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WEB TECHNOLOGIES IN DEVELOPMENT OF WORKING TIME REPORTING SYSTEM USING ASP.NET

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New technologies let's to build applications that comply with the demands of the increasing pace of life and mobility. An example of such an application is discussed in this article Online Reporting System Working Time designed for developers.
Keywords: ASP.net, MVC, C#, MS SQL

WEB-ТЕХНОЛОГІЇ У РОЗВИТКУ СИСТЕМИ ЗВІТНОСТІ РОБОЧОГО ЧАСУ З ВИКОРИСТАННЯМ ASP.NET

Нові технології дають змогу створювати додатки, які відповідають вимогам зростаючого темпу життя і мобільності. Приклад такого додатка, призначеного для розробників, обговорено в цій статті на сайті "Система звітності робочого часу".
Ключові слова: ASP.net, MVC, C#, MS SQL.

1. SYSTEM ASSUMPTIONS

Discussed system is designed so that it is widely available to users and the easy to upgrade and maintain. To achieve first of the goals, the system was built as a web application, which enables users to access the system regardless of the place and time of access. Using the Microsoft technology – C#, ASP.net, MS SQL and MVC (*Model/View/Controller*) allowed minimizing the time and costs needed for the construction and a subsequent extension and maintenance applications. Using Bootstrap framework made it possible to build unified user interface for all devices, which also reduces the cost of expansion and maintenance applications.

2. MVC pattern

This system has been designed in a three-layer MVC pattern Idea MVC is based on three elements:

• The model represents the business logic of the application, reflects the structure of the data and makes it consistency.

• The view contains logic for the correct display of the data model provided by the controller.

• The controller is intermediary between the view and the model through adequate preparation model and transfers it to the view.

By using MVC pattern changes in each layer can be made independently of each other, for example, changes in the appearance doesn't imply changes in the other two layers. (1)
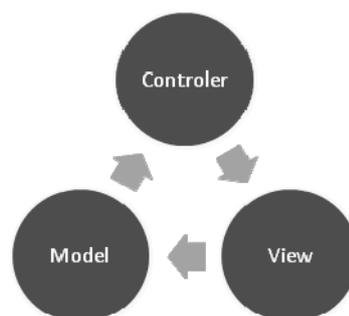

Fig. 1. Classic MVC pattern scheme (2)

3. Logical architecture

Presented system is composed of several dependent modules. The main module of the system, while first contacted by the user is the login module. Module lets you to access other modules according to user permissions.
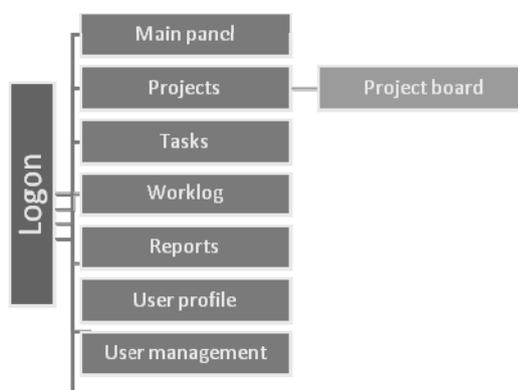

Fig. 2. Modules hierarchy

With the implementation of the hierarchical structure of these permissions are subject to inheritance. In the system, has been implemented in the following groups of users.

- administrator
- project manager
- senior developer
- developer

The user is one of the groups defines access to specific modules

4. Login module

Login module fulfils two tasks:

- user authentication – verifying the user's identity,
- user authentication – define a set of user privileges.

Authentication is a twostep process. The first step is to check whether a user with the specified data (e-mail) exists in user's database, and if so, if entered password is correct. When the conditions are met, the system checks whether the user account is active. To use the system was convenient login module has a function remembered. When you enable this feature is not necessary to re-login the next time you use the system. The time interval since the last use of the system, when you will need to again login is configurable by the system administrator.

Fig. 3. Logon page

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5. Main page

The main panel is a webpage that is displayed when the user logs into the system. On this page is a list of tasks assigned to the logged in user and his work log to flush current week. Main page is the same for all groups of users.

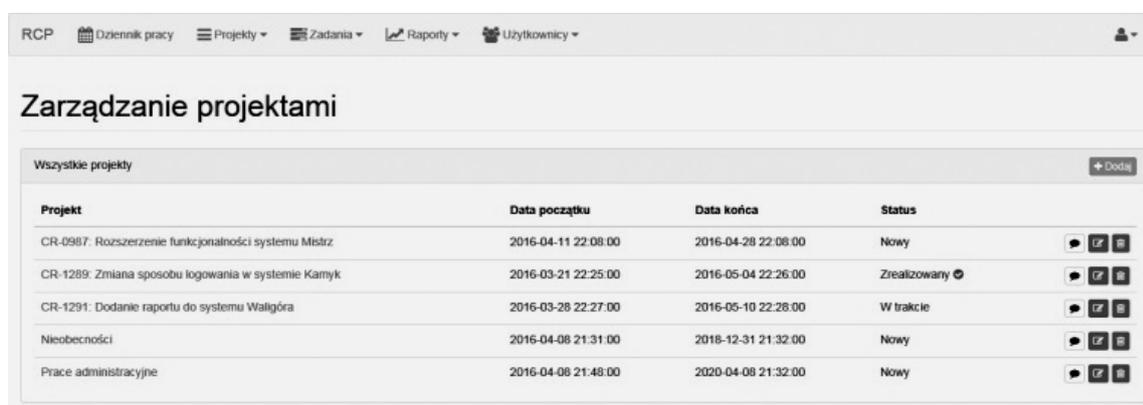*Fig. 4. Main page*

6. Projects module

Module design allows you to existing project management in the system. It also lets you to add, delete and edit the project. With Projects module is linked a module board of the project, which will be described later in this article. Full access to the module have project managers and administrators, other users can only view the list of projects with detailed information about them.

User is able to see the entire list of projects, which are presented all the projects existing in the system sorted by status (New first, then during, at the end Realized). In the table shows a summary data for each project is only the name of the project, start date and end date as well as status. In addition, if the project has a status other than realized (i.e., new or in progress) and the end date is the date in the past (earlier than present), next to the end date is displayed exclamation mark indicating that the term of the project has been exceeded (Fig. 4).

7. Tasks module

Task is the basic unit of the executive in this work log system. Task module allows you to create new tasks to edit or delete. Users with a developer privileges can only view detailed task information, change its status and assign it to another user. Members of other privileges have full access to the functionality of the module.

Task list can be displayed in two modes. The first is the task assigned to the project. The list is displayed on the page with details of the project. The second mode is list of tasks are assigned to a specific user. List is displayed on the main panel (Fig. 5).

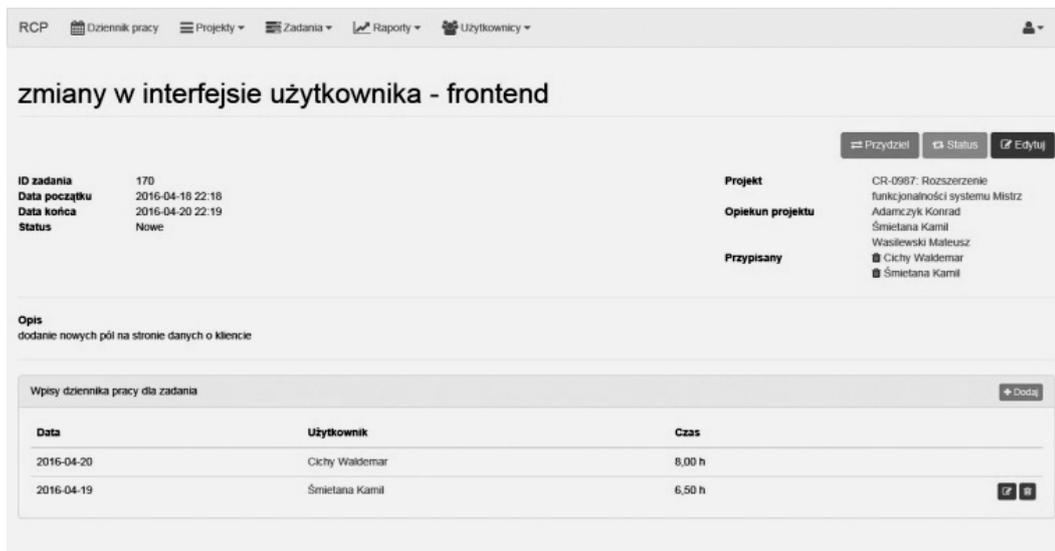*Fig. 5. Main page of Projects module*

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Fig. 6. Task details page

8. Work log module

Work log is a module which allows reporting time spent to implementation of a specific task. Time of work is reported on a weekly basis without regard real time and just the overall time spent of work on a task.

Work log of work allows reporting work time for five weeks – current week and the two weeks preceding it and the next two. Each user regardless of their privileges has full access to the module, which means that it can add, delete and edit entries of his log. It is also possible to display the list of entries in the logs of work for the task. This list is displayed with the details of the task (Fig. 6).

9. Users module

This module allows the administrator to manage users – using this module you can add a new user, edit it and remove the module also provides functionality of change the user's password and display basic information about the selected user. Access to this module have only users from administrators group. Other groups of users can only view the list of users with detailed information about them. Logged in users can change their own password and contact information.

When you change your e-mail, it is important to check whether the number is unique in the system. This is required because the e-mail address is used to log in to the system and must clearly identify the person who has access to the system (Fig. 7)
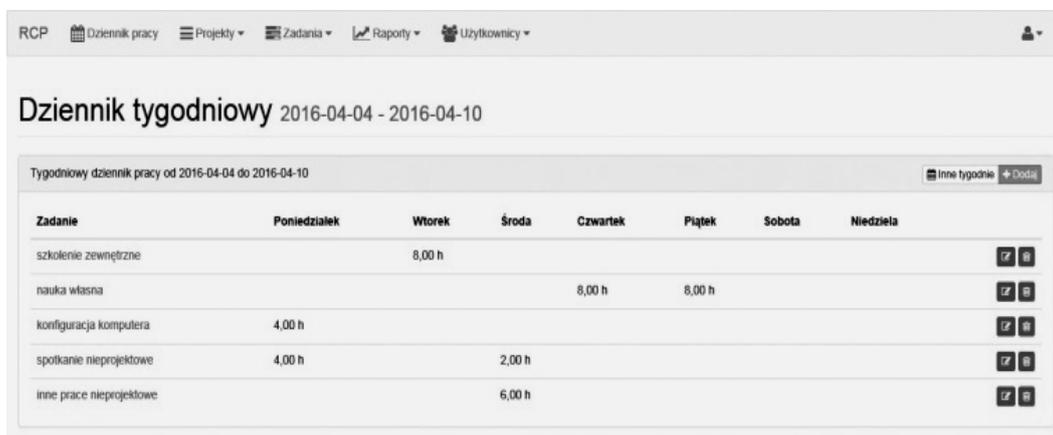

Fig. 7. Weekly work log page

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Fig. 8. Users module main page

10. Project board

Project board is a module associated with the projects and tasks module, acts as a project forum. Project board is used to exchange information and ask questions between members of the project. User can create a new topic, and other users can reply to it. Add new posts on the board can everyone, but to edit or delete the topic can only its author or another user with privileges higher than the programmer (Fig. 8).

11. Report module

System allows you to generate reports of the implementation of tasks and work log logs. Reports are presented in the form of tables and graphs. To access this functionality, have project managers and administrators. In the system, there are six reports:

- Tasks by Status
- Members of the number of jobs
- Participation of project tasks by status
- Projects by the number of jobs
- Projects by status
- Projects by time worked

Fig. 9. Project board page

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Raport Zadania według statusu
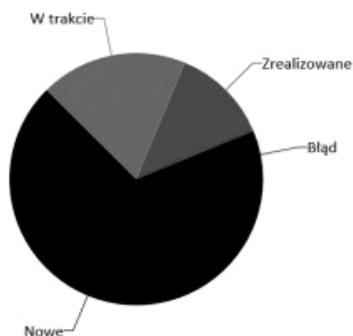
Status	Zadania
Nowe	10
W trakcie	3
Zrealizowane	2
Błąd	1

Fig. 10. Tasks by status report

12. Data validation

System implements a two-step validation of the data entered. The first level is validation of the user side by JavaScript.

If the user-side validation is impossible, the data is validated by the server. If a user enters wrong data, incorrect field will be highlighted in red and will be presented an error message.

Discussed system also has a mechanism for handling errors during runtime, which displays a friendly error messages instead of the standard server error pages. This feature consists of two parts – the first one displays server errors such as for example if user trying to open a page that does not exist; the second component is responsible for handling application exceptions.

This mechanism can be modified in such a way as to be able to store errors to a file for later analysis.

13. Summary

The system has been built as a web application which allows access to it regardless of the place and time of programmers. Using the Bootstrap framework makes the system available not only through computers, but also mobile devices. The user interface has been designed to be functional. It makes that system is ease of use and usability of the system by the user. This is an important aspect of the construction of the system because the reported regularly and reliably working time allows the person managing the project and appropriate, the financial settlement.

1. Freeman A. ASP.NET MVC 5, New York: Apress, 2013. 2. Microsoft, „ASP.NET MVC Overview," [Accessed: 07 2016] [Online]. Available: ttps://msdn.microsoft.com/pl-pl/library/dd381412%28v=vs.108%29.aspx.