# Development of a prototype of a document management information system for a curator of students of secondary vocational education

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**Abstract**. The paper considers the issue of forming preliminary requirements for the information system and the development of a prototype of the authorization form and the form of interaction with the task. A technical analysis of the hardware and software at the SBPEI IO "Angarsk Industrial and Economic College" was carried out, and as a result, the relevance of the development was indicated. The data access control system is considered. The main situations for authorization to the interactive software package are outlined. A prototype of a software module for the interaction of an information system with a task is described.

**Keywords.** Prerequisites, physical data model, prototype, access control system, authorization form, request.

Modern corporate systems, both present on the market and emerging, are aimed at managing the business processes of any enterprise, without exception. There is a wide selection of IT products, consulting firms and specialists in the market. The question arises about the further direction of the development of enterprise information systems. The most dynamically developing area of corporate information systems at the moment are business analysis systems and systems for working with a client [1, 2]. At present, any information system is not only a system for storing and processing information, but also an interactive complex of interaction between all users.

As a result of the analysis of business processes in SBPEI IO "Angarsk Industrial and Economic College", one of the conclusions was that there is no software tool that can automate the process of document flow between curators and administrators, for example, deputy director for educational work, dormitory teacher, educational unit etc.

As a result of the analysis of hardware and software in the educational organization, the following conclusions were drawn:

1. In the technical school, all curators and administrative workers are provided with workstations, united into the customer's local network.
2. The educational organization has a structural unit (information and computing center), one of the tasks, according to the Regulation on the

Information and Computing Center, is “the development, implementation and maintenance of information systems to support the main processes of the educational organization (educational process, scientific research, administrative control) "[3].

All of the above indicates the relevance of the development of an information system for document flow for the curator of secondary vocational education. In the course of analyzing the architectures of building an information system, a client-server architecture was chosen, since it allows you to create multi-user information systems.

In the process of developing an automated information system, the following were developed:

1. data warehouse;
2. user interface for interacting with the data warehouse.

The physical model of the data warehouse is shown in figure 1.

The data warehouse is implemented in MS SQL SERVER 2017, in which 10 tables are created, namely:

- Student;
- Parents;
- Parents' phones;
- Phones of students;
- Family composition;
- Activity;
- Chronic diseases;
- Items;
- Academic performance;
- Specialties.

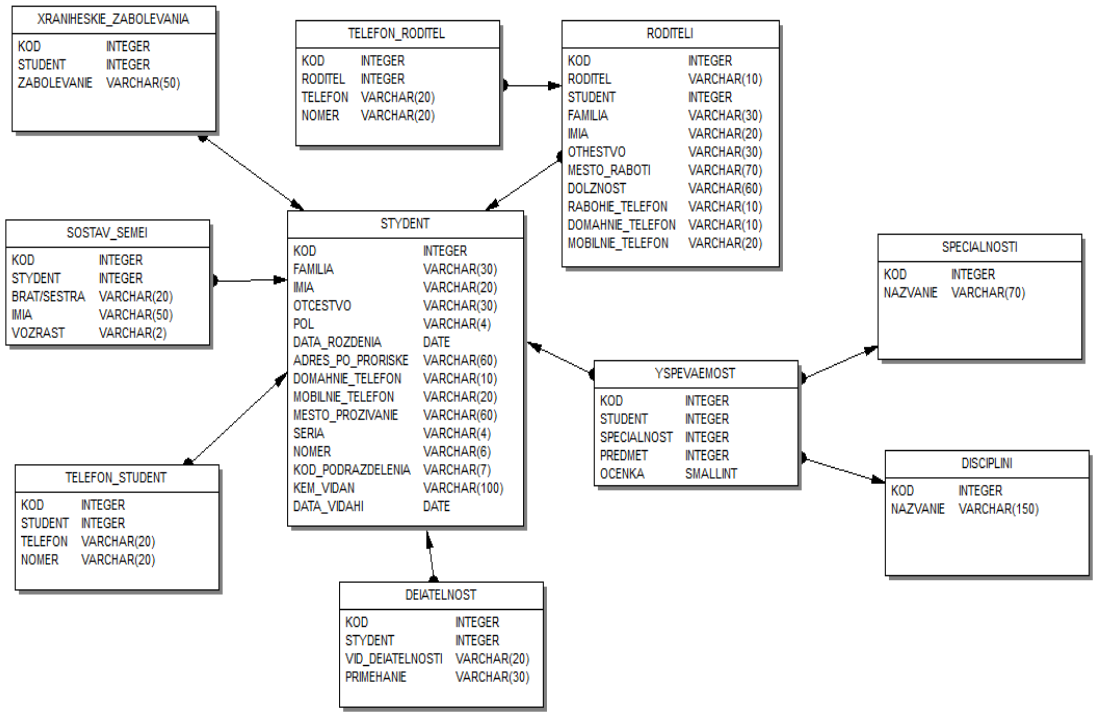


Figure 1 -Physical data warehouse model

The user interface for interacting with the data warehouse is implemented in the MS Visual Studio 2019 tool environment.

As part of the development of an automated information system, the following tasks were implemented:

1. a data access control system has been developed;
2. the system provides storage of various kinds of information;
3. the system provides an analysis of business processes and their indicators according to various criteria - temporal and quantitative;
4. the system provides an analysis of business processes in the context of specific performers of process operations;
5. the system ensures the formation of documents, including as a result of the operational analysis of information;
6. the system ensures the prompt exchange of documents;
7. the system provides accounting for individual objects of business processes.

Data access control system.

Access control is a function of an open system that provides security technology that allows or denies access to certain types of data, based on the identification of the subject who needs access and the data object that is the target of access [4, 5].

The main access control mechanisms are identification and authentication. A prototype of the form is shown in figure 2.

In information systems in use today, Username and Password are the most common form of authentication. Usernames and passwords are gradually being replaced by more sophisticated authentication mechanisms.

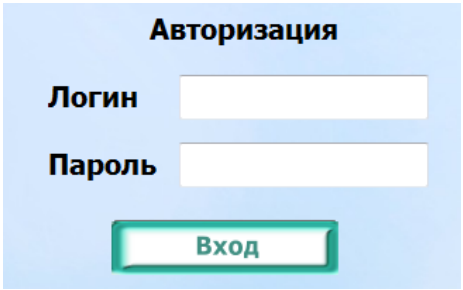


Figure 2 - **Login form prototype**

After successful identification and authentication, the user or system gets at its disposal exactly those resources to which the system or user has the right to access, as well as what actions will be allowed to be performed (launch, view, create, delete or change), this is called permission [6].

While implementing a secure registration and authorization method, the following had to be handled:

1. in case of an unsuccessful attempt to authorize the user, the following must be foreseen:
    a. if there is no entered login in the system, allow user registration with subsequent authorization;
    b. if the login already exists in the system, check the correctness of the password entry.
2. if the user is already registered in the system and authorized in it, redirecting him to the form of the corresponding program module;
3. when registering in the database, all user data and password are recorded (in md5 encryption). There are validation rules for each of all fields.
4. when registering an account, it must be checked for uniqueness;
5. all incorrect user actions are accompanied by error messages;
6. delimitation of access rights to the information system is determined only by the administrator. By default, the user is logged in by default as an operator.

As part of the work with information about students, it is necessary to provide for storage, processing with records of students. The form for working with the list of students is shown in figure 3.

The software module that implements work with information about students allows you to organize work with database records (edit an existing record, add a new record, delete a record). The program module includes the ability to generate a report on progress by group, the ability to group records according to various criteria.

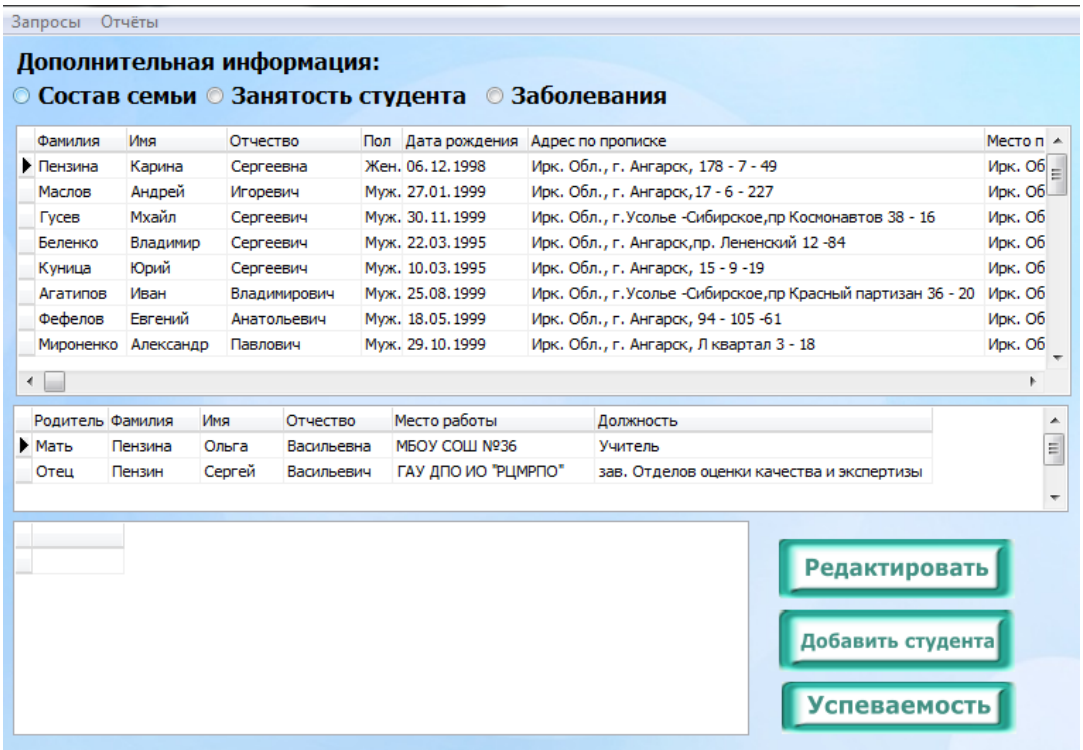


Figure 3 - **Form "Students"**

The form "Progress" displays the grades received by the student. Figure 4 shows the "Performance" form.

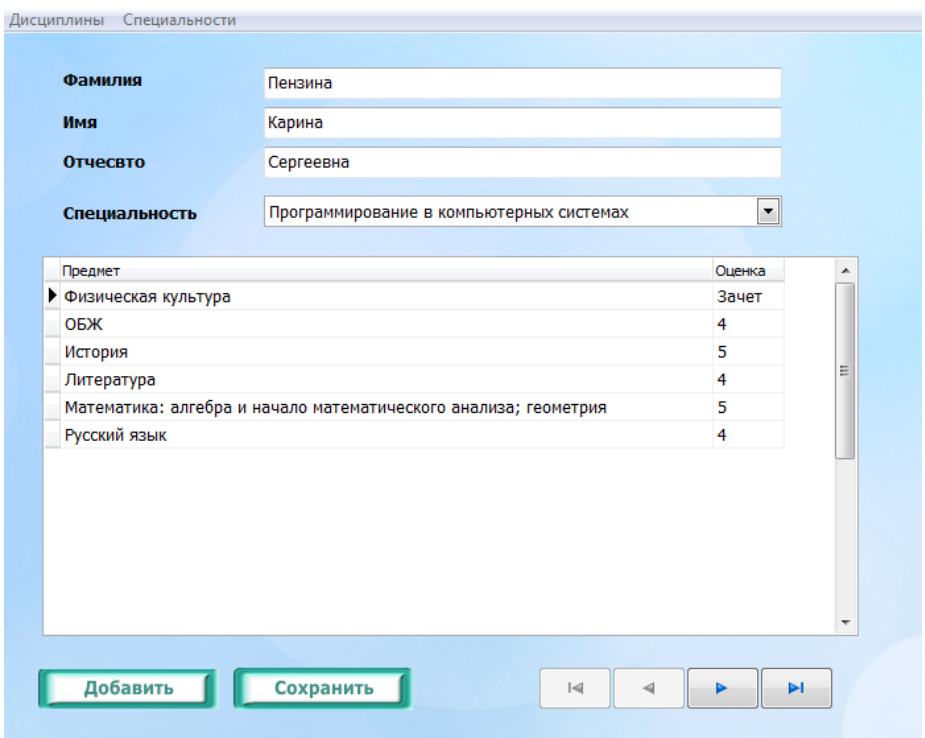


Figure 4 - **Form "Progress"**

On the "Edit record" form, you can edit existing data about a student or add information about a new student.

Figure 5 shows the "Edit record" form.

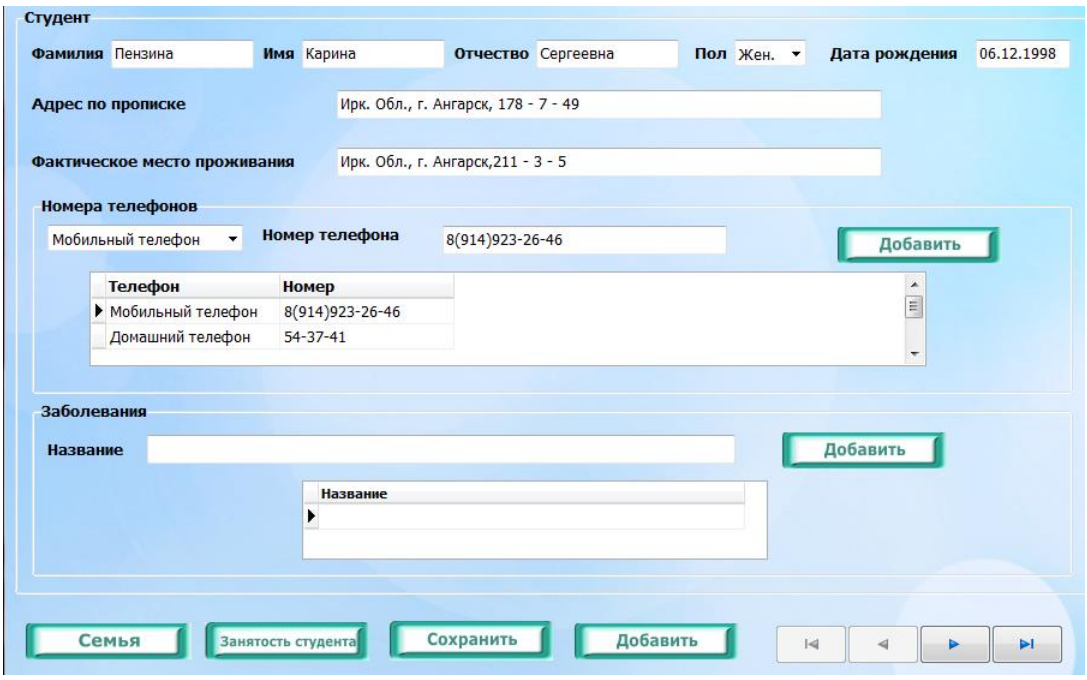


Figure 5 - **Editing a record**

The next of the main tasks of developing an information system for the workflow of a curator of students of secondary vocational education is the organization of interactive interaction between curators and the administration. To solve this problem, a prototype was developed, shown in figure 6.

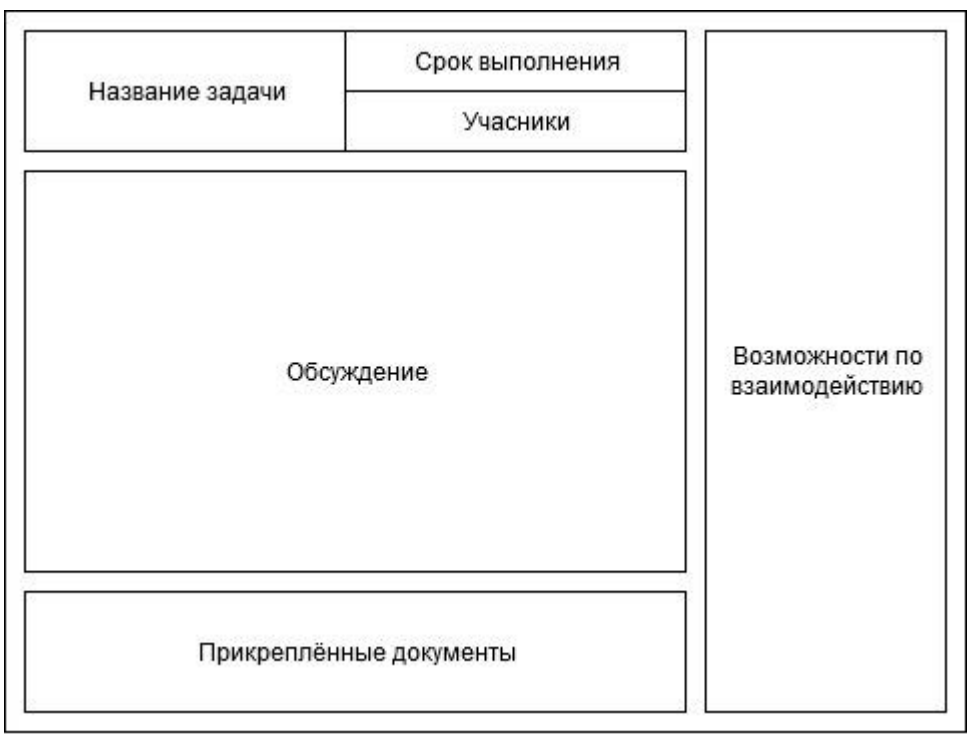


Figure 6 - **Prototype of the form of interaction with the task**

Assuming the implementation of interactivity in the information system, the following should be provided:

1. Organization of discussion of the most important issues.
2. Ability to add and download various documents.
3. Determination of the participants and time frames for the tasks.

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