

# *Executive Summary*

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A lot of goals were set at the beginning of this 12-week internship. My entire internship was based on the topic Blockchain – a topic I had never read, studied or worked on before. When I had my first meeting with the CEO after being accepted in the internship, I was informed that I will be working on Blockchain part of their company website. It is an educational website, that covers major upcoming technologies like Blockchain, AI, AR and VR. I knew this was going to be challenging, but I didn't have an idea of the how intense it would get.

We created a milestone document at the very beginning of this internship to lay down a plan of tasks we want to be accomplished. I had 9 tasks and 12 weeks to get it done, sounds pretty laid out and accomplishable, however, things did not go as planned given the fact that every week I could give only 8 to 12 hours to this internship and not anymore. The limitations I had on my hours was because this internship was being counted towards an academic credit and I still had four other courses to study and work for.

I dedicated my first few weeks in researching and gathering information about Blockchain. As easy as the tasks sounds, it took a long time. Blockchain is a growing technology and as I learnt something new, 10 more new topics lined up to be learnt. I accomplished this task and created a few reports on the following topics - what developer tools can be used for working on blockchain for our website, which blockchain type would be better to use for the InnovFin platform Ethereum or Hyperledger. I also created my own metamask wallet and researched on a few GitHub repositories Smart contracts to refer to later. The CEO, Othalia, also asked me to review their existing website and provide suggestions on how the framework could be improved – I created a report for this task. By mid February I was done with my first four tasks.

After I was done with the research and felt pretty prepared, it was time to put on the developer hat and gear up with my weapons – the developer tools. The final task was to have a working certification system for the website that takes student's information, including their public wallet address (blockchain) and assign a certificate to them upon completion of the course. This data is stored as a transaction into a block.

The first step was to map the process with key events using a project mapping tool - I have included a snap of this at the end of this summary report. I then wrote a report on what architecture would be good for this certification system – all the tools suitable for front-end and backend. I decided to use HTML, CSS, and JavaScript for front end and design of the page. And finally Solidity, Nodejs, SQL for backend and blockchain development.

Before I moved onto the next step of creating a plan to bring the demo to the MVP State, Othalia asked me to check where the sites are hosted for two of their webpages. I found a few useful tools online to get a good tech profile of the webpages. Following this I created a plan to achieve MVP and also a sequence diagram of how the transaction will take place on the blockchain.

I designed the certificate that will be presented to the student upon completion of their course. Then, I designed the issue certificate page using HTML and CSS. Using JavaScript I created the functions to place the information taken through the webpage on the certificate created and then display it as a pdf. This was a challenging because I had never done it before, and I was unable to find good resources. But, with one of my professor's assistance, I was able to complete it. This took me more time than it should have, that is, it exceeded the due date.

Now came the most challenging part, coding a smart contract and implementing it. Smart contract writing is very important part of the blockchain coding because this piece of code defined the code of what should happen during a transaction. I read through a lot of codes, and webpages to assist me with this task, because it was not easy. It is difficult to work on something complicated when all education and knowledge you have received from is a bunch of articles from various different sites. Even after completing the code, I was facing a new error every time I switched from one tool like Remix IDE to another such as VS Code Extension. Now I do understand why the error was generating, but in the beginning it was hard to understand and solve it.

I thought implementing the smart contract would not be hard. However, I was very wrong. Yes, there are very useful and immense amount of resources to implement a smart contract, irrespective of the extension or tool used to code on. But, sometimes, the software just does not want to support you. I have been facing so many problems on windows terminal (Command Prompt) and Ethereum Network, I can not seem to find a way out of these

errors. Othalia insisting me to work more than I can give was also quite intimidating and obstructing. I changed my tense of talking here because I still have not been able to get it done. I have tried using Nodejs, Ganache, Truffle but a new error seem to generate at every step. At this point, I still have three days of working left and I hope I can get this figured out by then.

Due to the blockage I faced coding the JavaScript to print out the certificate as a pdf, writing a working smart contract and implementing it, I was unable to get all my tasks completed. I was unable to get a working certification system and test all the implemented iterations with other team members. Since I could not get this system working, I could not create a plan to integrate it with the AI development either.

However so, I did have a good time during this educating and challenging internship, and it gave me a good idea of how work environment as both front end and back-end developer could be.

