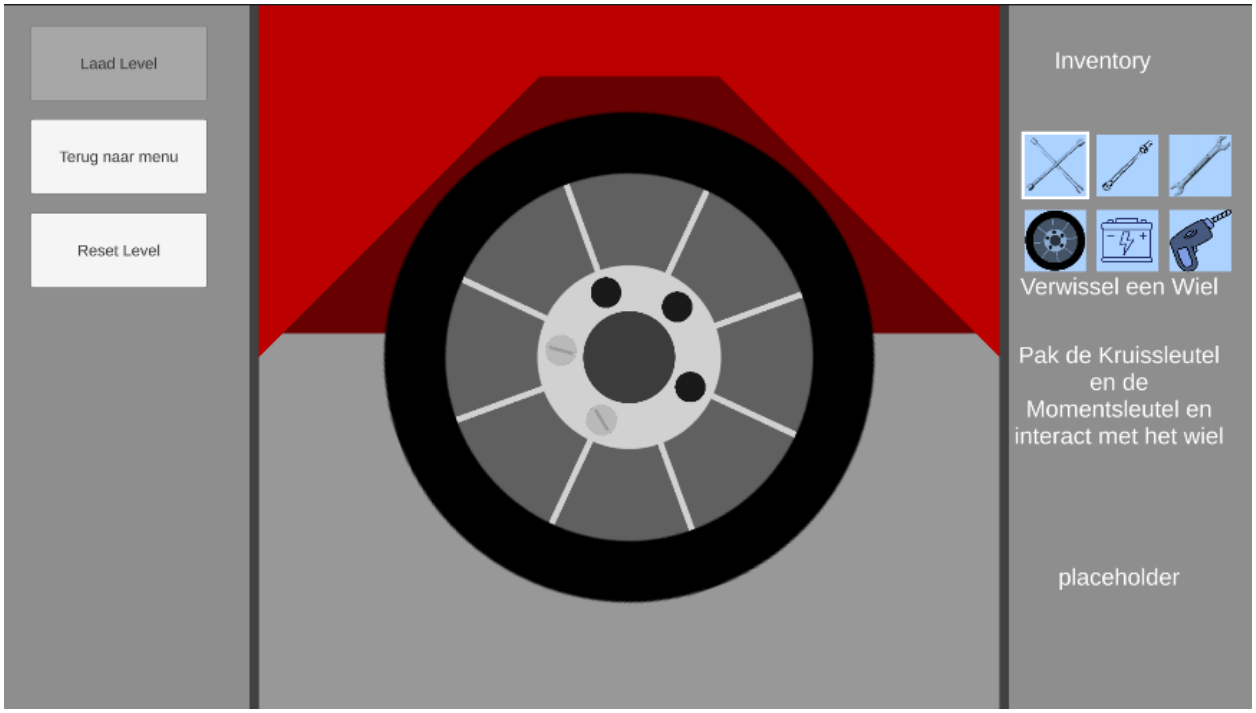
PROJECT REPORT

Image from my project: Automotive Level Editor



Kaan Gögcay

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PREFACE

In this document I will take you through my entire project. Instead of writing lots of duplicate paragraphs, I will reference the other documents I delivered in the same zip as this one.

INTRODUCTION

WHO AM I?

My name is Kaan Gögcay. I am a 20 year old IT student and have interests in sports, competition and gaming. This is my 3rd year in Software Development. I have also followed a specialisation on Artificial Intelligence. I have 2 years of coding experience in C# and I also have quite some experience in Python and Dreams. Next to that I also have limited experiences in HTML, CSS, TypeScript and Java. I'm also experienced with Photoshopping, Video Editing, and Designing. Currently I am also event manager of the Dutch community of a video game. That means I try to organise fun online and offline events for the Dutch community of that game.

WHO IS MY STAKEHOLDER?

Tim Waals is my stakeholder. He's a man with many interests like making music, in and outside a band, camera work, psychology, travelling, automotive and teaching. Currently he is an automotive teacher, but before teaching automotive he was a mechanic for many years. He also explained that working as a mechanic before becoming an automotive teacher, helped his image and credibility a lot in the school. He also used to be a cameraman and had a lot of fun filming but, in the end you also have to edit what you have filmed and since that felt more like a chore he stopped working as a cameraman.

WHO IS MY SUPERVISOR?

Erdinç Saçan is my supervisor. Erdinç has interests in Business and AI. During my internship I could always reach out to him if I had any problem. Erdinç was also the person who sent us to webinars and events or made us research certain AI websites.

PROBLEM / OPPORTUNITY

PROBLEM

The Automotive school I am making an application for only has one big practice garage. Inside this practice garage teachers explain to their students how they can for example change a tire or change the car battery. The problem is that we have multiple classes sharing the same garage. therefore they can't spend too much time per class in the garage. This means not all students get the chance to experience what it feels like to do these car related actions in real life.

SOLUTION

My stakeholder Tim, came up with a neat solution to this problem. His solution is to build a serious game in which students can practise these car related actions. This gives students prior knowledge about how to work with real cars. If the students visit the practice garage with prior knowledge, they will repeat processes they have practised on the computer, which will make it easier to learn. Also more students, maybe even all students will get the chance to practise in the practice garage, since everyone will be trained and quicker.

NOTE

I was also asked to make it in a 3D environment so that students really get the feeling how it will be in real life. Later on we noticed that another intern, Luuk, had the exact same assignment as me. So we decided that one would create his project as a 2D implementation and the other as a 3D implementation. Since Luuk has experience making a 3D-environment and I have experience in making a 2D-environment, it only would be logical for me to build the 2D implementation of the application.

GOAL

The goal is to prepare the students for the automotive tasks. So that if they end up in the garage they know what to do and recognize processes. This way both the students and the teachers use their time in the garage more efficiently.

RESEARCH QUESTIONS

I have two main questions. As a result, some of my research questions are related to one main question, while the remaining research questions are related to the other main question. You can identify which main question a research question belongs to by looking at the number before the dot. The number after the dot represents the specific index of the research question.

1.1 How do we make the Level Editor as user-friendly as possible for the teachers?

1.2 How do we make the Play Section as user-friendly as possible for the students?

1.3 How much should and can we take into account students with disabilities?

2.1 What is the most suitable programming language and framework to use?

2.2 Is this even the best solution for the problem?

Research Question nr.	**Strategy**	**Method + Description**	**Result**
1.1 & 1.2	Lab, Field, Workshop, Showroom, Stepping Stones	To answer these questions, I will use a combination of methods. Lab - Usability Testing: Testing the application with a student/teacher. By having the application tested, I can find out if everything is clear and if there are any issues with the application. Field - Participant Observation: When I have the application tested by a student/teacher, I will be present to observe their behaviour. This way, I can understand the challenges people encounter when using the application. Workshop - Sketching: After testing and receiving feedback, I can start shaping ideas. This can be done through sketching on paper or digitally on the computer.	This process works great, but I haven't utilised it too much. Therefore my application lacks user friendliness.

		Showroom - Co-reflection + Provocative Prototyping: Reflecting with the stakeholder, we discuss the ideas that emerged from Usability Testing. We also review the current state of the application together to see if the stakeholder feels that anything is missing. Stepping Stones - Prototype: After the entire process, I have a clear understanding of what needs to be worked on. This allows me to create a new prototype and repeat the whole process.	
-	-	-	-
1.3	Library	Library - Expert Interview: To determine this, the best approach would be to interview the stakeholder, as they are a teacher themselves and are therefore aware of the limitations present in the education system and what considerations we should or can take into account.	We don't have to take student disabilities into account.
2.1	Field, Library, Showroom	Field - Alternative Solution Analysis: I have researched in which other ways we can realise a solution for the problem of the stakeholder. Library - Cost-Benefit Analysis: When looking over the other possible solutions I took costs into account. This helps to identify solutions that are not suitable from a cost perspective. Showroom - Stakeholder Consideration: This strategy involves involving stakeholders and considering their needs in the research. I considered the wishes of my stakeholder and assessed the	Both VR and MR solutions are too expensive for realistic use. AR would've been a neat solution, but with the release of Wintor, an AR program wherein you can create a list of tasks, we left the idea.

		feasibility of the solutions.	
2.2	Workshop	Workshop - Experiment with Sample Projects: I try working with several coding languages and environments and try to understand the language/environment by making smaller sample projects. Once I feel like I like the language and environment I will use it for the rest of the project.	I will use C# + Unity and not use JavaScript + Phaser.

APPROACH

For my project me and my stakeholder decided to work in sprints. Every week I had a talk with my stakeholder. In this talk I would show the current state of the project. My stakeholder would then give me feedback on what I'd done. In the end this process was really useful because getting weekly feedback made me make sure I was satisfying the stakeholder's needs. You can find more about this weekly process in "Research/Toegankelijkheidsonderzoek v3.2.pdf" in the section "Deelvraag 1.1: Hoe maken we de Level Editor zo toegankelijk mogelijk voor docenten?"

PROCESS DESCRIPTION

I worked in 4 phases: analyse, design, realise and advise.

ANALYSE

Identifying the Problem

My stakeholder explained his problem to me. While he was talking I made notes to make sure I didn't miss anything. I also asked him questions as soon as something wasn't clear.

Choosing a solution

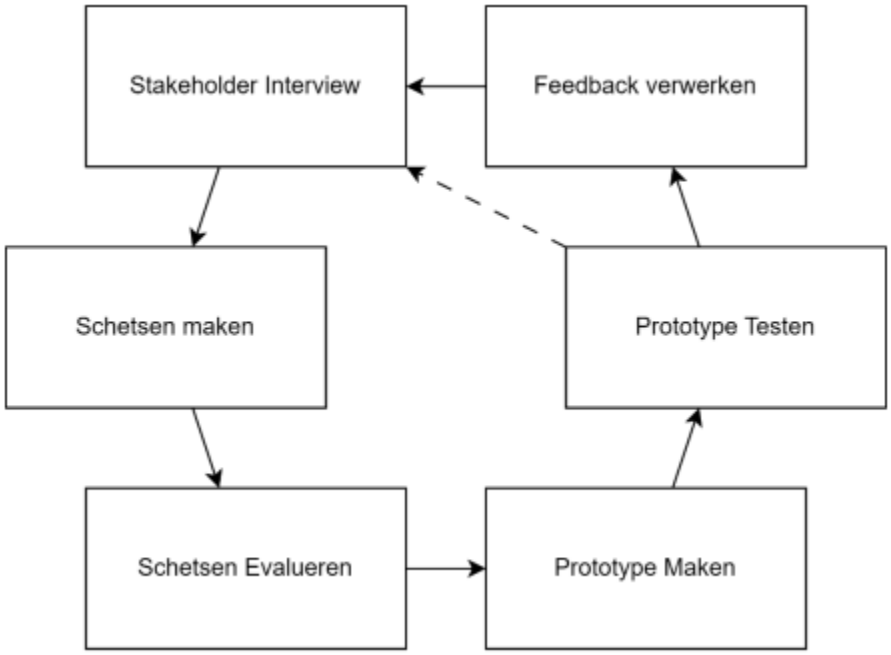
I interviewed my stakeholder about what he wants in his solution and why he wants it. He told me he wanted a solution that implements XR. I have researched the possible techniques we can use to realise a solution including XR techniques. More about this in my Research Document, which is located at the following folder, "Research/Toegankelijkheidsonderzoek v3.2.pdf" (Subquestion 2.2).

CMD Method Packs

I have conducted research using the CMD method packs. CMD method packs are a more elaborate version of the DOT-framework research method.

Iterative Process

For the design process I used the following feedback loop. It consists of 6 phases that we tried to loop weekly.

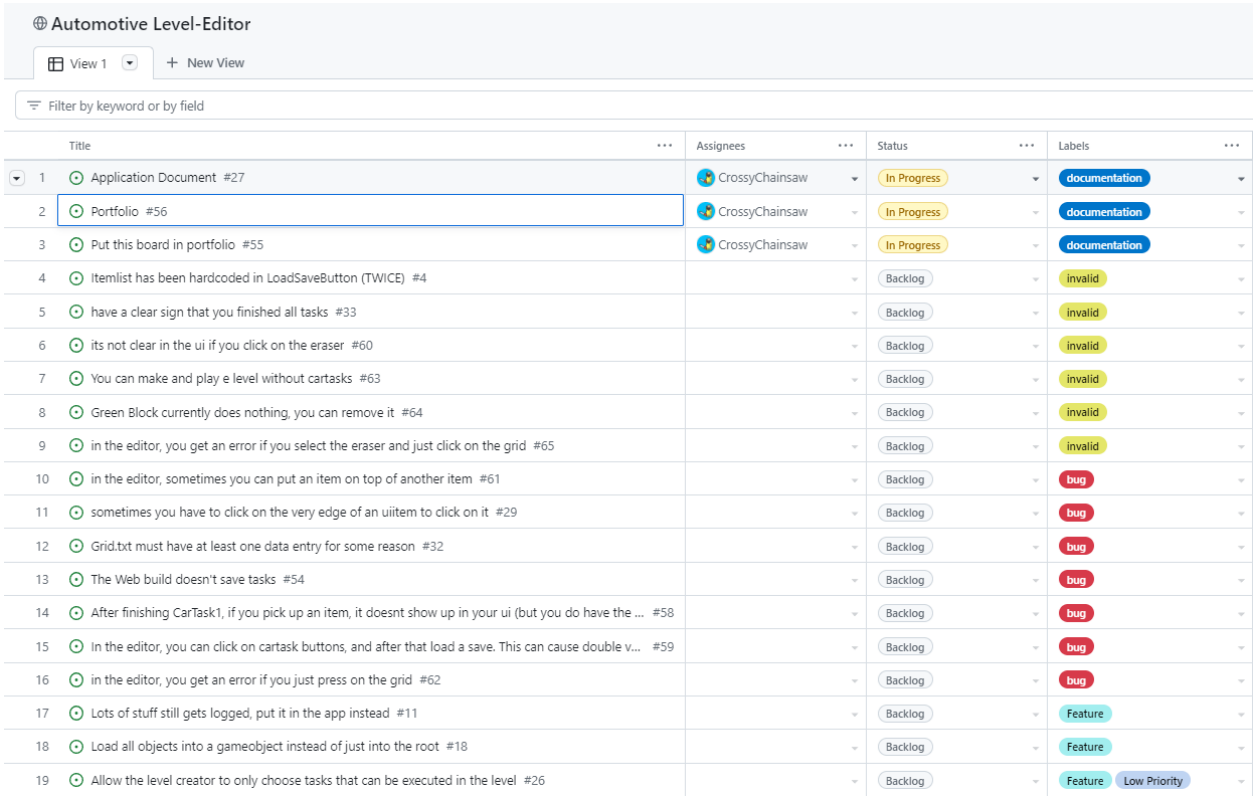


More about this iterative process in my research document. “Research/Toegankelijkheidsonderzoek v3.2.pdf” (Subquestion 1.1).

REALISE

Project Board

During my internship, I worked on the application on a daily basis. To keep track of tasks and progress, I utilised a project board on GitHub that resembled a Scrum board. This board allowed me to see what tasks were still pending and which ones I was currently working on. It provided a sense of progress and helped me understand the amount of time remaining for completion. Additionally, it enabled me to prioritise tasks and make decisions about dropping less important ones if needed. Here's an image of the project board. This project board also has been added to the same zip as this reading guide. "Realise/Project Board.png"



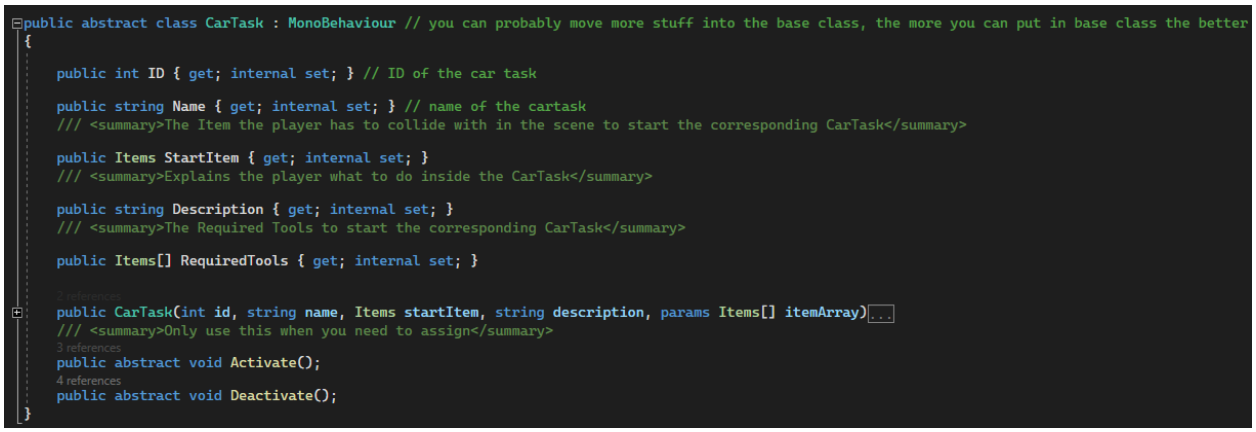
	Title	Assignees	Status	Labels
1	Application Document #27	CrossyChainsaw	In Progress	documentation
2	Portfolio #56	CrossyChainsaw	In Progress	documentation
3	Put this board in portfolio #55	CrossyChainsaw	In Progress	documentation
4	Itemlist has been hardcoded in LoadSaveButton (TWICE) #4		Backlog	invalid
5	have a clear sign that you finished all tasks #33		Backlog	invalid
6	its not clear in the ui if you click on the eraser #60		Backlog	invalid
7	You can make and play e level without cartasks #63		Backlog	invalid
8	Green Block currently does nothing, you can remove it #64		Backlog	invalid
9	in the editor, you get an error if you select the eraser and just click on the grid #65		Backlog	invalid
10	in the editor, sometimes you can put an item on top of another item #61		Backlog	bug
11	sometimes you have to click on the very edge of an uiitem to click on it #29		Backlog	bug
12	Grid.txt must have at least one data entry for some reason #32		Backlog	bug
13	The Web build doesn't save tasks #54		Backlog	bug
14	After finishing CarTask1, if you pick up an item, it doesnt show up in your ui (but you do have the ... #58		Backlog	bug
15	In the editor, you can click on cartask buttons, and after that load a save. This can cause double v... #59		Backlog	bug
16	in the editor, you get an error if you just press on the grid #62		Backlog	bug
17	Lots of stuff still gets logged, put it in the app instead #11		Backlog	Feature
18	Load all objects into a gameobject instead of just into the root #18		Backlog	Feature
19	Allow the level creator to only choose tasks that can be executed in the level #26		Backlog	Feature, Low Priority

Whenever I encountered challenges or got stuck while working on the application, I could rely on the support of my fellow interns or seek assistance on the corresponding Discord-channel. This collaborative environment encouraged teamwork and ensured that I could overcome obstacles effectively.

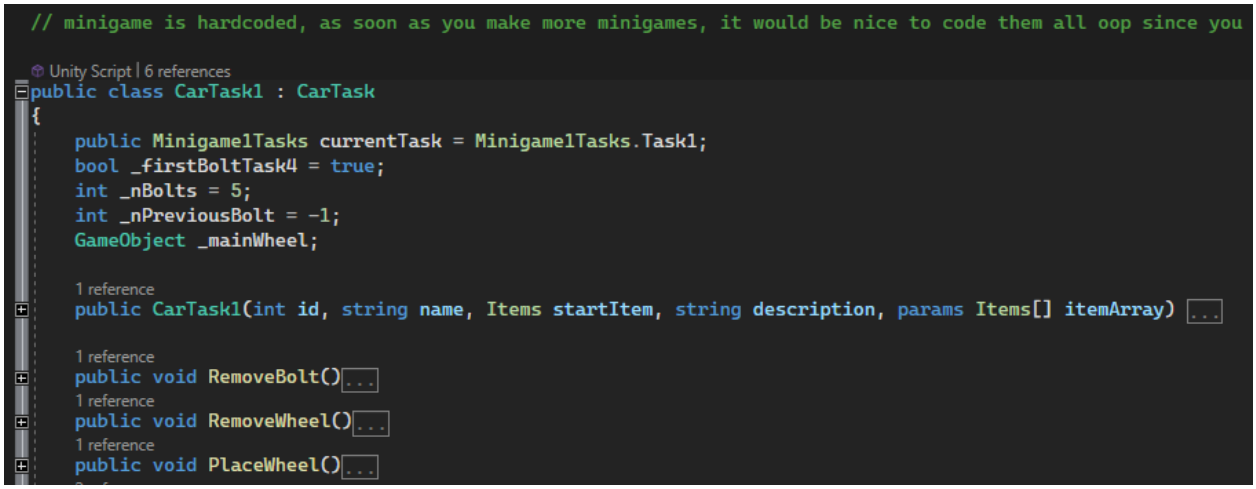
By consistently dedicating myself to the project, using the project board, and seeking help when needed, I successfully realised a minimal viable product during my internship.

Coding

By applying my knowledge of OOP, I developed efficient and well-structured code, making the project more adaptable and easily expandable. By following SOLID principles, I designed code that was flexible and could easily be adjusted to meet changing requirements, allowing the project to grow alongside the company's evolving needs. Here's an example of me using Base and Child classes for better maintainable code:



```
public abstract class CarTask : MonoBehaviour // you can probably move more stuff into the base class, the more you can put in base class the better
{

    public int ID { get; internal set; } // ID of the car task

    public string Name { get; internal set; } // name of the cartask
    /// <summary>The Item the player has to collide with in the scene to start the corresponding CarTask</summary>

    public Items StartItem { get; internal set; }
    /// <summary>Explains the player what to do inside the CarTask</summary>

    public string Description { get; internal set; }
    /// <summary>The Required Tools to start the corresponding CarTask</summary>

    public Items[] RequiredTools { get; internal set; }


    2 references
    public CarTask(int id, string name, Items startItem, string description, params Items[] itemArray)...
    /// <summary>Only use this when you need to assign</summary>
    3 references
    public abstract void Activate();
    4 references
    public abstract void Deactivate();
}
```

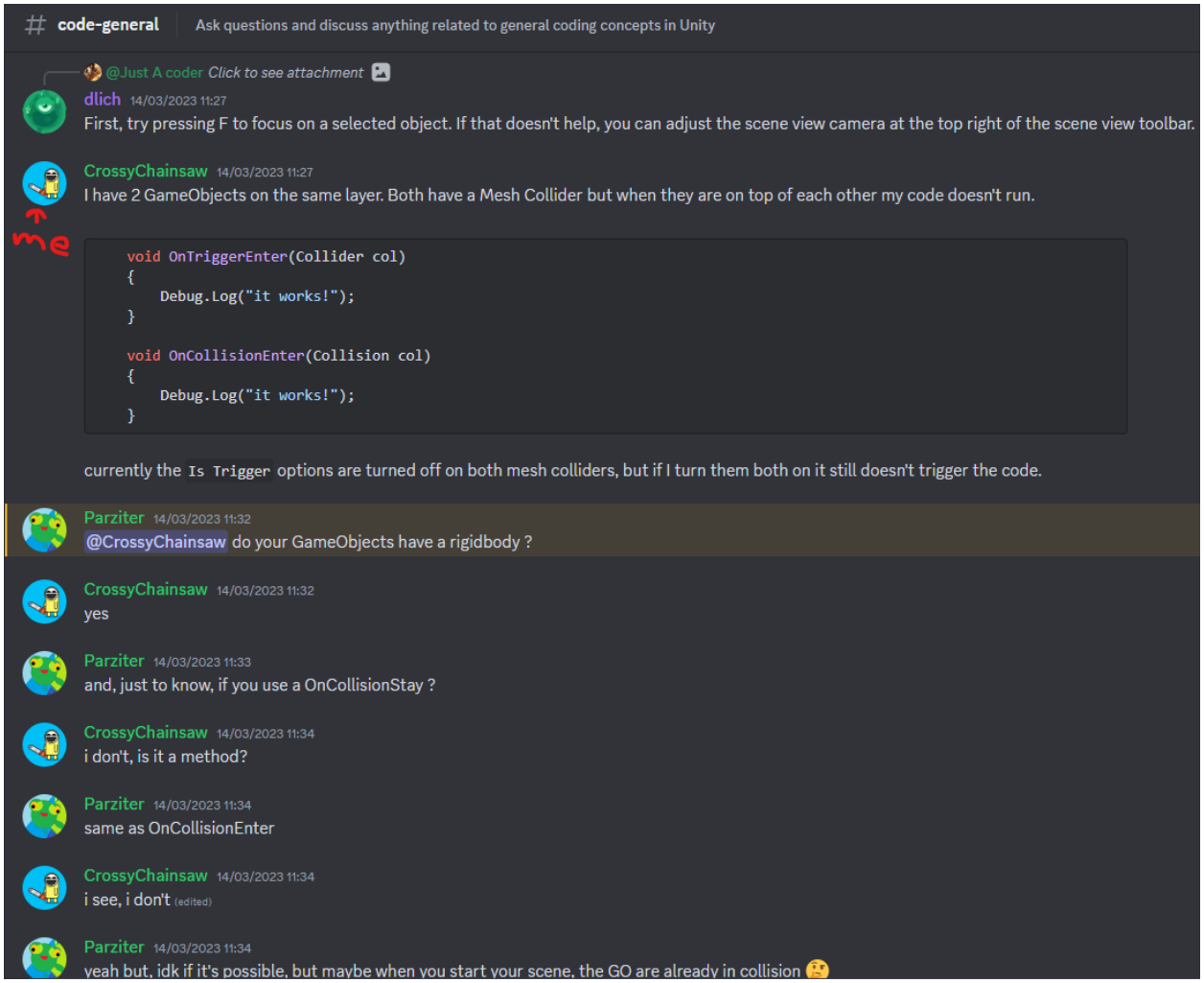


```
// minigame is hardcoded, as soon as you make more minigames, it would be nice to code them all oop since you

Unity Script | 6 references
public class CarTask1 : CarTask
{
    public Minigame1Tasks currentTask = Minigame1Tasks.Task1;
    bool _firstBoltTask4 = true;
    int _nBolts = 5;
    int _nPreviousBolt = -1;
    GameObject _mainWheel;

    1 reference
    public CarTask1(int id, string name, Items startItem, string description, params Items[] itemArray) ...

    1 reference
    public void RemoveBolt()...
    1 reference
    public void RemoveWheel()...
    1 reference
    public void PlaceWheel()...
```

Problem Solving

While working on my application, I encountered bugs and issues. To solve them, I sought help from other interns and used the corresponding Discord-servers. By discussing the problems with my peers and getting advice from the online community, I was able to find solutions and fix the bugs in my application. This collaborative approach helped me overcome challenges and improve my coding skills.

Here's an example of me seeking help on a Discord-server.



About seeking help from other interns, since that happened in real life I can’t share any example or image.

ADVISE

To guide the next intern on my project, I provided clear documentation to help them grasp the project's structure and coding standards. Within the documentation, I also documented any identified code smells and bugs, along with recommended solutions. Also did I include ideas and possible solutions for that. This enabled the intern to proactively handle potential challenges and resolve them efficiently. You can find the document at the following location, “Realise/Automotive Level Editor Docs v1.0.pdf”.

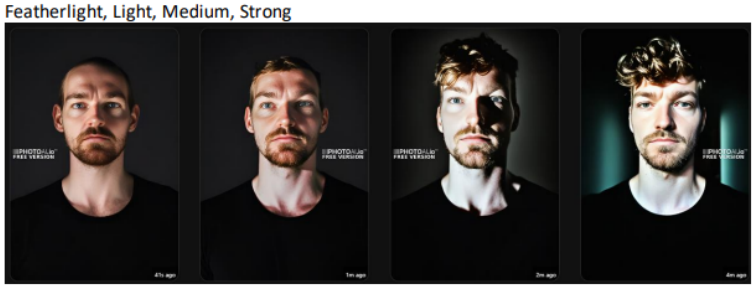
ADDITIONAL DUTIES

For the company I had to often visit webinars, events and hackathons and afterwards document my experience. Also did I have to research certain websites that make use of AI, such as Flair.AI or photoai.com. Here’s an example straight out of the photoai.com research. “Extra Werkzaamheden/Photoai.pdf”.

Op de website PhotoAI staan getrainde modellen die je kunt gebruiken. Met het model Pieter kun je een mannelijk gezicht op een foto vervangen. Echter is het gezicht dat in de afbeelding wordt verwerkt wel altijd de zelde personage. Laten we samen een voorbeeld bekijken,

Stel we pakken een random afbeelding van de website (om zelf een plaatje te uploaden moet je een abbonement nemen)

Dit is het resultaat met het Pieter model. Van links naar rechts zie je steeds meer model invloed. je kunt kiezen tussen 4 opties, hier zijn de vier opties van links naar rechts: Featherlight, Light, Medium, Strong



More about these duties inside the folder “Extra Werkzaamheden”

CONCLUSIONS / RECOMMENDATIONS

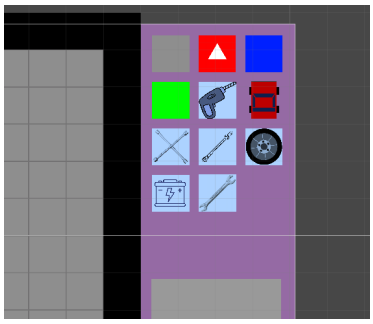
My recommendations are about current bugs, code smells, ideas and opportunities. Here are a few examples of recommendations to get a brief feeling of what to expect.

LOAD SAVE BUTTON

LoadSaveButton contains hardcoding which can be removed. By removing this hardcoded piece of code, you will save yourself time in the development process. This class is made to expect a list of prefabs inside the Unity Editor. The problem is that you need to add a new prefab to the list every time you create one. To fix this, you can make the class search for the prefabs by using the function *Resources.Load("prefabs/your prefab")*. I would advise to solve this code smell as quickly as possible, since it's used in both the level editor and the plays section. So fixing it will save lots of time in the development process.

THE INVENTORY IN THE EDITOR

The inventory inside the Level Editor needs all items to be hardcoded onto it in the Unity editor for it to function. You can make this a simple dynamic process, which removes the need to hardcode a new item each time you want to add a new item. As reference you can look at the classes *CarTaskButton.cs* and *CarTaskButtonCollection.cs*. In these classes the same process has been executed but dynamically.



BUILD AS WEBGL ONCE IN A WHILE

The app must be hosted on a website in the end. So, make sure to check if your application runs the same way on a WEBGL build as it does in the Unity editor. Otherwise it might give you problems near the end of the project.

CODING SUPPORT

Whenever you have a problem you can't solve by looking it up on the internet, you can always ask for help inside the following two Discord-servers.

Unity Discord Server: https://discord.gg/unity (Official Unity Discord) Coding Discord Server: https://discord.gg/code (The Coding Den

LOCAL DATA PROBLEM

The current idea was to open file explorer as soon as you click load level. And the same for saving a level. So that you can import and export levels into the program. This hasn't been realised due to not having enough time. If you do want to add it, discuss this with the stakeholder first. Look up the following two things -> OpenFileDialog, SaveFileDialog

Right now we use textfiles to save and load data, but this doesn't work on the WEBGL build so you will have to find an alternative.

The full details of all my recommendations can be found back in the following document. "Realise/Automotive Level Editor Docs v1.0.pdf" in the section Recommendations.

PERSONAL REFLECTION

In my reflection I will explain how I expected a process to go, what actually happened and what I learned from it.

PERSONAL GOALS

Before I started this semester I set 3 personal goals for myself.

Leadership: *I feel like I can be a good project leader with a select group of members. But I'd like to become a leader that can lead any type of group to success. But I don't know how I could accomplish this in the internship.*

Expectation

I expected to be put in a project group with other interns and experts together. I expected the role of scrummaster to rotate around. I wanted to be a better project leader. A project leader that can lead the group to victory no matter who's inside the group.

Reality

I've been put in a small team, me and my stakeholder. My stakeholder knows everything about automotive and I know about coding and together with his knowledge and my skills we shaped a serious game.

What did I learn?

During our collaboration I let my stakeholder come up with ideas and I always told him to explain his ideas exactly how he wanted them. Later we would look at how we could realise this into my application. My stakeholder told me that he really liked that he had the feeling that nothing was impossible. That's definitely something to consider for the future.

Time Management: *I have always hated time management inside software development. I never know how long something will take and I believe that it's not weird because you also have to take into account research and the time it takes to understand a topic before you can actually work on it. I can work on this by doing point poker and keeping track of how long stuff takes. And in the end I can compare it to see if I was accurate*

Expectation

Be inside a project group where we would play point poker to decide how long certain tasks will take.

Reality

Since I was the only one who was working on the project I thought it was unnecessary to play point poker for each task. Usually it's a good way to make sure the rest of the group is doing the task they should work on. But if you are on your own. You are the one that has to do everything anyway. I made use of a Kanban-board. This was very useful because I could always see how much still had to be done, therefore I also had an estimate of how much time I needed to finish the project.

I also made a planning from the start of my project. Inside this planning I had to guess which week I would do what but. It was really hard for me to do that.

What did I learn?

With the Kanban-board I indeed had a very good structure. But something to take into account according time management is, I started off my application with 0 experience in the framework I used. That resulted in low level code in my application. Since I thought I had to finish my application this semester. I didn't mind the low level code being in the app and rushed through it so I could finish the application. Later on I found out the application didn't have to be finished. So for next time. It's good to be engaged better into the company so I'm aware of these types of things. Also when I did find out it might have been a good idea to prioritise all code to be high level instead of a rushed through application full of code smells.

But on the other hand, some people in the internship only care about how the application looks and can't appreciate a strong backend. This put some pressure on trying to make the application look nicer, while there were more important things to do.

I mentioned how I found it hard to plan through an entire semester from the start. Something that could help me next time is reading through canvas entirely. This way I can at least plan in the more important occurrences in my planning, for example company visits.

Professional Communication: I want to become more professional in the way I communicate digitally. I chose this because the product owner from the previous semester let me know I could work on that. I can work on this by communicating professionally to my semester coach and my intern coach. With professional I mean formal

Expectation

Every now and then have contact via mail with my stakeholders and supervisors

Reality

Mostly mail contact with my company supervisor. Weekly contact with my stakeholder in person.

What did I learn

Check my mail more often. There were times where I didn't check my mail for 2 days. This meant that sometimes my company supervisor felt ignored for 2 days while I just kept forgetting to check my mail. So check mail more often.

LEARNING OUTCOME 1: PROFESSIONAL DUTIES

*You carry out the **professional duties on a junior bachelor level** resulting in **professional products in line with the IT-area** you are working in.*

Professional duties on a junior bachelor level = All or a subset of the activities Analysis, Design, Realise, Advise, Manage&Control. As a reference use: 1) the HBO-I framework on proficiency level 2, 2) the level as required in OE3 or OE4

Professional products = end products and intermediate products as a result of the professional duties

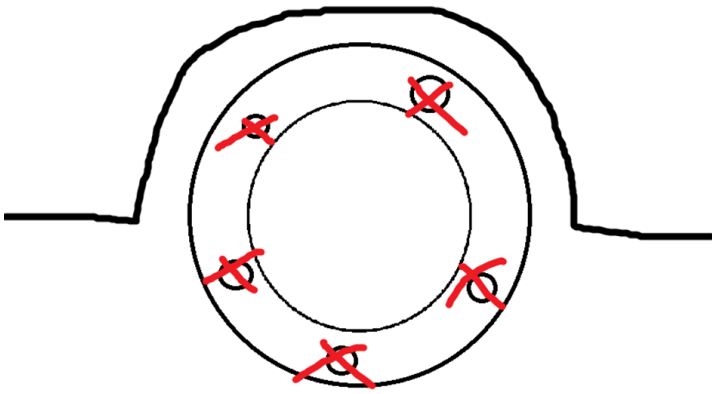
In line with the IT-area = You deliver professional products that are characteristic for the IT area of your project. As a reference use: 1) the HBO-I framework on proficiency level 2, 2) the professional products required in OE3 or OE4

Professional duties on a junior bachelor level

My analysis on the different types of techniques we can use to solve the solution was really good in my opinion. I analysed which opportunities there are and put them against each other in a table with pros and cons.

My analysis on the project itself was also good. I did my very best to exactly understand the problem of my stakeholder. I had to give a short impromptu presentation about my project to visitors and this presentation went really well. This was because I took the visitors through a chronological story of my project. Since my understanding of the problem was so good. I could improvise a presentation and tell them about every detail of why I am doing this. So it was really good that I had this kind of knowledge.

I have designed mockups by using stakeholder feedback and discussed them with the stakeholder to see what he liked and what he didn't like. This was a good way of creating an idea of what he wants and likes. If he didn't like my mockup he also told me what he didn't like about it. This way we could work together efficiently and I think we have done a pretty good job at it. Here's an example of such Mockup/sketch I made. You can see the first sketches of the first minigame of our application.



The goal here is to remove the bolts from a tire, and to change the wheel.

Realisation -wise I'm really proud of some parts. I have used for example base classes and child classes in a useful way. Also have I turned static processes into dynamic processes which required me to understand Unity to a certain level.

I wrote a document to give advice to the next person that will take over my project. Inside this document I didn't only address problems, bugs and code smells, but also gave advice on how to fix them. Also problems I ran into and reflected on have been implemented to the next person in the form of advice. For example how a WEBGL build doesn't run the same as in the Unity Editor, so that he has to make sure it works every now and then so he won't get surprised in the end. So I feel like my advice part is one of the stronger sections.

Professional products

My end product is an application in which you can create and play levels. The application has room for improvement, which has been further clarified in my app documentation. I still have bugs and code smells inside the application that I'm not too proud of, but at the same time, I couldn't really do anything about it because I thought I had to deliver a finished application. Whenever I found out that the app didn't have to be finished, I focused on removing these bugs and code smells.

Furthermore, I think I have done a good job in realising what my stakeholder wanted. My stakeholder is positive about what I have created.

However, my intern supervisor is less positive about my work. That is because he compares my serious game to other serious games that have been made. The other serious games are more complex than mine but are developed by game designers, which puts me in an unfair position. In the end, I am a software developer, not a game designer. We discussed this with my intern supervisor, and he told me that they will keep in mind to try to give an intern a project that suits them.

LEARNING OUTCOME 2: SITUATION-ORIENTATION

*Situation-Orientation: You **apply** your previously acquired knowledge and skills in an **authentic context** to deliver **relevant** results for the project and company.*

Apply = You work in a methodological and structured way, adapted to the processes and way of working of the company

Relevant = Your work is relevant for one or more persons

Authentic context = you are embedded in an IT environment and work on a given IT problem with multiple stakeholders

APPLY

During my internship I have applied agile methodologies to my project, utilising weekly sprints and flexible requirements. This approach was a good way of making sure the workflow in my project went organised and efficient.

In such a weekly meeting, I showed him the current state of the project. Such as what I realised recently, requirements I'm working on and what I plan working on next. In this process I gave the stakeholder the opportunity to add or change or to prioritise certain requirements. This process is a good way of making sure the stakeholder is satisfied and to make sure we fulfil his needs.

RELEVANT

According to my stakeholder, the finished product would be a useful addition to the current ways of education on the MBO Automotive. The application is currently still in development, but I'm sure that the next intern that will work on the project will add up a good amount of work to the project. Collaboration with my stakeholder played an important role throughout my internship. With regular communication and feedback collection, I was able to continuously improve and adapt the product to meet the stakeholders expectations. Seeing the results and delivering a product that made my stakeholder satisfied was truly fulfilling.

AUTHENTIC CONTEXT

3 days in the week I would be working on-site, and the other 2 days I worked from home. On-site there were 20 other interns and a supervisor. One day of the week my stakeholder would also be on-site. Whenever my stakeholder was on-site I took my chance to ask feedback and show the current state of the project. When on-site I had the opportunity to ask any question to other interns. Since there were so many interns, there would always be an intern that could help me with my problem. This made me feel comfortable, knowing I always had people I could go to if I got stuck. Also have I made use of coding communities. These communities also added up in making me feel comfortable, since those communities are full of experienced coders.

One thing my internship did lack is the fact there wasn't a technical expert that could give me feedback on my way of coding. During my internship the only one who has reviewed my code on its quality was my school-supervisor.

LEARNING OUTCOME 3: FUTURE-ORIENTED ORGANISATION

*You explore the **organisational context** of your project, make **business, sustainable and ethical considerations** and **manage all aspects of the execution** of the project.*

Organisational context = you identify the business domain and stakeholders of the project and know its business legitimisation

Business, sustainable and ethical factors = you take into consideration business, sustainable development and ethical aspects in your judgement process using standards or methods/tools (e.g. TICT).

Manage execution = you create a project plan and monitor your project including the research activities, time, money, risks and the quality of the solution which is valuable for the organisation.

Organisational Context

I understand why I am making this project and for who. I accomplished this by interviewing my stakeholder. Interviewing a stakeholder had a very high value in my project since he was the one that would use it in the end. He knew exactly what the problem was, because he was experiencing the problem. To reinforce this part, I could've also interviewed the students since they are also stakeholders in my project. As if right now we do have a company visit planned at their company but after my portfolio deadline. The reason why this was planned so late is because my MVP was finished very late. And the reason for that was because I, and other interns, thought for a long time that we had to make a full application this semester. But in the end we just had to build a strong foundation. So I wouldn't blame myself too much for it since I wasn't the only one who didn't know about it.

Business, sustainable and ethical factors

While doing research to which technique was the most suitable for my project, costs were one of the major factors. In my opinion I have done a good job in researching the possible techniques for the solution, and have put them nicely in a table where you can exactly see the pros and cons of each solution. Here's the table which basically summaries my solution research.

Resultaten

	Voordelen	Nadelen
2D	- Snellere ontwikkelingstijd - Eenvoudiger ontwikkelingsproces - Lagere systeemvereisten	- Beperkte visuele diepte, - Minder realistische interactie
3D	- Realistische visuele weergave - Realistische interactie	- Langere ontwikkelingstijd - Complexer ontwikkelingsproces - Hogere systeemvereisten
VR / MR	- Volledige immersie - Realistische ervaring - Mogelijkheid tot simulatie	- Kosten - Beperkte mobiliteit - Potentiële gezondheidsproblemen
AR	- Toegankelijkheid - Lagere kosten - Behoud van omgevingsbewustzijn	- Beperkte immersie - Technologische beperkingen - Beperkte interactie

Manage Execution

I feel like I have done my best at managing the project. An important factor on the project was that I thought the project had to be finished this semester. When I later found out it didn't, I left lots of features and focussed on improving the code quality of my application. At the start I was just rushing through the application because I thought I had to be as quick as possible. I also spoke to another student about it and he told me something very wise: "Even if you had to finish it this semester, it is always important to build a strong foundation". And I think he is right. It would've been better to deliver an app with a strong foundation than a hardcoded app. Therefore I tried fixing these code smells near the end of the project.

LEARNING OUTCOME 4: INVESTIGATIVE PROBLEM SOLVING

*You take a critical look at your project from **different perspectives**, **identify problems**, find an **effective approach** and arrive at **appropriate solutions**.*

Identify problems = Throughout all phases of the project, initially by identifying the problem/opportunity of the client, defining the main scope of the project and formulating the related research questions, and during the project by identifying newly encountered problems/challenges and formulating more in-depth or detailed research questions.

Different perspectives and effective approach = you use a variety of research strategies, methods and activities (reference: https://ictresearchmethods.nl/The_DOT_FrameworkLinks to an external site.) in a structured way in order to find justified answers to your research questions.

Appropriate solutions = you use the results from your research to create valuable solutions and validate these with the relevant stakeholders.

Identify problems

One of the problems was that we wanted a user-friendly application. To solve this problem I did research to figure out how we can realise a user friendly application. I think the idea of the research was really good, but we couldn't utilise it as much as we wanted to. Most of the time I was trying to improve code or build foundations in the backend which resulted in less time to put in the front end. And less time in the front end ment less time for me and my stakeholder to add up to the user friendliness research. This again refers back to the fact that I wasn't informed about the application not having to be finished in the end. Otherwise I wouldn't have chosen this as research since I would have probably only worked on the backend. Currently there hasn't been put too much effort in the front end and quite some effort in the backend. But if I could do it over I would've spend it all on the backend and make front end minimalistic

Different perspectives and effective approach

I have used all strategies of the DOT researching framework. But I would still like to add that I am not a fan of being forced to do research which you are forced to utilise in your project. I believe that if the students are forced to do research about anything that has to do with IT, It would've been a more educational process. I also feel like that if I got the chance to research something more interesting like Reinforcement Learning for example, I would've had more fun researching it, and I would've been able to put a way stronger research.

The approaches I used for my research can mostly be found back in the CMD method packs. I can't really add anything else besides that. I did a good job using all strategies of the DOT framework.

Appropriate solutions

From my research I concluded that the feedback loop would've been a good way to bring the user friendliness of the app to a higher level. My stakeholder agreed to this, also wanting to work on this weekly feedback process.

I also like how I came up with Unity. It was a well elaborated choice. Unity in the end was also a really nice framework to work in. It has a big community, lots of documentation and was easy to understand.

LEARNING OUTCOME 5: PERSONAL LEADERSHIP

*You are **entrepreneurial** around your projects and personal development, you **pay attention to your own learning ability** and keep in mind what kind of IT professional and/or what type of positions you aspire to.*

Entrepreneurial = you take the lead in your own project, both planning as well as content wise.

Pay attention to your own learning ability = you can reflect on your own actions, ask and receive feedback on your actions and look for further opportunities and possibilities that flow from that feedback and that you are aware of your development as an IT professional

Entrepreneurial

I was the only one actually working on the project, meaning I could approach it anyway I wanted to. I started off by making a rough planning wherein you can see which week I would be doing what. Here's an image of the planning

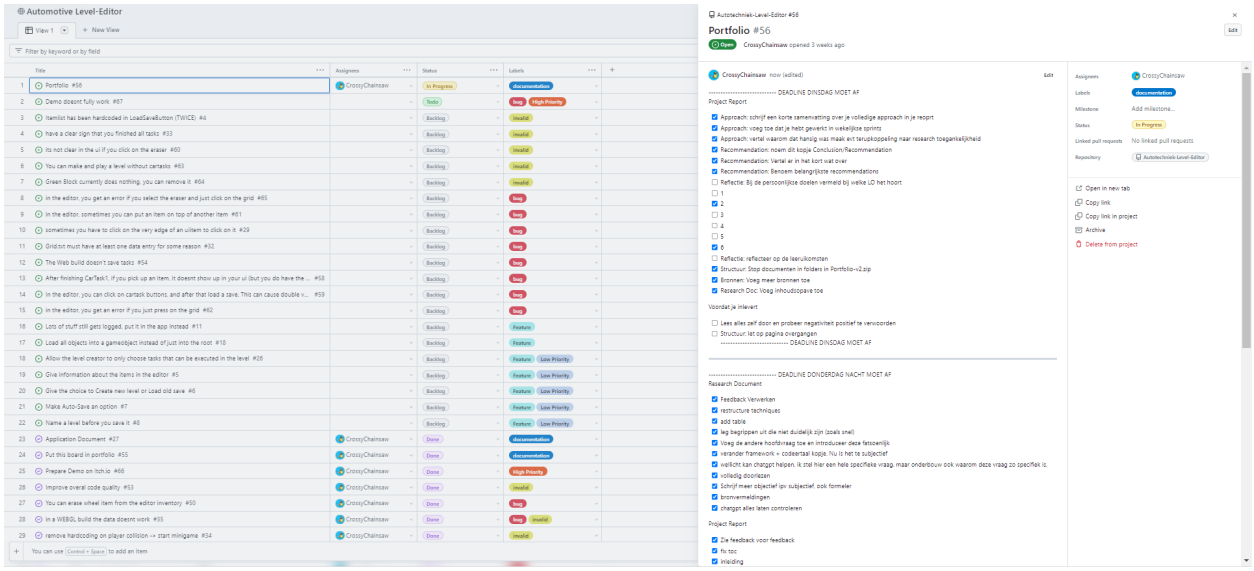
2.4 Planning

6 t/m 10 Maart	- Project Plan afronden - Start Research Report
13 t/m 17 Maart	- Research Report Afronden - Start Ontwerp Document Applicatie
20 t/m 24 Maart	- Verder gaan met coderen - Ontwerp Document Bijhouden - Research Report Afronden

7

27 t/m 31 Maart	- Verder gaan met coderen - Ontwerp Document Bijhouden - Research Report Afronden - Project Plan afronden
3 t/m 7 April	- Verder gaan met coderen - Ontwerp Document Bijhouden - Research Report Afronden - Project Plan afronden
10 t/m 14 April	- Verder gaan met coderen - Ontwerp Document Bijhouden
17 t/m 21 April	- Verder gaan met coderen - Ontwerp Document Bijhouden

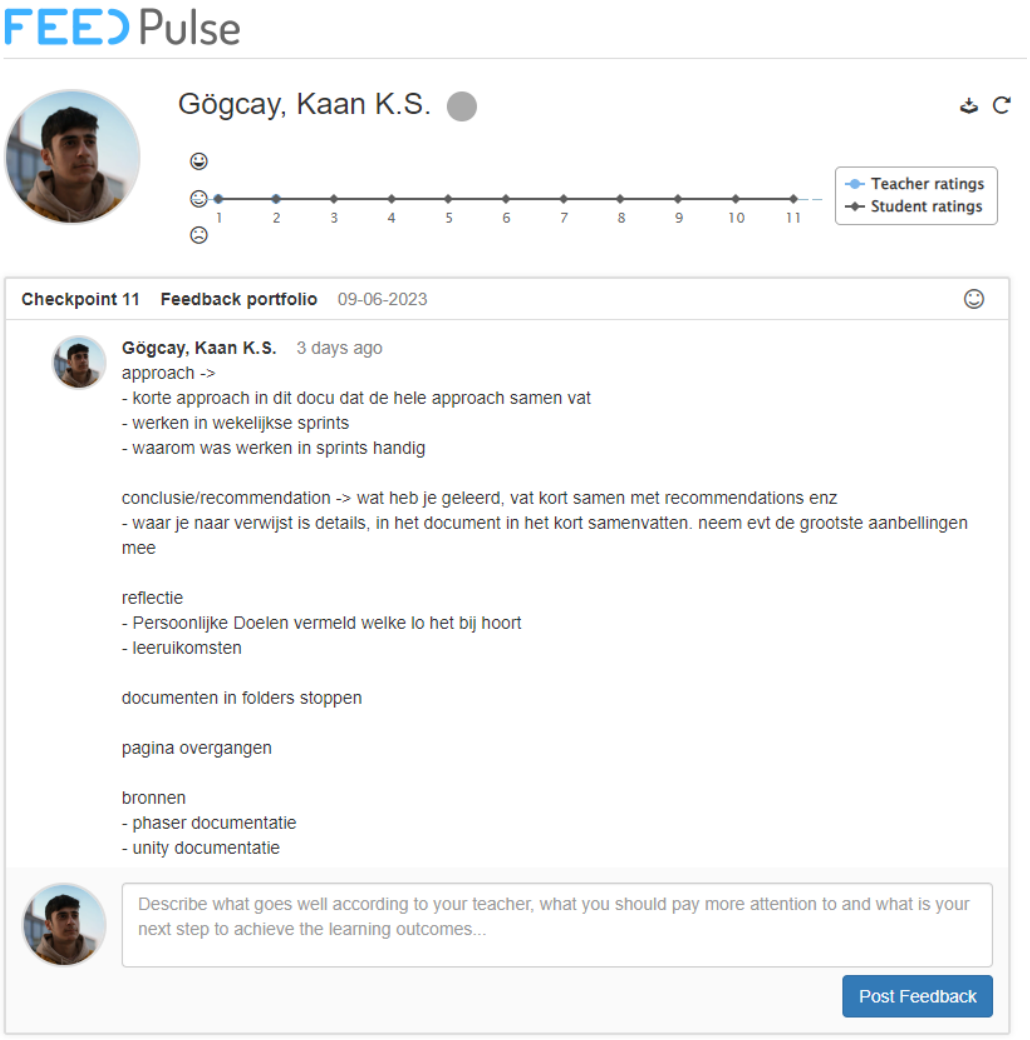
I tried to make this planning based on the information on canvas. Canvas contained all deadlines in my semester, so I tried to use those dates as a base for the planning. As time passed I created a project board to help me with the planning. This project board was a very good addition because it was more clear then the planning I made at the start of the semester. The project board contained all features I made, was working on and still had to do. The project board showed all features in a list, this gave me a relaxing feeling since I knew exactly how much still had to be done at any time. Here's an image of the board currently.



For more details about the project board you can take a look at an older version of my project board. (Realise/Project Board.png)

Pay attention to your own learning ability

I have had weekly feedback from both my stakeholder and my school supervisor. This was very useful since I was always aware if my project was going in the good direction and if my project was satisfying my stakeholders needs. Here are my notes on the latest feedback the school supervisor gave me.



This document that I'm writing is also a good addition to this learning outcome. In this document I show that I'm able to reflect on my previously done actions and that I can learn from them. One downside of the document that I am currently writing is that I made it in google documents. Google documents does not satisfy my needs that I look for when writing a document. Word on the other hand does. So for the next time starting in word would save me a headache.

LEARNING OUTCOME 6: TARGETED INTERACTION

*You determine which **partners** play a role in your project, collaborate constructively with them and **communicate appropriately** to achieve the desired impact.*

Communicate appropriately = you make sure that your communication has the right impact and execution.

Partners = the different stakeholders in the project to which you pay attention to and whose interest in the project are clear to you.

Communicate appropriately

Communication-wise I think I have done a pretty good job. In this semester there were 3 main people I have had contact with.

- My stakeholder: Me and my stakeholder would have weekly contact every tuesday. If one of us was sick or wasn't able to show up for any other reason, we would update the other about it. Also When one of us was sick, I still tried to show a new functionality I made. I did that because I wanted to make sure the stakeholder knew I was continuously working on the project. Here's an example of me updating my stakeholder on the project status. In my opinion the contact between me and my stakeholder was very good. Also the bond between me and my stakeholder was really good. I had a very open minded stakeholder, who I could talk with for hours, even about topics outside the internship.

- My intern supervisor: The communication between me and my supervisor was a mix between online and real life contact.In real life my supervisor would ask me if I had any problems or just came to talk with me about actual topics. Online my supervisor would ask me to research certain websites for him, or to visit webinars and events. Online contact was mainly executed via mail, but sometimes also via Whatsapp. The only downside to the contact between me and my supervisor is when I missed an email from my stakeholder. But he would point it out to me as soon as he noticed. I'm glad he pointed it out, from that point I started to pay more attention to it.

- My school supervisor. I have had weekly contact with my school supervisor. In this appointment we would discuss any work I was working on, review code and ask questions about actual topics. My supervisor gave me weekly feedback on anything I needed feedback on, which I really liked. Since we spoke to each other weekly we could identify problems quickly.