***Progress Report 4***

5th week as Junior Developer intern at InnovFin.

This week, during the weekly meeting with Othalia, we discussed what I had to do for this week’s task. I was supposed to create a report on the developer tools used of the blockchain types. I also had to start the coding for the website to display printable certificate pdf when submit button is pressed for issuing certificate for a student who has finished the course. And next I was supposed to finish another task of answering a few questions on Hyperledger.

I started my shift with writing my report on the developer tools used for Ethereum and Hyperledger Fabric. For Ethereum, I wrote about Truffle, Ganache, Drizzle, Remix IDE, Solidity, Test RPC and Mist. For Hyperledger, I wrote about Golang, JavaScript, Node.js, Java SDKs, Docker, Metamask and Hyperledger Sawtooth. I also compared the tools in the respective blockchain. For instance, Solidity is widely famous to write Smart Contracts on Ethereum, similarly, Golang is used to write chain code (which is the Smart Contract for Hyperledger).

Once I finished writing the report, I started coding for the outline and design of the webpage where the information is entered for issuing certificate. I had never coed for attaching a pdf form of a document which will take information from the user input and finally create a pdf of a printable format. So, I had to research a little, look for some sites that could help me properly. I even emailed Professor Jamie if she could send some helpful link since I was not able to find a proper one. Jamie did send a link which had a tutorial video which I found very helpful. However, to use that code, I needed a base template of the certificate without any ‘temporary’ detail – for instance, the name of the person the certificate is being issued to, the certificate hash, the certificate holder Ethereum address. The template/sample of the certificate I was provided had these information already provided. I asked if there was a certificate without these information but upon getting no reply for a few minutes I decided to try and edit the certificate on my own on GIMP. It is a time-taking process since the certificate PNG format I got was not in a very good resolution, so it has been difficult. I still have to do the editing as it is still left and finish the coding. The languages I am using are HTML, CSS and JavaScript. I am going to try and finish the answering questions task before my next shift so that I am not a lot behind for my next shift.

I have attached the information about the Developer Tools I wrote in this journal. -------------

***Developer Tools***

Ethereum and Hyperledger use different developer tools. However, there are even few software to run files form Ethereum in Hyperledger.

*Ethereum*

These are the few developer tools used in Ethereum :

1. **Truffle :** Truffle is an Integrated Development Environment, that acts as a base environment for Ethereum. Most of the Ethereum can be built on Truffle. Truffle helps comply, deploy and link any smart contracts, inject them into web applications and develop the front end for the Distributed Applications (D-Apps). Truffle allows automated contract testing with Mocha and Chai. It integrates compilation, testing and deployment of Smart Contracts.
2. **Ganache :** Ganache is a locally deployed Blockchain Simulator. In simple words, Ganache will build a ‘sample blockchain’ to test our code on. It features Graphical User Interface that can simulate blockchain networks and live test smart contracts without requiring to set up real test networks or using to remote network. It creates our personal safe and deterministic blockchain environment
3. **Drizzle :** Drizzle is kind of like the third important tool (first and second being Truffle and Ganache) that completes the required developer tools for Ethereum. Drizzle is an assortment of requires front-end libraries that are often useful components for developing web applications that can seamlessly connect with Smart Contracts.
4. **Remix IDE :** Remix is an IDE, an open-source tool, that helps in writing Smart Contracts straight from the browser. This is written in language – JavaScript. It supports testing, debugging and deploying of Smart Contracts. Remix is only for Smart Contracts – test, debug, deploy, analyze - and nothing further can be done on it.
5. **Solidity :** Solidity is the most infamous and widely used developer tool to write Smart contracts. It is an object-oriented, high-level language that was influenced by languages C++, Python and JavaScript.
6. **Test RPC :** When Test RPC rose to popularity, it was renamed *Ganache.*
7. **Mist :** Mist is a browser interface that also acts as a digital wallet. It works with association wit Geth. Mist allows to link with various DApps available on Ethereum network. The user can sync with the blockchain using this. Geth serves like a node. Geth is used with Mist since it is not very user-friendly. It is basically used to mine Ether.

*Hyperledger*

These are the few developer tools used in Hyperledger :

1. **Golang :** Golang (Go) language uses the VS Code extension and is the widely used language to develop the chain code (smart contracts for Hyperledger). Golang, which is similar to language C, is an equivalent to Remix I would say because as Remix is only used for Smart Contracts, similarly Go is used mostly for development, debug, deploying of chain code.
2. **JavaScript, Node.js :** JavaScript is one of the languages used to code the transactions in Hyperledger. Node.js provides a simple API to submit transactions to a ledger or query the contents of a ledger with minimal code. Like truffle, Node.js is widely used to code the transactions in Hyperledger.
3. **Java SDKs :** Hyperledger provides Java Software Development Kit as a language to program in. Basically a developer can work using Java and Node SDKs.
4. **Docker :** Docker helps to pack up an application by using containers with all parts – the libraries, other dependencies and deploy it all as one package. It is an open-source tool written in Go, however, not to be used since the containers are ran with incomplete isolation and hence the computer is at risk to be attacked my malicious code.
5. **Metamask :** Metamask is a digital wallet that can be used for both Ethereum and Hyperledger. It is an extension for the browser that asks for logging in and automatically sends the owner address into the input field on Ethereum or Hyperledger.
6. **Hyperledger Sawtooth, Sawtooth Seth :** It is used to run EVM Smart Contracts to Hyperledger Sawtooth platform. It is a way to avoid writing your own chain code and just use the smart contract from Ethereum.