INFORMATION TECHNOLOGY

EVENT MANAGEMENT SYSTEMS

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***Abstract**: This paper addresses the topic of event planning and conference room management with the help of an IT system designed to provide support to users who are having trouble keeping accurate records. Starting from the idea that computer systems become a reliable help to people in different fields, optimizing processes, increasing efficiency and reducing the time with the execution of certain activities, we considered it appropriate to develop a system to solve event planning and record them. The system is designed especially for the business environment by helping companies and their employees to get better planning and record of the meetings they hold and all the events organized.*
***Keywords**: management, system, technology*

Introduction and Background

We want to make a web application, easy to access from any device. Thus, the company's employees will benefit from a centralized situation of all the events that will take place, an increase in the efficiency of the planning processes and a reduction of the time lost with the discussions that took place, in the scheduling of these events.

The objectives of this system are the following:

- Development of a conference room management system that allows for meeting planning and scheduling details;
- Including a conference room management section (adding and editing of rooms);
- Includes a user management section (add and edit);
- Inclusion of a meeting planning section through an appropriate graphical interface;
- View schedules created from the user or administrator position;
- The section for viewing the occupied rooms and the participants in each meeting;

- Email notification when creating events as well as notifying users before they start.

The causes that led to the development of such a system are, among others, the following important:

- The need for efficient management of conference rooms and good meeting planning;
- The appearance of human errors;
- The need for process optimization;
- The need for automation;
- Resource saving;
- Lack of an overview.

The data flows will be composed of the input data provided by those who plan a meeting (time slot, date, hall, participants) and will receive a confirmation by email with the reservation created.

Users of this system are grouped into normal users (company employees) and Administrator. Users will have the right to schedule meetings, view their schedules and profile, invite new members if they are not added, and view room occupancy. In addition to these rights mentioned above, the administrator will be able to manage the rooms and users and will have the right to cancel a meeting created by another user.

All these processes can be done through a friendly and intuitive graphical interface through a web application (see Figure 1).

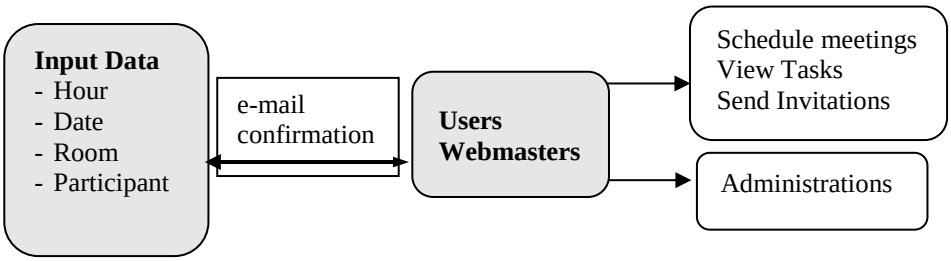

Figure 1. Web application Interface

Technology description

Developing a web application requires the use of components that include both the software and the hardware. The environment used to develop the application is Microsoft Visual Studio 2019 Community. This IDE (integrated development environment) from Microsoft is a creative tool through which we can edit, troubleshoot and write code for an application.

ASP.NET Core is a popular framework for building web applications on the .NET platform. It is the open-source version of ASP.NET, which runs on macOS, Linux and Windows. It is designed to enable the rapid evolution of components, APIs, compilers, and languages, while providing a stable and supported platform to keep applications running.

However, the used framework is ASP.NET Core MVC which is a rich framework for creating web applications and APIs using the Model-View-Controller design model, practically including here the type of system architecture (Freeman, Pro ASP.NET CORE MVC 2, 2017).

The programming language used mostly is C# of course used with other application development languages such as JavaScript and SQL, specific JavaScript libraries such as JQuery, Moment.Js or libraries used for other functionalities such as qTIP or flatpickr.

Moment.js is a free, open source JavaScript library that eliminates the need to use the JavaScript data object directly.

qType is a jQuery plugin that provides features such as chat boxes or imagemaps, and has been helpful in displaying certain details about calendar events.

Flatpickr is a light and powerful data selector that does not depend on any library, being very useful especially for calendars, thus avoiding loading a large number of libraries, improving performance.

ASP.NET Core Identity is an API that supports the graphical interface for authentication functionality. With this API you can manage users, passwords, their profile, roles and more. (Marinko Spasojevic, 2019).

An important step in developing the application was to use a calendar from fullcalendar.io. This is a popular JavaScript-based calendar that has over 100 settings and what is important is that it is open source. Calendar customization was done through FullCalendar's API (Documentation, 2019). Bootstrap version 4 was used on the front end and SQL Sever was used to create and develop the database.

Presentation of technological concepts and products that are the subject of the proposed application

User authentication is based on a form, in which you will need to fill in the email address on which the account and password were created.

After logging in, the user is redirected to the main page where they can view all the events (meetings) that will take place within the company or plan new ones depending on the purpose of each user (see Figure 2).

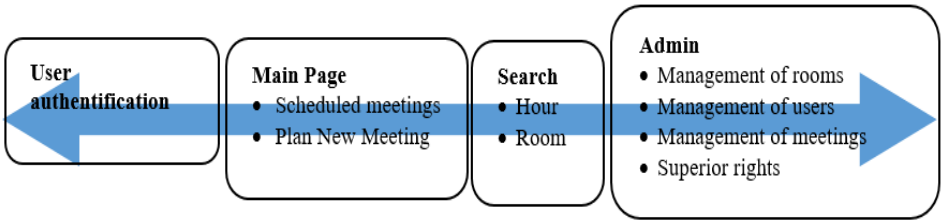

Figure 2.

You can view the created schedules, if you decide on the planning of a new event, then the conditions for checking the desired time slot, space (event room) and the respective day will be met. If the conditions are met, the reservation will be created and the meeting participants will be notified by an email notification, otherwise an error message will be displayed which will not allow the event to be booked until the conditions set out above are met.

The administrator will take care of the management part of the system, therefore he will be responsible for adding users to the computer system, adding the spaces where the events will take place and at the same time he will have superior rights to regular users, being able to modify or delete any event created by other users. The administrator will also be able to plan events and manage their profile. The whole process can be seen in Figure 9 (What is a Data Flow Diagram, 2020).

The Model-View-Controller architecture separates the application into three main groups of components: models, views, and controllers. Through this pattern we manage to separate the concepts. Thus the user's request is sent (routed) to a Controller who becomes responsible for communicating with the model to perform the user's action or to withdraw the results of a query. The controller chooses the view to display the result to the user and provides all the required model data.

Delimiting responsibilities helps us to extend the application in terms of complexity, because it is easier to write code, troubleshoot and test (a specific problem that is on a component). It is much more difficult to update, test, and troubleshoot code that has more domain dependencies than the three listed. Changing the user interface is much more common than changing the application logic, so it's important to separate this part so you don't have to change business logic every time we change the interface, as many errors can occur and require retesting the application from all points of view no matter how small the change. The MVC principle can be seen in the figure below:

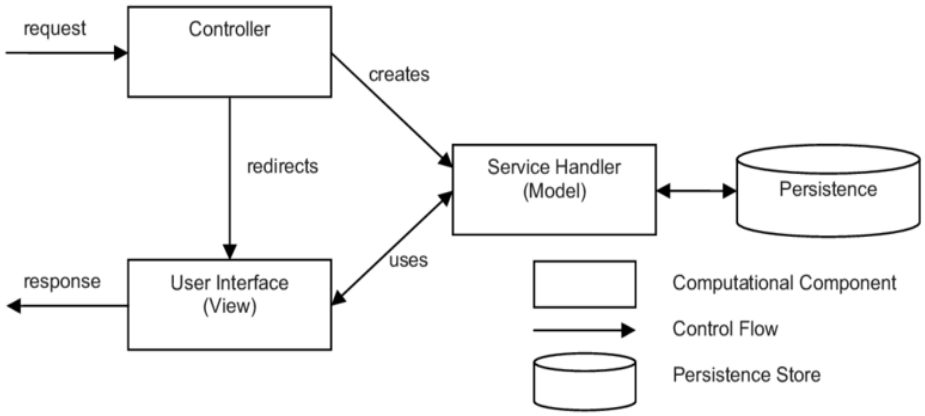

Figura 3. Model-View-Controller Architecture

Both the view and the controller depend on the model, but the model does not depend on either the view or the controller. This is one of the key advantages of separating the concepts, allowing the construction and testing of the model independent of the front-end part.

Activities and requirements necessary to achieve the objectives

Each system has been developed based on needs to solve a certain problem. Therefore, all these needs came from different sources from which the functional requirements were extracted and not only to determine how the system will work.

The obligatory conditions for the good interaction of the user with the system aim at a fast internet connection for fluidity, being a system that is dependent on an internet connection, a browser version as new as possible, the system being tested on Google Chrome and Microsoft browsers Edge, a device (desktop, laptop, or mobile) that supports all of these needs and has an account holder to use the web application in compliance with system requirements.

The functional specifications of the system can be found below:

- The users who will use the application are of two types: an administrator and users who have limited rights;
- Users will only be able to log in if they have an account, it will be provided to their email address;
- There is an email notification for meeting booking operations, their cancellation and a reminder before they start for users registered for the meeting;

Administrator will benefit from the following features:

- The administrator will be able to manage his profile with the right to update his data and reset his password;
- Accessing a dashboard with a record of conference rooms and participants in each meeting;
- View a calendar displayed on almost every page for event planning directly from the calendar;
- Accessing conference rooms with the following features:
  - Adding them with the related details;
  - Management: editing or deleting conference rooms;
- Cancellation of events made by other users;
- Employee management:
  - Adding an employee: last name, first name, email, password, password confirmation, etc .;
- Employee management: editing, updating and deleting
- Possibility to leave the account and close the current session (sign out).

User will have the following features:

- The right to manage the profile (update information, change the password, etc.);
- View a calendar displayed on almost any page with the possibility of adding events (meeting planning) directly from the calendar;
- Accessing conference rooms with the following features:
  - Reservation: time interval, date, name of the meeting, number and names of participants;
  - Cancel only user-planned events;
- Overview of the other rooms and participants;
- Accessing all planned events;
- Possibility to leave the account and close the current session (sign out).

Given the non-functional requirements that capture aspects of the operation of the system and not its behavior, they impose implementation or design constraints on functional requirements such as performance, security, or reliability.

The security of user data is ensured by specific Microsoft mechanisms, which provide certain tools to ensure that data is kept secure. Therefore, the confidentiality of the data is achieved, the administrator not having access to sensitive user data such as password in compliance with Regulation (EU) 2016/679 on the protection of individuals with regard to the processing of

personal data and on the free movement of such data. personal data to other entities. At the same time, the integrity of the data is maintained, which can be modified using a correct and authorized manner depending on the role (administrator or user).

The system is reliable, ensuring a constant operation over a long period of time, its maintenance being achieved without affecting its use.

To ensure the efficient management and allocation of time and resources, the entire development process has been systematically planned for specific time periods, according to the GANTT chart below:

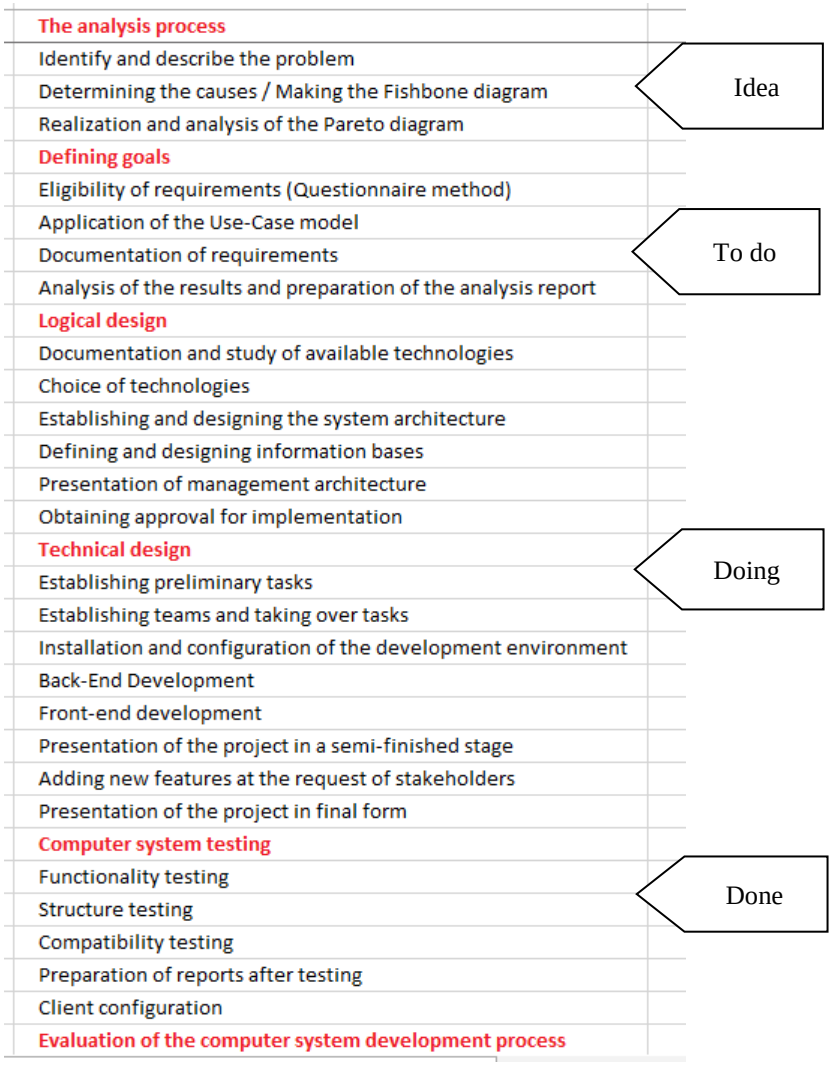

Figura 4. Graphical representation using the Gantt chart method

Technical design

For the data storage part we used Microsoft Visual Studio and Microsoft SQL Server. I chose to use a relational database with SQL language for several important reasons. One of them is that Visual Studio comes bundled with SQL Server and provides features that help you view, modify, and develop your database in an easy and user-friendly way.

Another important reason was the familiarity with relational databases and Structured Query Language (SQL) and the knowledge of the concepts of relationships between entities (tables), their cardinality, data types and well-known syntax.

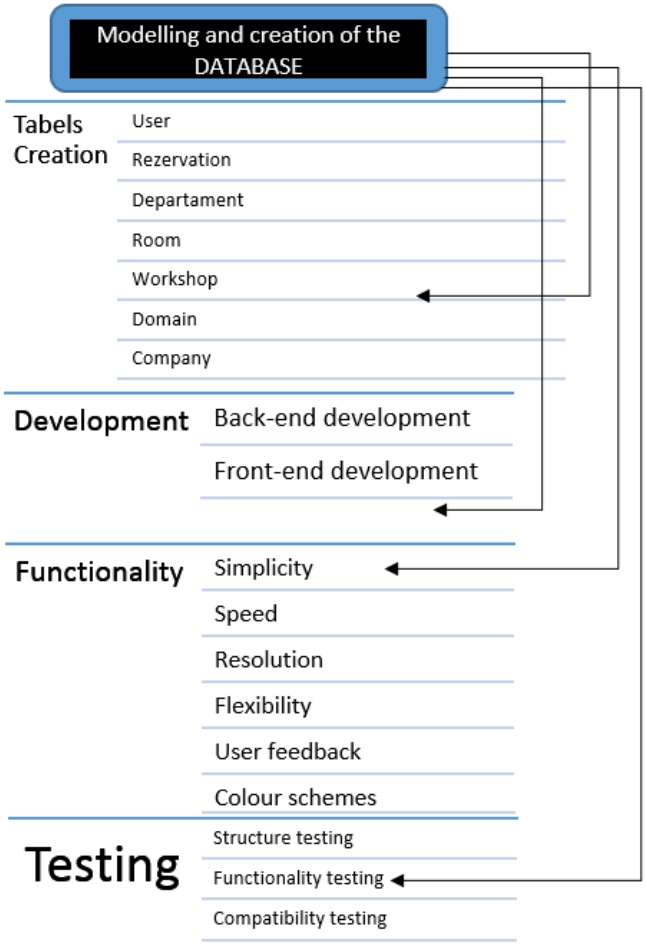

Figure 5. Techical Design

The SQL Server Data Tools component of Visual Studio gives us the ability to build the database, test it, and publish it later in our project. We can also edit scripts and SQL commands in the database thanks to IntelliSense providing a friendly way to check and identify errors.

Conclusions

Even though distributed management systems have grown rapidly with important advantages such as easier maintenance that does not require the interruption of the whole system, we still opted for a centralized system, because we considered that effective control over the use and development of software is more appropriate. currently ensuring data integrity.

The purpose of our application is to build a conference room management system along with meeting planning with two important actors, namely the users who will be represented by the company's employees and the administrator who will manage the components for the proper functioning of the system.

The importance of knowing the flow of data for the whole system is important to be able to understand the processes and how they are executed. Therefore, the data flow chart aims to show graphically how the processes take place and to which entity they belong.

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