My CODE Challenge:

Introduction and Concept:

This document serves as a documentation of my process and my thoughts during the whole challenge. To underline my way of approaching the challenge I first wrote down a roadmap, that is also available in the folder “Documentation” as the pdf “roadmap”. I will go into every step of the roadmap and describe how I dealt with each of the given points.

Starting with finding someone who has a problem, which turns out is a challenge for itself. I started by making a list of every person I could ask. At the top of this list was my father who is, with a friend of him, an owner of the company “Colorfy”. He told me of the issues his company has because of the COVID-19 restrictions that only allow a certain amount of people in the office at the same time. I asked whether he could specify the problem, so I have a better understanding whether I am able to help him.

The next step is to receive the problem. But until then I had time to think how I want to present the challenge. I already have created a roadmap to give an understanding how I approached the challenge the moment it was given. The progress over the next three weeks however will be described in form of a protocol also available in the folder “documentation”. The major use of this documentation will be to describe my thoughts while I am working on the challenge and every problem I will encounter and how I will solve it.

My next steps will be to explain the problem and describe how I approach it. My father told me that the major problem is to organise the attendance of the people on an everyday base for all his employees and customers. Especially based on the reason why his employees want to work in the office. The office is an open-plan office with two additional smaller offices, one for the administration and one silent office. Furthermore, they have a workshop with technical equipment and conference rooms for meetings. My father told me that only twelve people are allowed at once in the office.

Based on what he told me, my first thought was to develop a website on which the employees, customers, and the managers can apply for slots to go to the office. But before I can start to work on an immediate solution, I will work out a concept of what this website should do and how it should work.

The first question that raises is how to decide who is allowed to go to the office if more than twelve people apply for the office slots. My first approach for this is, to sort the entries by a priority list. I designed such a priority list and presented it to my father whether this would fit his idea and he was convinced that this idea was good. This priority list consists of five priorities.

The highest priority are customer meetings in the office.
The second highest is the usage of technical equipment in the office.
The third highest are project meetings in the office.
The fourth highest subject team meetings in the office.
The least are employees that just prefer to work in the office without further reason.

I also added two further restriction which includes that two slots must always be available for one manager and for one of the administration team. For better clearance and order I am going to determine that the registration for the slots of the next week must be done until the end of the Friday of the week the person is currently in. To make this a little more dynamic and to allow more than twelve people in the office on one day I am going to make some more alterations. The first alterations

will be that two of these twelve slots can only be assigned until the day of occurrence in the short-term. To display better what I mean by that I will give an example:

> Let us say in the current week ten employees, one manager and one of the admin team assign for the next Monday each with their own reason to be there. After the registration time is over, only eight of the employees are allowed to go, which will be determined by the priority list. That is because only ten slots can be assigned in the current week for the next one, the other two slots can only be assigned for on the same day and because two slots are already taken by the manager and the admin team. So, in the next week on the Monday if someone has an urgent appointment or need to be in the office for whatever reason, they can take one of the two short-termed slots.

My next alterations will allow more than twelve people to work on one day in the office. The slots will be only for half a day which means every day 20 slots are available to apply for, ten slots per time window, and four short-termed slots, two for each time window, for each day. For the whole week that means there are 120 slots in total available. I told my father of the extensions I made, so we were on the same page and he approved them.

Now I have the general concept of what this website should be able to do in general. My next step will be to think about how this website should look like and what technical features it should contain that I think are feasible to implement in the given time that fit my concept. For this I have made draft how I vaguely want my website to look that will be available as an image in the folder “Website designs” as “first.draft”. I basically imagined that the UI should be some sort of a calendar from Monday to Friday of the current week. As my draft shows both time windows should be seen, and it should be able to assign for the short-termed slots for each time window. Furthermore, every entry will be enlisted in the time window.

It should be able to swap to the previous week to see the entries of that week and to swap to next week. In the next week employees, customers and so on should be able to assign themselves for one of the time-windows. My current idea is that if they click on the assign button some sort of pop-up window opens where they can enter their name and their reason to be in the office, this form should somehow be able to save the entries so the person does not need to entry their name over and over again.

Now I know what the website is supposed to do and how it should look like and what technical features it should contain. During the whole process of my design idea I have ignored data security. But I am aware that to display every name of everyone who has assigned is extremely critical as well as just giving everyone the option to write down the name they want. I have decided to ignore it for now because of the limited time. However, I am going to pick this up at the end of this documentation in my reflection.

Implementation

I know that I want to create a website, but I do not know anything about making a website. So, I started doing some research on the internet, more specifically on YouTube. There I found a video that explained everything that is needed to become a web developer. Before I go into detail, I want to mention that this YouTube video and every other video I will use will be listed in the document “sources”.

This video told me that a website consists of the frontend and backend development. It showed which tools could be used for frontend and which tools could be used for backend. I learned that frontend is the client side which usually consists of the design created by HTML and CSS added with some functionality with JavaScript that is visible to the user. Whereas backend development is on the server

side and rather the data management and processing which is usually invisible to the user on the website.

I started by learning the basics of frontend development with HTML and CSS and began to implement the draft I made into HTML and CSS. The result can be seen in the image “first.desgin” in the folder “Website designs”. Currently it only contains a header and five blocks that will represent each day from Monday to Friday, currently buttons to assign and to change the week are still missing. Which means I in the next step I added buttons to assign and to change the week. As of yet they do not have any function, but I will be implemented this with JavaScript. The finished design I made with HTML and CSS can be seen in the image “finished.design”. Furthermore, I learned and worked with the framework Tailwind which makes it very easy to implement a responsive design to my website. Which means while the blocks are displayed in a row on bigger screen they will be displayed in a column as the screen is getting smaller.

To finish my frontend development or at least to implement some of the features I mentioned in my concept I have learned the fundamentals of JavaScript and the framework React that makes it easier to implement functions. Before I can start to program my buttons, I have to add React to my project and change basically the whole structure of my project.

After implementing the design into React I started to think about what exactly I want to implement while not to spend too much time on the frontend development to also implement a backend to my website. I wanted to have the possibility to add new entries to one time-window and also be able to delete it. Instead of having a pop-window when clicking on the assign button, which was my first idea, I have now implemented a form to enter the first and last name and the reason to be in the office and then to submit the information. The entry will be added above the form and on the right side of every entry will be a “x”-button to delete every entry that was made. Currently every time the website gets reloaded the entries will vanish, because of a missing backend where the data will be saved. Furthermore, I have added Redux to the frontend that helps to store the data or in combination with a backend manages the data of every component of the website in this case it manages the data that is inserted by the form.

Although there are still missing a lot of features, like changing the week and the whole system that only twelve are people are allowed at the same time. Furthermore, every entry that will be made will be displayed in every time window which is not intended and although I know why it is behaving this way I do not have the knowledge how to implement the improvement due the limited time. I will focus my attention to backend development for now to at least have a full stack website. The current look of my website can be seen in the image “frontend.design”. Depending on the time left I will try to implement as much of the features I mentioned in the concept as possible after adding the backend.

Now I am going to learn the basics of backend development to be able to save the entries and to deploy it on the internet. Whereas JavaScript is the most popular used programming language especially for frontend development, there are different programming languages that can be used for backend development. Because I already learned JavaScript, I am going program it with JavaScript and Nodejs which is one of the most popular used method.

For my backend I learned Express.js which is a framework for Nodejs to make implementing the server easier. Furthermore, I decided to use MongoDB as my database. My first step was to create the route to the API that contains my database of MongoDB. After adding the database to the server, I had to change how the data, that gets implemented through the form, will be saved so that everything will be stored inside my database so it will be saved even when the website will be reloaded. Although it does not sound like very much it was very time consuming to implement my backend and to connect it to my frontend but now I have created a full stack website.

To give a better understanding of my project I wrote the structure of this project down in the “ReadMe” files in the also in the “Documentation” folder. I will explain the purpose of each file and what belongs to the frontend and what to the backend. Furthermore, I will add with which framework and language were written in.

Reflection

Now that the time is over, I want to review the progress I made, what I learned and what is still missing.

I was able to create a full stack website without any previous knowledge. I learned the basics of frontend development with HTML, CSS, and JavaScript and also how to use the frameworks Tailwind and React and the library Redux for data management. For the backend I learned how to implement an API that can save the given Data that will be inserted by the frontend, with Express.js and MongoDB. Although I would say I learned a lot in during these three weeks I am aware that I am only scratching the surface and I am really looking forward for learning more. These three weeks were really demanding but I had a lot of fun learning everything during this time and it confirmed my interest I have in Software Engineering.

I also want to list everything I was not able to implement from my concept into my website. It is not possible to change the week, furthermore the dates that are shown next to the name of the day are not generic and will not be able to change unless going into the code and change them manually. In addition, the whole registration idea that twelve people are allowed and that they should be sorted by priority is not implemented as well. Currently every entry that is made by one of the forms on each day is displayed in every time window. The reason for this is the lack of knowledge because of the limited time I had to acquire it, but I am still very content with end product.

Although a lot of features are missing, I want to review my website and reflect what could be improved when locking on the concept I made. As I already mentioned at the beginning, I have ignored data security for the most part regarding the personal information that would be shared on the website. One major way to improve this would be implement an account system. For example, every employee and manager would have one account created with email-address, password, and their name. At this point it would still be possible to pretend to be someone else but to avoid this I would suggest that one or two owner accounts exist, run by the manager or someone else, that will creating the accounts with a “colorfy” email-domains, that also has access to every account to either delete it or change something about it. This would also mean that not every name will be openly displayed on the website just placeholder that indicates how many have assigned for a certain day but not who. Only the owner accounts would be able to see this exactly who assigned. When working with accounts it would also possible to add several more features like getting a verification email on the previous day for the next day one has assigned for. Further improvement could be to display the number of available slots for the week and each. Especially an account system gives further possibilities on how to manage the applying system.

Furthermore, I also thought about how this website could be made available for other companies if it would contain every feature. For example, the owner-accounts could be able change some variables like how many people are allowed in total in one office or how many short-termed are needed and other things. And maybe include the office structures and assign employees based on the rooms that are available for the company.

This are only some ideas on how to improve the concept in general independent on the current state of the website. However, until my website can be really used, I have to implement the basic features and so on to really think of improving it.

My project is also available on GitHub with several different versions of the project:
https://github.com/BrokenBladee/colorfyoffice
My website is deployed via Heroku and is available on:
https://www.youtube.com/watch?v=93p3LxR9xfM

Thanks for reading it until here.

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