer gives out credit cards that are thoroughly verified. Finally, the transport management arranges for the delivery of DVDs to the address provided.

Process 2: Produce management report

After updating customers' records for the day, the cashier make an update of all items rented, the remaining and the ones that missed in the kiosk. A report is made and sent to the management for review. The report

includes number of copies sold, cash reviews, customer and complaints. The management report serves as useful information for managing the business and making decisions (Sen 2).

Process 3: Check customer DVD complains

The clerk received the DVD from the customer and checks customer's record past complaints. The DVD is played and if it contains some problems the customer is issued with another copy at no extra cost.

Process 4: summarize cash received

During this process, the system makes a total of all received cash for the day and updates the accounting system are made weekly. All the records are stored in the database warehouse.

Process 5: Add new customer

Since the system uses an integrated database environment, it has a way of adding new customers. The new customer provides his or her information in order to produce a DVD purchase card. The customer is allowed to select a DVD and his or her information is recorded and the system updated any time a DVD sold.

Process 6: Produce Monthly bonus letter

The system checks a customer's record after one month to check the total amount of movie purchased and the amount paid. All customers who have attained a total of $40 are issued with a bonus letter.

Process 7: Produce yearly bonus letter

Customer records are reviewed after one year. Those customers who have attained a payment of $220 are issued with a yearly bonus letter and a free coupon for renting DVDs.

Description of data flows

The model must be designed in an efficient way in order to avoid delays in delivering information to the required destinations (Kotok & Webb 14-1). Firstly, (D1) shows the customer ID being represented as a customer ID bar code that emphasizes physical implementation of the process. The following data flow process occurs between the time the customer registers for the card and the time of shopping. The second process (D2) shows cash transactions. This process is necessary because it helps keep financial records of the DVDs sold daily. Process three (D3) shows the video/DVD purchase system that has been replaced with a Video Master File. This file communicates between systems. Finally, data flow process 4 (D4) represents the sale transaction file that stores information on all purchases and payments made on daily bases.

Description of data store (data warehouse)

The data store is the area where the process stores data for later use by the same system or another one. The data stores are represented with files and tables (Donald n.d). Figure 7 above shows 4 data stores used in the online DVD sale store. The first store shows the customer profile. This shows cash store keeps all the information relating to the customer on name, location, number of DVDs shopped, and the amount of money and paid. The second store shows cash transactions. This keeps all the accounting information for the movie store. The third store is the video store. This area keeps record of all video DVDs available in the store. It gives the clerks easier time locating a certain DVD. Finally, store D4 shows information contained in the shopping basket. The database has the capacity if determining the most frequently sold videos and increases their stocks.

Conclusion

The high rise of technology and globalization requires organizations to be prepared with the current technology in order to win the global competition. The following practice assists in capturing important business processes and ensures an effective means of carrying out business operations (Curtis, Kellner & Over 76-79). In addition, the use of data flow modeling helps in eliminating major human errors. The above data flow process enables the management to keep quality business records and avoid instances of staff members misusing finances. In addition, it eliminates cases of cash losses because the system is automated and there is no physical cash involved this, hence, accounts for every transaction.

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