Research and Design of Enterprise Information Management System based on Web

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Abstract

With the rapid development of social economy and the arrival of the information age, the scale of enterprises is becoming larger and larger. There is more and more information about warehouse management, staff management, parts procurement, supplier selection and product selection. The establishment of enterprise management information system is a very important step in the development of information technology. After accurately understanding the user requirements of the enterprise information management system, this paper gives a detailed database system design process. The system has the functions of enterprise employee management, supplier management and warehouse product management. Finally, the enterprise management system based on Web platform is developed. The experiment shows that the system has good practicability.

Keywords

1. Introduction

In the normal production process of an enterprise, it is particularly important to manage warehouses, employees and suppliers. Finding buyers and carrying out projects are complex tasks, which may involve the allocation of employees in various warehouses, the increase or resignation of employees, the renewal of parts, the selection of appropriate suppliers and the normal implementation of supply projects. Traditional problems may take more time, As the running time of the enterprise increases, various data will also increase[1]. In order to solve the above problems and improve the operation efficiency of enterprises, more and more enterprises choose to try out the common warehouse management database, which makes the enterprise operation more information-based and intelligent, and reduces the cost loss and various operational errors caused by manual operation and data tediousness.

2. Database Design

Database design refers to the design and optimization of the logical mode and physical structure of the database for a given application environment, and the establishment of the database and its application system, so that it can effectively store and manage data to meet the application needs of various users, including information management requirements and data operation requirements. Information management requirements refer to which data objects should be stored and managed in the database; Data operation requirements refer to the operations performed on data objects, such as query, add, delete, modify, and statistics.

2.1 Requirement Analysis

Demand analysis is simply to analyze the needs of users. Demand analysis is the starting point of the design database. Whether the results of demand analysis accurately reflect the actual requirements of users will directly affect the design of subsequent stages and whether the design results are reasonable and practical[2].

Enterprise management system to achieve enterprise management information, efficient, to achieve the purpose of enterprise information management. Based on the principles of practicality, universality, openness and security, the database is designed according to the relational model to realize the functions of enterprise staff management, warehouse management, storage parts management, supplier management and product management query. The administrator user can query the basic environment of the warehouse, the basic information of the staff, the basic information of the parts in the warehouse, the basic information of the suppliers and the basic information of the undertaken projects to add, delete, search, modify and other data operations.

The system needs to meet data integrity requirements:1. there is a sequence between enterprise warehouse and employee data. Only after a new warehouse is created can staff work in the warehouse. 2. unique values are required for enterprise warehouse number, enterprise staff, enterprise storage part number, supplier number and project number.

The system needs to ensure the security requirements:1. ordinary enterprise staff can only query their own work information, basic warehouse information, warehouse stored parts information, basic supplier information and basic project information, but they cannot modify the information. 2. the enterprise administrator can perform all functions of the system, such as adding, deleting, modifying and querying.

2.2 Conceptual Structure Design

The ER diagram of enterprise information management system is as follows:
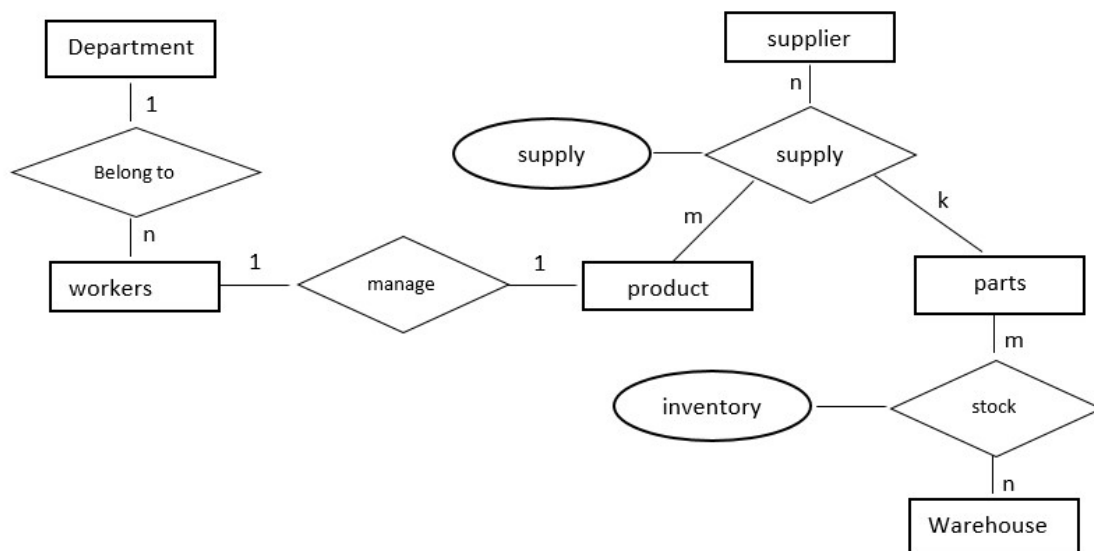

Figure 1. E-R diagram of enterprise information management system

The process of abstracting user requirements from requirements analysis into information structure is conceptual structure design. It is the key of the whole database design. The task of conceptual design is to abstract it into a conceptual model based on requirements analysis. The conceptual model is usually expressed by E-R diagram[3]. The enterprise management information system involves the following entities (the attributes of each entity are attached).

1) Department: department ID, department name, and telephone;

2) Workers: worker ID, worker name, worker age, workers phone number;

3) Warehouse: warehouse ID, warehouse name, warehouse area, and telephone;

4) Supplier: supplier ID, name, address, telephone;

5) Part: part ID, part name, part size, and part price;

6) Product: product ID, product name.

2.3 Logic Structure Design

The task of logical structure design is to convert the ER diagram designed in the conceptual structure design stage into a logical structure consistent with the data model supported by the database management system. The database we selected is SQL server, which supports relational data model[4].

When an entity is converted into a relationship pattern, the attribute of the relationship is the attribute of the entity, and the code of the relationship is the code of the entity.

The ER diagram is converted into the relationship mode as follows:

1) Department (department ID, department name, telephone);

2) Worker (worker ID, worker name, worker age, Workers phone number);

3) Warehouse (warehouse ID, warehouse name, warehouse area, telephone);

4) Supplier (supplier ID, name, address, telephone);

5) Part (part ID, part name, part size, part price);

6) Product (product ID, product name);

7) Supply (supplier ID, part ID, product ID, supply);

8) Stock (warehouse ID, part ID, inventory).

2.4 Physical Structure Design

The process of selecting the most suitable physical structure for a given logical data model is physical design. In relational database, it mainly refers to access method and storage structure.

Convert the above relationship model into data tables as follows:

Table 1. Department-Table

Serial number	Column name	data type	constraint
1	Department_id	varchar	Not null, primary key
2	Department _name	varchar	Not null
3	Telephone	varchar	Not null

Table 2. Workers-Table

Serial number	Column name	data type	constraint
1	Workers_id	varchar	Not null, primary key
2	Workers_name	varchar	Not null
3	Workers_age	int	Not null
4	Workers_phone_number	varchar	Not null

Table 3. Warehouse Table

Serial number	Column name	data type	constraint
1	Warehouse_id	varchar	Not null, primary key
2	Warehouse_name	varchar	Not null
3	Warehouse_area	int	Not null
4	Warehouse_ Telephone	varchar	Not null

Table 4. Supplier-Table

Serial number	Column name	data type	constraint
1	Supplier_id	varchar	Not null, primary key
2	Supplier_name	varchar	Not null
3	Address	varchar	Not null
4	Telephone	varchar	Not null

Table 5. Parts-Table

Serial number	Column name	data type	constraint
1	Parts_id	varchar	Not null, primary key
2	Parts_name	varchar	Not null
3	Parts_size	real	
4	Parts_price	real	Not null

Table 6. Product-Table

Serial number	Column name	data type	constraint
1	Product_id	varchar	Not null, primary key
2	Product _name	varchar	Not null

Table 7. Supply-Table

Serial number	Column name	data type	constraint
1	supplier ID	varchar	Not null, primary key
2	part ID	varchar	Not null, primary key
3	product ID	varchar	Not null, primary key
4	supply	Real	Not null

Table 8. Stock-Table

Serial number	Column name	data type	constraint
1	warehouse ID,	varchar	Not null, primary key
2	part ID	varchar	Not null, primary key
3	inventory	Real	Not null

3. System Implementation

After the demand analysis, conceptual design, logical design and physical design, the enterprise information management system uses the data definition language to create the database, establish the data table, import the data, realize, test and run in the SQLSERVER database management system. Data analysis, modification, adjustment and other maintenance work and subsequent development work can be carried out for the database[5].

In the database management system, we need to use data definition language to create database, establish basic tables, index, views and import data.

Implement basic table: use SQL statements to create warehouse table, employee table, part table, supplier table and product table, and define the name, meaning, type, length and data integrity of each column.

Index implementation: use SQL statements to establish the index of staff number and part number respectively.

Implementation view: use SQL statements to create t complete product view, enterprise warehouse employee basic information view and enterprise retiring employee basic information view respectively.

4. System Testing

System testing includes two important tasks: data loading and application coding and debugging.

Add data: you can use the insert statement to add data to the warehouse table, employee table, part table, supplier table, and item table respectively.

Data Deletion: the delete statement can be used to realize the deletion operation proposed by the user and delete the corresponding data from the corresponding basic tables in the database.

Data Modification: you can use the update statement to modify various data.

Data query: various query operations proposed by users can be realized by using SQL statements to query the corresponding information from the database. The query operation can realize multiple query methods such as single table query, join query and nested query, and can query various query requirements put forward by users under multiple conditions.

Database application design and database design are carried out at the same time, so the application should be tested while organizing data warehousing. Due to space limitations, I will not repeat it here.

5. Conclusion

The purpose of database design is to determine a suitable data model, which can contain all the data that users need to process, and can also realize all the processing functions that users put forward. This paper introduces the design and implementation of enterprise management system based on the actual needs. Taking sqlserver as the database management system, a complete enterprise management database system is built, which can complete the functions of enterprise warehouse management, enterprise employee management, enterprise parts management, enterprise supplier management and project management. It shall have reasonable structure, convenient use and easy maintenance, and shall meet the needs of users. It can make enterprise management more information-based and intelligent, and greatly improve work efficiency.

References

[1] Olawale Surajudeen Adebayo; Joshua Bulus Micah, Development of Secure Electronic Cybercrime Cases Database System for the Judiciary, International Journal of Information Engineering and Electronic Business, Volume 14, Issue 1. 2022. PP 1-16.

[2] Duaa S. Naji, S. Naji Duaa, E. George Loay, A Technique for Big Data Deduplication based on Content Attributes and Dictionary Indexing[J] IOP Conference Series: Materials Science and Engineering, Volume 928, Issue 3. 2020.PP 56-60.

[3] Wang Jun; Anfimov Nikolay; Guo Jing Yuan, Database system for managing 20,000 20-inch PMTs at JUNO, Nuclear Science and Techniques, Volume 33, Issue 3. 2022. PP 101-106.

[4] Craig S Mullins, Use Cases for NoSQL and Multi-Model Database Systems, Database Trends and Applications, Volume 36, Issue 1. 2022. PP 39-39.

[5] C. Mata, A. Oliver, A. Lalande et al. On the Use of XML in Medical Imaging Web-Based Applications[J] IRBM, Volume 38, Issue 1. 2016, PP 23-25.

[6] Shengnan Ke, Jun Gong, Songnian Li et al. A Hybrid Spatio-Temporal Data Indexing Method for Trajectory Databases, Sensors, Volume 14, Issue 7. 2014, PP 55-58.