Performance Evaluation System
(Weekly 10)

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1. Executive Summary

The main problem our project was created to solve is creating a new performance management system for HR of the Nazarbayev University based on the currently used Weekly10 system.

Main objectives of the project included:

- Creating a new system that had all of the functions of the current system
- Designing a new system in a user-friendly way to ensure great UI/UX, which current system lacks
- Adding new features to the new system requested by HR of Nazarbayev University

We decided that the best computing solution to achieve those objectives would be creating a website. To create a final product we used the following stack:

- **Frontend:** React.js
- **Backend:** Spring Boot, Java
- **Database:** PostgreSQL
- **Deployment:** Docker, Kubernetes

In the end, we were able to create a web application that satisfies the requirements of the project.

Our work on the project started with the design of all web pages created in Figma. We put a lot of effort into creating the best user interface and experience as it was one of the main requirements of the project.

After the completion of design we started implementing the solution using the technical stack indicated above. We used GitHub for version control and communicated with each other using the Telegram messenger app. Every week we had meetings to discuss the progress of the project and set up the tasks for the following week.

To evaluate the final project we decided to test the user-friendliness of our website by asking some volunteers to perform several tasks using the new system.

2. Introduction

The problem our project was created to solve is the need for the new performance management system for HR of Nazarbayev University. The current system had many issues: only one administrator that could add or remove new users; horrific and not intuitive user interface; lack of some features required for the proper management of the performance of an organization as big as Nazarbayev University. Our new system was based on the existing system used by HR, namely the Weekly10 system. The main motivation of our project was to easen the work of the HR department of our university and create a system that will be better than the current system.

In this report we will provide a detailed overview of our work on the project starting from the background work done before the start of the project. We will talk about the design decisions made early on and then provide information about our approach to the project (tools used during development, team management tools and the development approach we used). After that we will focus on the final product created and its evaluation.

3. Background and Related Work

3.1 Design references

Before starting the work on the new system we did a thorough analysis of an existing system. We did not have access to the working copy of a system used by Nazarbayev University at first and focused on screenshots from the demonstration done by HR. High amount of details was paid to the places where user interfaces could be improved without the loss of functionality.

We found a video demonstration of all the features of the Weekly10 system on Youtube and used it as a reference in the following designing stage. Having no direct access to the system limited our ability to recreate all the features of the current system. In the end, we decided to completely disregard the design of Weekly10 and create our own design that will still fulfil all the requirements. We decided to find other references for performance management systems to seek further inspiration for our design. Project designers were not able to find other websites that had all of the functionality we wanted to implement in our final project, but they were able to find several websites that had partial functionality of our intended final project. Those websites were used as references when designing the pages for our website.

3.2 Development references

As most of our team members had no previous experience working with the libraries that we used in this project we had to read a lot of documentation to better understand how they work and use them to their full potential. We also had to reference some online articles to properly use some of the functions.

3.3 Reasoning for chosen solution

From the start we decided that our project would be in the form of a website. The main reason was the ease of development and the current system used by HR of Nazarbayev University, also being a website. Choosing website as the main deliverable of our project had following advantages:

- Ease of development. There are a lot of tools available for the development of websites that allowed us to focus on implementing the functionalities without being burdened by the development overhead
- Clear division of labor. We were able to easily divide the tasks among ourselves as developing a website required three main components: design, frontend and backend.
- Similarity to the existing system. The current system used by the Nazarbayev University is also a website, so it will be easier to migrate to the similar system when it comes to deployment

- Compatibility with all systems. Developing a mobile or desktop application would have required us to consider all the possible systems the application would have been used on, which would have made the development process way more complex. By choosing a website as our main deliverable we ensured that it will work on any system with access to the internet

We considered developing a mobile application, but in the end decided against it. It would have made the development process more complicated and we would have needed to find a person with experience of developing a mobile application, as no one in our team had any previous experience of developing mobile applications from scratch.

4. Project Approach

4.1 Technical stack

During the development of the project we used the following software and programming languages:

- **Frontend:** React.js
- **Backend:** Spring Boot, Java
- **Database:** PostgreSQL
- **Deployment:** Docker, Kubernetes
- **Design:** Figma

For the design of the website we used a collaborative web application for development of UI, Figma. This program was chosen because it allowed easy collaboration between our two designers and had a range of features that streamlined the design stage of the development. It also allowed us to test the user flows before even starting the work on frontend and test the user experience of the design we created.

React.js library was chosen for the development of the frontend due to its versatility and the vast amount of existing tutorials that helped us during the development. The ability to build up pages from discrete components allowed us to evenly divide the job and clearly see the progress of development of each page. Moreover, we were able to switch up separate components without rewriting the whole pages when we had some changes in initial design.

For the development of the back end we used Java, more specifically Spring Boot framework. Spring Boot was chosen because of its ease of use and compatibility with our goal of creating a web application. It had built in support for many features that were required in our project.

PostgreSQL was chosen as the database management system due to its ease of use and utility. It allows high control over the structure of the database and has a great user interface making it a perfect fit for our project.

To test our project we used Docker to make sure that our project will work on any machine.

4.2 Roles

In our project there are three main roles with different levels of access to the website:

4.2.1 Employee

An ordinary employee with no subordinates of their own has very limited access to the website. They have access to the following functions/pages:

- Login and main page - employee can log into their account and access the main page that provides an overview of the reports they need to submit (or already submitted) and goals set by them
- Reports page - reports pages provides more detailed information about the reports that employee needs to fill and allows them to see the feedback on particular report given by their supervisor
- Goals page - this page gives an employee ability to see and change their goals. They can see and change the progress of each goal set new goals (KPI and competence goals)

4.2.2 Supervisor

Any employee that has their own subordinates is given a supervisor role. They have access to all of the functionality avali able to an ordinary employee and in addition can use the following features:

- Subordinate overview on the main page - in addition to the information about their own goals and reports, supervisors can see their employees progress on their goals and reports
- Employee page - supervisors can access a personal page of each of their subordinates where they can see more detailed information about their reports and goals. In addition, this page gives them access to giving feedback on each report filled out by the employee and approve progress on their goals.
- Team management - supervisors have control over their subordinates. They can add and delete subordinates to their teams.

4.2.3 Main administrator

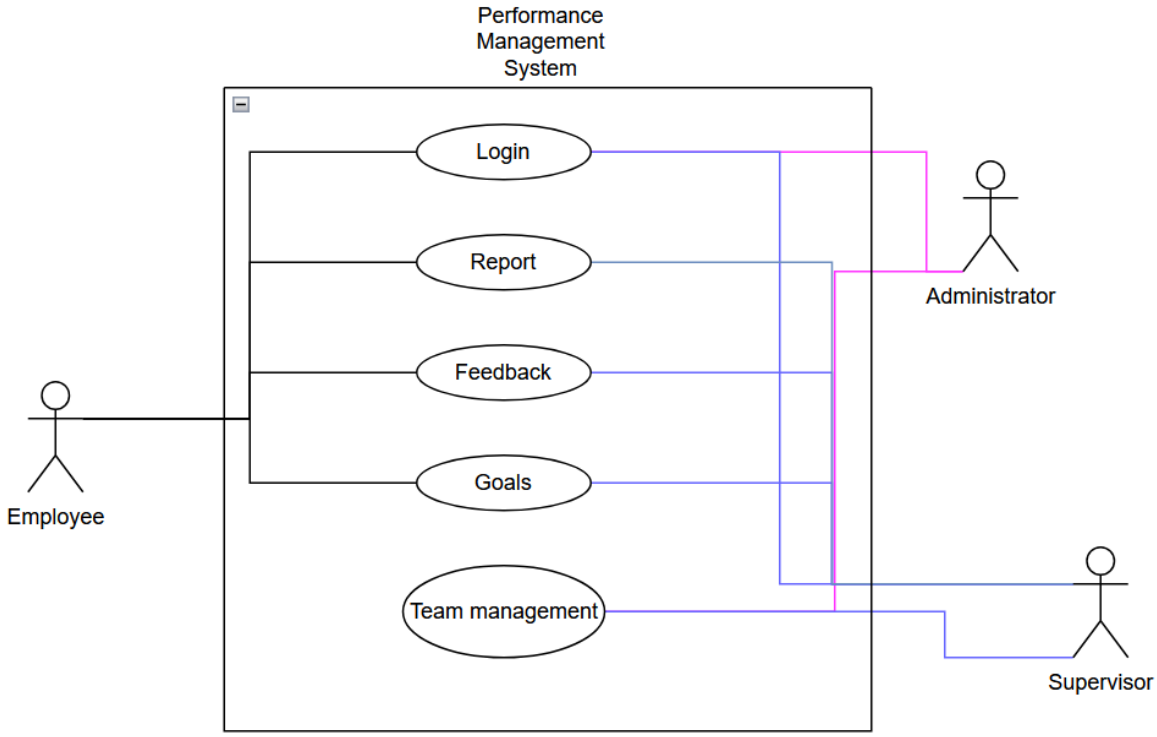
The main administrator has complete access to all the functions of the website. Aside from the features already mentioned above the administrator have access to the following functionalities:

- Setting the list of competency goals - as competency goals should be chosen from a predefined list we decided it would be best if that list was created and managed by the administrator.

- Team management - they have complete access to all the users of system and can delete and add new employees at any level of the hierarchy.

4.3 Use case diagram

The following use case diagram provides an overview of the main functionality available to each role:



Pic 1. Use case diagram

4.4 Project features

Our project's main goal was to create a new performance management system based on the existing system, so we mainly carried over the features of the existing system with some additions of our own. List of features include:

- Authentication and authorization of users
- User interface in three languages (kazakh, english, russian)
- Overview of the user's reports and goals on the main page in a dashboard form
- Report filling – each employee has access to the report filling form allowing employees to easily fill out the reports and see their progress on reports for a given period of time
- Goal setting – each employee can set their own goals and track their progress on working towards their completion. As requested employee can have maximum of

5 goals at a time, 3 of which are KPI goals set by employee themselves and 2 of which are competency goals chosen from the preset list

- Team management – as requested by stakeholders unlike the current system where only the main administrator can add and delete new employees to the system, in the new system each supervisor has control over their team. They can freely add and delete employees subordinate to them
- Feedback system – each supervisor has access to the reports filled out by their subordinates and can provide feedback on each of them to ensure proper communication between them

5. Project Execution

5.1 Overview of the work done

In the beginning of the project we decided that the first semester will be spent on designing the website and working out the logic of all the features, so that we will be able to start the actual development in the Spring semester without any overhead slowing us down.

We had a meeting with stakeholders at the beginning of the Fall semester that gave us a lot of food for thought and a clear list of requirements that we needed to fulfill with our project. This meeting was very helpful as we got to see the current system used by the stakeholders and got a better understanding of what our final deliverable should look like.

During the Fall semester we were able to successfully design most of the pages of the website with a plan to end other pages during the Winter break period. Meanwhile, we successfully submitted all of the required assignments without missing any deadline. Working on those assignments helped our team to understand what features must be included in the final product and how they should interact with each other. Our initial plan included developing an analysis feature that will use large language models to provide an overview of the employees' progress and common issues faced by them. Unfortunately, we realized that, due to our lack of prior experience of developing a website and our team lacking a proper frontend developer, we better off scrapping that feature and focusing more on developing the version of a project that had all the features of the currently used system.

Winter break period was spent with planning the Spring semester and dividing the development task between the team members. During that period our designers finished the preliminary design of all of the pages of the project. While planning we realized that development may take more time and effort than we expected. In hindsight, we should have started laying the groundwork and developed at least basic prototypes of some pages during the Fall semester.

With the start of the Spring semester we started the actual development of the project. We tried to have weekly meetings to discuss the progress of each team member, but sometimes we were not able to hold them due to the schedule misalignments. One of our main mistakes during that period was not contacting our adviser and co-adviser for evaluation and guidance on the development of the project. Additionally, we should have had more meetings with the stakeholders

of the project to better understand how aligned our solution was to the initial requirements set by them.

5.2 Team management and roles

We divided the roles between ourselves at the beginning of the work on the project. Each team member's contribution to the project listed below:

- Alimbek Alimbekov - project management and team communication; documentation lead
- Daniyar Tokhtar - web design; UI/UX design
- Gaukhar Nauryzbayeva - lead frontend developer
- Kamila Beguliyeva - web design; frontend developer
- Meirzhan Sattibayev - lead backend developer; database management;

To ensure the proper communication in the team we used the Telegram messenger app to regularly communicate with each other and discuss the work on the project. When possible we had weekly offline meetings to assess the progress of the work on the project and adjust the deadlines and tasks of each member. Even though we had some issues with time management, especially during the break and midterm/final periods, we managed to mostly follow our initial plan of development. Keeping track of each team member's progress was done by using Gantt charts and a task list kept in our chat and a separate Word document.

All of the documentation was saved on the shared Google Drive to ensure that all of the team members have access to it and can consult when needed. Clear documentation tracking and communication within the team allowed us to easily complete all of the assessments without missing a single deadline.

To keep track of the versions of the code we used the GitHub platform with one main branch and several test branches.

5.3 Team workflow

Our team followed the agile development process. During each sprint we focused on one particular page/feature and tried to finish as much of it as possible in one week. Unfortunately, some more complex features required several sprints to complete, which disrupted our initial plans a little.

Each sprint started with a team discussion of a page/feature in question to work out the details of the work needed to complete. After the discussion we focused on the design of the page when working on web pages or system architecture when working on an important feature like report submission. When the architecture/design phase was completed our frontend and backend developers met to discuss the end points and places where frontend and backend will connect and then started developing the page/feature in question. At the end of each sprint we tested the final

iteration of a page/feature to decide whether it was in a satisfying state for us to move onto the next page/feature or required some additional work.

6. Evaluation

6.1 Requirements evaluation

First step of our evaluation was to check whether our final deliverable was satisfying all of the requirements set by the stakeholders. We held a meeting where we discussed the state of our project and manually checked whether we missed any of the requirements.

During the discussion we came to the conclusion that our project met most of the requirements, including all the main functional requirements. Our final deliverable was able to provide all of the functionalities set out by the stakeholders: authentication system, report filling form for employees, feedback system, team management not only by the main administrator and better user interface to make the use of the system more intuitive.

6.2 Evaluation by stakeholders

As was mentioned in the Project Execution part of this report, we made a grave mistake of not having regular meetings with our stakeholders. We are planning to show them our final project after the finals period, as all of our team members will not be available due to the preparation for the final exams.

6.3 UI/UX evaluation

One of the main required features was the improvement of the user interface and experience as the current system's interface was clunky and not intuitive at times. We decided to evaluate the improvement of the new system by asking three volunteers to perform some tasks in the prototype of the new system. They asked to remain anonymous, so we will refer to them as Volunteer 1, Volunteer 2 and Volunteer 3. All of the volunteers were other students of Nazarbayev University. We provided them with authentication information for all three types of users we have in the system.

Case 1: Login

First task we asked of our volunteers was to simply log into the system as simple employees. All the volunteers were able to successfully login and access the main page of the website

Case 2: Report submission and checking the feedback

In this case we asked our volunteers to submit the latest report available to them and check feedback for a previously filled report (feedback and report were prepared by us). Volunteers 1

and 3 were able to successfully access and fill out the report, but Volunteer 2 tried to leave the report form. We did not implement the saving of not submitted reports yet, so they lost all the progress and had to start from scratch. Volunteers took some time to understand how to access the feedback for previous reports, but pop up hints shown when hovering over already submitted reports helped them to achieve this task in the end.

Case 3. Giving feedback on a submitted report

In this task we asked our volunteers to login as supervisors and provide feedback on a recently submitted report of a particular employee. Volunteer 3 had some trouble understanding how to access that feature, but after exploring for a few minutes they successfully completed the task. The rest of the volunteers had no trouble completing the task.

Case 4. Team management

We asked volunteers to add a new member to their team and remove them afterwards. Surprisingly, all volunteers were able to easily complete the task from the first try. We expected some confusion with the team management screen as it is the weakest part of our design in our opinion, but volunteers had no problems understanding the complex interface.

7. Conclusion and Possible Future Work

In conclusion, we think that our project is a success. The final version of the web site satisfies all the main requirements provided by the stakeholders. Each team member contributed a fair amount of work and thanks to proper time management we were able to finish the project on time. Each of us got much better at teamwork and gained valuable experience of developing a web application in a team.

Strong sides of our project are well-thought out design and system architecture that helped us tremendously during the development process. We were able to develop a website with a much better user interface and as our evaluation has shown that it is very intuitive. We were able to develop a replacement for the current system that, in addition to retaining all the features of the current system, has a better UI/UX and some new features required by the stakeholders.

Unfortunately, our project has some weak parts that require future work. Due to our lack of communication with our stakeholders we do not yet know how satisfied they are with our final product. We plan to set up a meeting with them shortly and do some work based on their feedback. Furthermore, we might try to implement the AI analysis feature that we decided to not develop due to its complexity. Now that we have finished the work on the main features, we have time to work on additional features like that.

8. References

Link to the GitHub repository for frontend: https://github.com/GN191919/new-capstone
Link to the GitHub repository for backend: https://github.com/sttmeir/senior-project

Resources used for understanding backend:

- https://mapstruct.org/
- https://spring.io/projects/spring-security
- https://swagger.io/docs/
- https://swagger.io/resources/articles/documenting-apis-with-swagger/