

THE ARCHITECTURE AND SOFTWARE DEVELOPMENT FOR WEB-APPLICATION FOR RANKED CHOICE VOTING (PRIMARIES)

Yurakov Yevhenii¹, Sydorenko Ganna²

¹ *1 Master's student of the Department of Systems Analysis and Information-Analytical Technologies, NTU "KhPI", Kharkiv, Ukraine*

² *Associate Professor of Systems Analysis and Information and Analytical Technologies, Ph.D. tech. Sciences, NTU "KhPI", Kharkiv, Ukraine
zh.yurakov@gmail.com*

In society, important decisions have been made through voting for a long time. The voting is used to elect officials such as deputies, directors and presidents as well as to pass crucial resolutions and laws in government assemblies, universities and schools. With their votes people can often make the significant and everyday decisions, ranging from choosing the country's president to selecting a movie to watch.

The choice voting may seem like a straightforward event at first glance, but if you delve into the matter, you'll discover that it's a complex process. Voting has various implementation options, each with its own formula and conducting principles.

The purpose of this work is to create software in the form of a ranked choice voting system (primaries) that determines the leaders within a group and ranks their relative influence. During the development of the software, several analogs and key technical components were considered for implementation in an online voting support application.

The aim of the master's thesis is to develop software that allows users to automate the process of creating and conducting voting or participate in them. Additionally, the software should have a user-friendly graphical interface. The main result of this work is the developed web application that utilizes a client-server architecture.

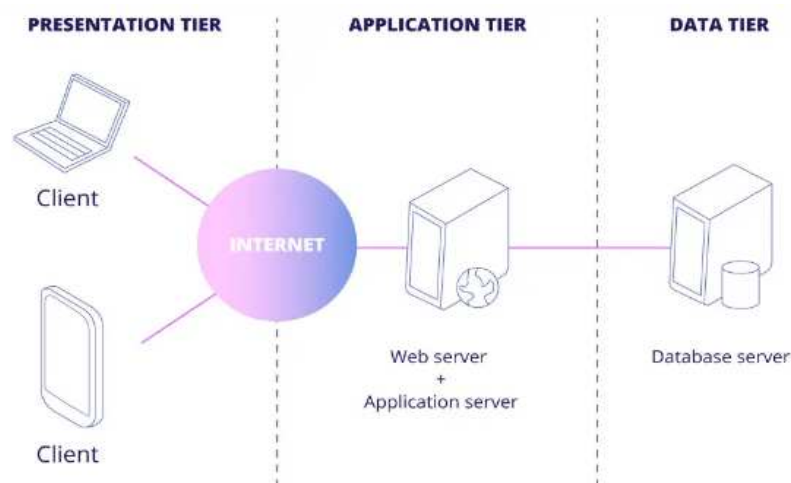


Fig. 1 – Graphical display of client-server architecture

Additionally, research was conducted to explore potential technology options for further development, and the following choices were made:

1. Entity Framework was selected as the framework based on C#. It offers many advantages that will assist in the application's development. Key benefits include cross-platform compatibility, allowing the application to work with various operating systems.

Another important feature is the ability to store data and track changes that occur in entity instances sent to the database.

2. For the application's user interface, HTML/CSS was chosen because their tools are very convenient for creating web applications. HTML provides a structural foundation, enabling the organization of text and images, while CSS provides colors, fonts, and layouts, making web pages attractive and responsive to different devices. Together, they help to create interactive and visually appealing websites.

3. Since Entity Framework was chosen for development, working with the database is done through it. Entity Framework enables the use of migration commands, allowing them to be executed using the NuGet Package Manager Console or the command-line interface for creating or editing the database.

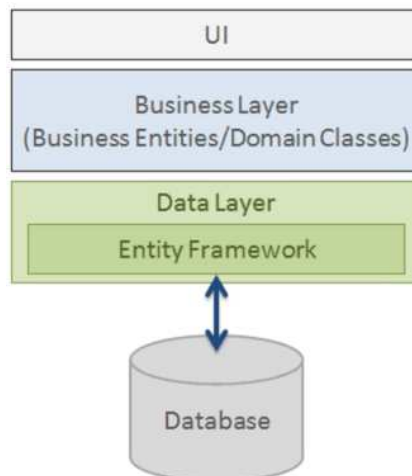


Fig. 2 – Graphical display of the Entity Framework architecture

The developed web application was tested for compatibility with various browsers and on multiple mobile devices. As a result of the work, users can:

- Register and log in to the website.
- Create, edit, participate in, and view the results of voting.
- Have access to all necessary information.
- Receive notifications about the status of voting and updates on the website.

The results of the work include the development of a system for conducting rating voting. Also in the robot there is an interface for interaction between the web application and the mobile application with the database. The software module will be split up for further development and refinement in the future.

List of references:

1. How to tabulate ranked choice voting system [Electronic resource] // www.csharp-helper.com - 2022. - Resource access mode: https://www.csharp-helper.com/howtos/howto_rank_voting.html.
2. Ranked Choice Voting / Instant Runoff Voting systems [Electronic resource] // electionrunner.com - 2019. - Resource access mode: <https://electionrunner.com/support/kb/ballot/ranked-choice-voting-instant-runoff-voting/>
3. C Sharp language tutorial [Electronic resource] // metanit.com - 2018. - Resource access mode: <https://metanit.com/sharp/tutorial/>
4. The Entity Framework Core tutorial [Electronic resource] // metanit.com - 2018. - Resource access mode: <http://metanit.com/sharp/efcore/>
5. How to use HTML and CSS [Electronic resource] // developer.mozilla.org - 2019. - Resource access mode: <https://developer.mozilla.org/docs/Learn/HTML>