Light Up

M242 TBZ

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1. Project work

1.1 Procedure

Brainstorming

Like every other project our first step was to understand the task. We read through the criteria and tried understanding what is expected from us. We came up with a few different ideas until we decided on one. We decided on creating LightUp. LightUp is a program that will help you control and brighten up your lights in your house.

Project Proposal

Only deciding what we wanted to do wasn't clear enough. To pay attention to details and understand what is awaiting us we made a project proposal. The project proposal includes a detailed description of what we would be doing. It also contains important milestones. Like every project, we also need a DoD (Definition of Done). The definition of done is also mentioned in the proposal. And of course, we had to decide upon a programming language and think of the infrastructure.

Planning

The most important part of a project is planning. If you plan carefully enough you can make your work easier and faster. To make sure we aren't forgetting anything we started making a small checklist. First, we wrote listed all the physical material we would need to implement the project. Next came the milestones. We noted them down in more detail which we used as story names. We made a Trello board with all our stories/issues to keep them on track. Next came a brief time plan to make sure we know how much time and when we should invest in the project.

Implementing

Of course, the implementation is the hardest part, but our planning helped us achieve it. We started off by creating our coding environment first. Both of us made sure that the IDE and SDK were working on our induvial devices. Not only did the environment have to be ready but we also made sure that the demo repository was working.

Once we were ready to start, we distributed our tasks. One of us took care of the chatbot while the other looked at a demo project. Once we were done, we enhanced the chatbot by writing messages, commands, and their meanings (start and help messages). This would be helpful for the user.

Then the commands we wanted were individually implemented. We had to do this step in the frontend and backend. The backend was the python project in PyCharm. The frontend was m5Stack flow where we built the code with code blocks. To work in the frontend, we made sure that our microprocessor is connected properly to the laptop. The Unit LED Lights also had to be added. Something that also belonged in the frontend was the different light settings. We created all the possible light settings (on/off, different colors, and preset settings.) with code blocks in the m5Stack flow.

Then came the part with MQTT. We had to make sure that all connections we needed were working properly. That included sending stuff from backend to frontend. We had to be able to subscribe to topics and then also publish. This was a bit hard for us considering we had never done it before. We faced a lot of problems (which you will get to know about in the next chapter).

After we coded for hours and bought our project to work as much as we could, we started testing. We tested each functionality manually and wrote down notes for us if something was buggy. With the testing process, we were done with the implementation phase.

1.2 Problems

Git:

One of us (Tamanna Rajput) had problems setting up her python environment. We tried various IDE's that would let us work with python, but none seemed to work. We couldn't download some needed packages. After trying for quite a while, we decided to start using our time for something else. This led us to working 90% of the time in pair programming.

Demo repository:

To understand the logic, we had to implement for our code, we cloned an example project. We thought we would be able to understand it better but had a few problems setting it up. Once we had cloned the project. We opened it with IntelliJ and tried to configure the settings. The IDE could not recognize our Python SDK, so we decided to switch to a different IDE and worked with PyCharm. PyCharm also refused to let s download some packages we needed. It wasn't letting us download the package Paho for MQTT. With some help, we were able to solve this problem.

Telegram Bot:

We had successfully created a chatbot on telegram with the help of BotFather. When we tried to use this bot in the code, we had to use the API Key that was given to us by the BotFather. But this API Key wasn't being recognized and we had no idea why. After trying a bit more we didn't find the problem. We decided to create a new bot and hope that this error won't come up again. With the new bot, there were no more problems.

MQTT:

Our first problem came when we tried to connect to the TBZ Cloud. We first thought that the problem is occurring because we weren't present in the building. But after searching a bit more we found out that it should be public and possible for us to connect. In the end, it was a small mistake where the hostname was wrong.

A similar problem occurred while we were trying to subscribe to a topic. In the code, we had written "Light_Up" and the same in the m5Stack code blocks. But we were still unable to subscribe to a topic. We tried typing in "LightUp" instead of in the code blocks. This however worked we still aren't sure why this worked.

Technical:

This problem was very weird and something we hadn't seen before. If we would change something in the code and then test it, it would work. Sometime later the change would be reset to the previous condition even though we didn't change a line in the code. This kept happening a lot, which slowed us down.

Logic mistakes:

Like all coding phases, we were stuck for hours on two problems. We thought that the code we wrote is wrong and invested hours trying to find a different way. After looking carefully and going over the code repeatedly we realized we had a problem with the logic we tried implementing. Problems like these are very common and understandable but we ended up investing a lot of time with them.

1.3 Reflection

This reflection belongs to both of us. This project wasn't the easiest. We underestimated the task in the starting. Looking at our project proposal and based on how well the planning phase went, we thought we had understood everything and would be done fast. Unfortunately, during the implementation, we had to face a lot of hurdles as mentioned. These hurdles had demotivated us for a while and we started procrastinating. We still managed to get ourselves together and slowly step by step started jumping over the hurdles. The internet wasn't very helpful in our opinion, and neither was the demo project we had been looking at. But we had a breakthrough and managed to achieve what we wanted. We are happy and proud of our result. It might not be much for everyone but looking at the problems and the long hours we had to face, we think we did a good job. Especially when we had never done a project like this before. We learned a lot from this.

2. Documents

All the documents that have been mentioned above can easily be found. Here are the document names and their location if you are interested in taking a better look.

2.1 Repository

During this whole project, we had a lot of documents, checklists, code, etc. We had to make sure they are easily accessible in one place. On this Repository, you will find our documentation, project proposal, and of course the code.
https://github.com/desigurlsana/Lightup-M242/projects?type=beta

2.2 Project proposal

The project proposal is where you will find the most important information about or project. This document is uploaded as a PDF on Teams. If you directly want to go on the document, you can click on this link which will lead you to the file directly on our repository.

Teams: M24 -> General -> Files -> Projektantrag -> M242_LightUp_Projektantrag_Rajput_Nagulanandan

Link: https://github.com/desigurlsana/Lightup-M242/blob/main/m242_LightUp_Projektantrag_Rajput_Nagulanandan.pdf

2.3 Timesheet

This timesheet helped us keep the time in track. This plan was maybe not always in sync with our planning, but we made sure to compare every time how much we achieved and how much we should have.

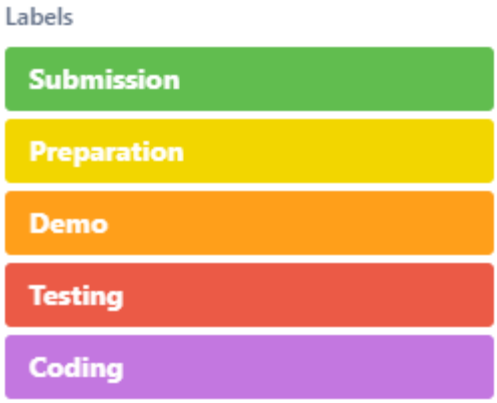
Week	Task	Person
Week 5	Project proposal	
Week 6	Arrange Lego structre Arrange LED Lights Prepare programming environment Download demo repository	
Week 7	Create Telegram Bot Create messages Create Create Commands in code Create Commands in flow.m.stack	
Week 8	Setup MQTT Suscribe to topics Publish topis	
Week 9	Manual Testing Write Documentation	
Week 10	Create Powerpoint Demo	

Person	
Tmn	
Anu	
Both	

2.4 Storyboard

As mentioned, we wrote down our milestones in smaller steps and used them as issues. We created a task board (SCRUM) with all these issues to keep them on track. Not only did we write these down but also created labels. We had different labels which we assigned to each issue to have a better. Overview.

We used the following labels and distributed our issues with them:



To look at this board, click on the link below:

https://trello.com/invite/b/hscn7voN/67fb23c87ab3150b7bed7fa3596a67a2/tasks-lightup