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INFORMATION SYSTEMS AND SOFTWARE IN DATABASE CREATION

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ABSTRACT

This work analyzes the theoretical and practical foundations of database formation, the structure of information systems, and the modern software used to manage them. The role of relational and non-relational databases in the processes of systematizing, storing, and processing data is highlighted, along with issues of enhancing the security and efficiency of information systems.
The research results include recommendations for the correct selection of software solutions in database design.

KEYWORDS

Database, information systems, software, DBMS (Database Management Systems), SQL, NoSQL, data architecture, design.

Introduction

Annotatsiya. Ushbu ishda ma’lumotlar bazasini shakllantirishning nazariy va amaliy asoslari, axborot tizimlarining tuzilishi hamda ularni boshqarishda qo‘llaniladigan zamonaviy dasturiy ta’minotlar tahlil qilingan. Ma’lumotlarni tizimlashtirish, saqlash va qayta ishlash jarayonida relyatsion va norelyatsion ma’lumotlar bazalarining o‘rni, shuningdek, axborot tizimlarining xavfsizligi va samaradorligini oshirish masalalari yoritilgan. Tadqiqot natijalari ma’lumotlar bazasini loyihalashda dasturiy yechimlarni to‘g‘ri tanlash bo‘yicha tavsiyalarni o‘z ichiga oladi.

Kalit so‘zlar. Ma’lumotlar bazasi, axborot tizimlari, dasturiy ta’minot, MBBT (Ma’lumotlar bazasini boshqarish tizimlari), SQL, NoSQL, ma’lumotlar arxitekturasi, loyihalash.

Аннотация. В данной работе анализируются теоретические и практические основы формирования баз данных, структура информационных систем и современное программное обеспечение, используемое для управления ими. Освещается роль реляционных и нереляционных баз данных в процессах систематизации, хранения и обработки данных, а также вопросы повышения безопасности и эффективности информационных систем. Результаты исследования включают рекомендации по правильному выбору программных решений при проектировании баз данных.

Ключевые слова. База данных, информационные системы, программное обеспечение, СУБД (Системы управления базами данных), SQL, NoSQL, архитектура данных, проектирование.

A database is a collection of interconnected and ordered data. It describes the properties, state of objects under construction, and the relationships between objects in a certain area. Indeed, today, storing and rationally using the necessary information in a database plays a very important role in human life. The reason is that no matter what area of social development we are in, we will definitely have to turn to a database to obtain the information we need.

So, the need for the organization of a database is becoming one of the most urgent problems of information exchange technology. As you know, before the concept of a database entered science, it was very difficult to base information on various aspects. Programmers organized data in such a way that it would be relevant only for the issue under consideration.

When solving each new problem, the data was reorganized, which made it difficult to use the created programs. It should be noted that when creating a database, two important conditions must be met: First, the type and appearance of the data should not depend on the programs that use them, that is, when entering new data into the database or changing the data type, it should not be necessary to change the programs. Secondly, there should be no need to create a program to find out or search for the necessary information in the database.

Therefore, it is necessary to follow certain laws and rules when creating a database. From now on, we will distinguish the word information from the word information, that is, taking the word information as a general concept, and by information we mean the qualities of a specific, specific thing or event. Today, one of the most reliable means of storing data is modern computers. A database stored in computers is a file with a specific structure and a special format. Each file in a computer's memory consists of the same type of parts, called records. A record is a piece of interconnected data. The number of records in a file depends on the size of the data being considered. Each record consists of pieces called fields. A field should consist of as short a set of data as possible. Each field has a name according to the information it represents.

Imagine that thousands of students study at a university. It is impossible to manage them on paper, so an information system is created. Database structure: * Tables: "Students", "Subjects", "Grades", "Teachers". Dependency: The ID number in the "Students" table is linked to the "Grades" table. Software: MySQL or PostgreSQL.

If the system is asked for "Aliyev", the program will retrieve his year of study, his debts in subjects, and his residential address within seconds.

Bank information system (Transactions). In banking systems, the database must be of the highest level of security and accuracy. The database consists of: "Customers", "Account numbers", "Transactions (Transactions)". Software: Oracle Database or Microsoft SQL Server.

When you withdraw money from your plastic card, the system contacts the database: Is there enough money on the balance? (Check). Subtract the amount and save the new balance (Update). Record the time and place of the transaction (Save).

Library information system. Used to control the flow of books in the library. Database structure: * Book_ID, Book_Name, Author, Quantity. Software: SQLite (for smaller libraries) or Microsoft Access.

When a patron checks out a book, 1 is subtracted from the Quantity column in the database. When the book is returned, 1 is added. This automates the "inventory" process.

NoSQL example: Social networks (Telegram, Instagram) Data in social networks is very scattered and diverse (images, videos, text, audio). Database structure: A collection of data in the form of documents. Software: MongoDB or Cassandra.

When you post, it is stored in the database as a single "document". It contains the text, the link to the image, and the number of likes. This allows you to quickly load very large amounts of data.

Database development is not just a technical process, but the art of establishing a systematic order in the digital world. The role of information systems and software in this regard is described by the following fundamental conclusions:

Data is the "Fuel" of the New Era If we compare an information system to an engine, then the database is its fuel. A properly designed database: Saves time: Finds the necessary information among millions of rows in milliseconds. Reduces errors: Eliminates redundancy and inconsistencies caused by the human factor.

Understanding the Intellectual Role of Software DBMSs (such as MySQL, PostgreSQL, Oracle) are not just "warehouses". They are complex logical devices that ensure the integrity of data. Conclusion: The more perfect the software, the more "smart" the system can make decisions. For example, transaction management ensures that data is not lost even if the system is unexpectedly shut down.

Logical Precision in Design Mathematical precision is required when building a database. Normalization processes (1NF, 2NF, 3NF) optimize the data structure. This can be seen in the following logical relationship: If we have a functional relationship A \rightarrow B (A follows B), then this logic should not be violated when forming the database. This ensures the future stability of the system.

Security and Future Trends In modern information systems, the conclusion is this: It is more difficult to protect information than to store it. * Cryptography: Software must store data encrypted. Cloud technologies: Now physical servers are being replaced by flexible, accessible cloud databases that can be accessed from anywhere. Artificial Intelligence (AI): In the future, databases will become "autopilot" systems that can self-optimize and predict errors.

The formation of a database is the most responsible stage of information systems. If the software is chosen correctly and the system architecture is carefully designed, it will become not just an archive for the organization, but a powerful competitive advantage. A database is a tool for storing the past, analyzing the present, and predicting the future. These extended conclusions show how important the database is not only from a technical, but also from a management and security point of view..

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