

MANAGEMENT OF PREPARING AND FORECASTING OF PERSONNEL IN EDUCATIONAL SPHERE BASED IN FREE SOFTWARE

Aripov Mersaid, Kerimov Igor

Department of Computer Science, National University of Uzbekistan

igor-kerimov@mail.ru, m.aripov@nuuz.uzsci.net

1. INTRODUCTION

Automatization of the personnel management is a well-known and widespread problem. Obviously this problem can be solved using different ways – a creation of enterprise advanced applications with great economic and business investment (The solution based on expensive Shareware software and technologies, for example - Microsoft SQL Server, Microsoft Windows NT, Visual Studio .NET and others) and creation of inexpensive system based on free software like a Apache Web Server, script language PHP, database server MySQL, free OS Unix (Linux) and other. In this paper we consider a specially developed system for automatization of personnel and personnel management which is based on free software.

2. SYSTEM DESCRIPTION

An automatization system of preparing and forecasting of professional personnel was created in connection with developing computer technologies. This system contains a large set of functions of the entering data, editing, and automatic receiving of the results and forecasting of professional personnel in different spheres. System also includes multi-level access for different users and groups of users. Each user have a determinate level of access to this system – access of viewing individual data or editing of personal data or viewing data of other group of persons or editing data of other group of persons or access of different groups of administrators for editing or updating or creating, erasing data of other persons, groups of persons and even groups of other administrators. All of listed rights of access can be used together or separately.

System consists of next parts: entering data, automatic receiving of the results and information's belonging all activity of personnel by using simple and complex multilevel queries, viewing data, statistical data manipulation and elements of forecasting. In future developments expert system of different levels will be used for forecasting.

One of the basic advantages in using this system is the easiness of the development and using. User does not need any knowledge in programming. It is sufficient to have the basic computer knowledge. This system differs from other existing databases and information systems, because it has a complete web-interface application. Therefore this system can be used in the local network and Internet.

3. METHODS AND SELECTION OF TECHNICAL TOOLS AND SOFTWARE

The environment of the development is an union of next technologies: script language of programming PHP, the goal of which is to allow web developers to write dynamically generates pages; a very fast multi-threaded, multi-user and robust SQL database server named MySQL; HTML-for creating static web pages and helping for creating dynamically generating pages, Java Script language; web server Apache, which can be used on Windows, Linux and other platforms. The information transfer in the local computation networks, WAN, Internet and telephone lines is one of the advantages of these technologies.

Union of these technologies is widely used in the network of Internet for creating complex, multi-level web portals with complex structure. This decision is very popular among web-developers because these technologies have the following advantages:

PHP support many kinds and sorts of databases, such Oracle, Sybase, dBase, others and MySQL, which was used for creating this system; good integration with different Operation Systems as Linux, Mac, Windows and others. We note that we are using this system on Windows platform. But we have not any problems for using this system on the platform Linux, which is popular hosting system in Internet also. Causes of using MySQL are described below:

MySQL is most popular open source SQL database. MySQL was originally developed to handle large databases much faster than existing solutions and has been successfully used in highly demanding production environments for several years. The connectivity, speed, and, security make MySQL highly suited for accessing databases on the Internet.

4. DISCUSSION

Now we consider a main idea of the automatization personnel system, which was developed for our country needs. We only use open-source free software. The idea behind Open Source software is rather simple: when programmers can read, distribute and change code, the code will mature. People can adapt it, fix it, debug it, and they can do it at a speed that dwarfs the performance of software developers at conventional companies. This software will be more flexible and of a better quality than software that has been developed using the conventional channels, because more people have tested it in more different conditions than the closed software developer ever can.

4.1 System properties and features

System of the management of preparing and forecasting of professional personnel was created for helping in management of personnel in the country. In particular, this system was developed for management of preparing and forecasting of professional personnel in education sphere of the country. Education sphere of the Republic consist of set of education organizations, institutes, universities and other such organizations. The system must contain all personal data on each member of all education organizations in the Republic. This personal data must be entered by special administrators of this organizations and institutes, who are responsible for the entering of personal data of officials (workers) of organizations and institutes. These administrators must have an access to Internet for entering data, viewing and editing. They should open web page of this system, enter their login and password, which they have obtained from main administrator early, and must work with this system by methods, described above.

Consider this problem for an example of one university, which consists of faculties and departments. Each faculty is divided on chairs. In this case we have several levels for access to data on the web-portal of the system. If you are a simple user and do not work in education sphere, you can use this system for only viewing data of any teacher, lector, professor, doctor and other specialists of any educational institutes, organizations or universities of the Republic. In addition, it has been a possibility of multifunctional search of persons on different parameters (place of work, specialty of person, nation of person and other parameters).

If user works in education sphere – he has access of simple user plus possibility of editing self-personal data. If user responses for the enter data of persons of his organization, in other words, he has access as administrator of his educational organization, then he has access of simple user plus possibility of editing, updating and deleting personal data of any officials of organization. If he works on the faculty and has access of administrator of his faculty, he

can change any data of officials of his faculty and give rights of administrating to determine person on the chairs of faculty. We consider this below.

4.2 System components (based on free software) properties and features

We are using a MySQL database in developing.

MySQL is a most popular Open Source SQL database. We want MySQL to be:

1. The best and the most used database in the world.
2. Available and affordable for all.
3. Easy to use.
4. Continuously improved while remaining fast and safe.
5. Fun to use and improve.
6. Free from bugs.

This database contains more than a great number of tables and each table contains determined set of data. Three tables of that database called “The main tables”. There are three main tables in our database – table of educational organizations, universities, institutes, faculties and chairs, called “Table of departments”; table of users and table of rights of access to data. Table of users contains a personal data of all officials of any educational organizations or their divisions with login and password, which are distinct for each registered user (all officials of educational organizations are registered users). Table of rights of access to the personal data contain data of access for different levels of administrators. Other tables are information tables, named by inquiry tables. Structure of inquiry tables is described below.

There is a several inquiry tables in database. Consider one of them. Other inquiry tables were created through the same method. Our considered table is a table of the scientific specialties in the Republic. Table consists of two fields (columns) – field, named “ID” and field, named “Name”. “Id” is an autoincrement field and this field is primary key of the table. This column contains an ordinal numbers of the specialities. Column “Name” contains all scientific specialities immediately. This structure have another inquiry tables as table of domains of the Republic, table of the nationalities, table of scientific degrees, table of government rewards and others.

We consider the first of the main tables. It is a table of the educational organizations of the Republic and their divisions. Structure of this table is described below.

The table of educational organizations consists of 4 fields. The first field is on autoincrement field “ID” (not that id, which was used in inquiry tables).

Second field is a name of organization or section of organization. Third field is a brief name of organization or section of organization and fourth field called “SUPER_ID”, special field, values of which can be repeated.

In the top of hierarchy of the educational organizational is Universities, institutes, or organization, but not sections of the organizations or faculties or chairs. All this organizations have SUPER_ID is equals zero.

Any faculty or section of organization will have SUPER_ID, equals ID of parent organization. Consider this in the next example.

We have University with many faculties and chairs in the faculties. In this case SUPER_ID of university is equal to zero, SUPER_ID of the faculty is equal to ID of the University (not SUPER_ID), and SUPER_ID of a chair of the determined faculty is equal to ID of this faculty.

The table of scientists or users contains the following fields: ID, Login, Password, place of birthday, specialty, day of birthday, family position, social origin, list and names of scientific works and publications and other fields of individual character, and plus field "ID_ORG" and "ID_RIGHT".

The field "ID_ORG" is connected with field "SUPER_ID" from the table of the educational organizations. The fields "ID_RIGHT" are connected with field "ID" from the table of rights, described below.

Table of rights consists of the autoincrement field "ID" and field "RIGHT".

In the field "RIGHT" can be contained different levels of administrating, such as local administrator of organization, local administrator or faculty, local administrator of chair or global administrator.

We considered a structure of our database, and we consider structure of PHP scripts, used in web-developing of this system now.

4.3 Programming tools architecture

Architecture of PHP scripts is divided in three parts: parts of representations, part of business-logic and data stage.

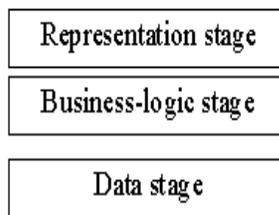


Fig 1. System architecture.

Part of representations contains php-scripts and templates, composing user interface of system. This type of representation is very comfortable comparatively with usual one-level architecture. First, representation of data is strongly separated from the logic of functionality. Therefore, we separated work of designer and web-developer. Second, such representation simplifies the structure and possibility of comfort reading of codes. Third, the application will be more powerful, because in order to add new function of the system we must just add new methods in class.

There were created many classes with determined functions and methods. Each class performs determine “functions”. Example, class “login” is for the authentication of users and others.

There were performed some basic classes, which were included in another classes- PageControl class (In this class were created functions and methods for the control of number of data on the page), Db class (for the connection with database using host or ip-address of machine, where database is placed) and others. Listed classes are basic classes of the system or a kernel of the system. They were used in almost all other classes. Files of templates are responsible for placing data on the web page. Templates are transforming on determined class.

Structure of templates contains web-design of the automatically generating pages, CSS schemes for the nicely printing data to the web page.

4.4 Operation System selection

System can be installed on many platforms such Windows, Mac, Linux and other operation systems. But we used OS Linux because:

1. Linux is free;
2. Linux is portable to any hardware platform;
3. Linux was made to keep on running;
4. Linux is secure and versatile;
5. Linux is scalable;
6. The Linux OS and Linux applications have very short debug-times.

5. RESULTS

The practice of using this system shows that it is very powerful tool for the simplifying work with the personnel of the educational sphere.

This system may be used not only in the educational sphere, but in any other sphere of management systems. Using this system in other sphere of management requires only a little modifications of the system.

References

- [1] L. Algerich, W. Choi , J. Coggesball, K. Egervari and others, Professional PHP 4. Wrox Press Ltd, 2003.
- [2] Actual problem of mathematical physics and information technologies,vol.I, Tashkent, 2003.
- [3] M. Fowler, Patterns of enterprise application architecture, Addison-Wesley, Boston, 2003.
- [4] H. Garsia-Molina, J. Ullman, J. Widom, Database systems: The Complete Book, Prentice-Hall, New Jersey.