

Lucex Bank

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When I started this project, my goal was to make a functional banking system that used blockchain to record transactions in a secure fashion. Alex and I wanted our bank to have simple functions such as deposit, withdraw, and pay as well as a user-friendly interface. We chose this project because we wanted to learn more about blockchain. Both Alex and I had heard so much about it, but we did not truly understand it. Throughout the course of our work, we consulted YouTube videos and articles to further our understanding of blockchain technology. I also used websites such as Stack Overflow to help fix any problems I ran into. Yet, perhaps the most useful source we used was a blockchain demo. By interacting with a visual representation of blockchain, it was much easier to understand how this relatively new technology works. I also consulted my classmates during school. This method was also very useful because I would receive new perspectives that I would have not otherwise gotten. In the end, I would say about 85% of our project was completed. We were not able to fully integrate blockchain into our banking system simply because we did not have the time and knowledge to do so. Blockchain is a complicated technology that I learned so much about in the amount of time I had. However, fully implementing a decentralized blockchain requires much more knowledge than I had. We were able to accomplish building a block and blockchain class and have our console print a new chain every time a transaction was made. This created a record of all transactions made. Moreover, we wanted our accounts to have a password rather than having the user simply type in their account numbers. This was not implemented as we were trying out hardest to solve the problems we were experiencing with blockchain.

The most prominent thing that I learned is the fundamentals behind blockchain. This learning process started with me and Alex building a simple block and blockchain class from scratch. In doing so, we were truly able to understand what blockchain is at a fundamental level. Simply put, we learned that a blockchain is made up of clocks that contain attributes and data. What makes the data structure so special, however, is the use of hashes and previous hashes. For a chain to be valid, the previous hash of a block much match its hash. Therefore, when something is changed in one block, the hash will be changed, and the previous hash of the next block will not match. Hence, one cannot change a value in a block without changing all the other blocks that follow in the blockchain. We also learned about the algorithms that have been created for creating the hashes of blocks. Initially we used SHA-1 for the cryptographic hashing algorithm. However, we quickly learned that this algorithm was not very secure and that we should use more secure algorithms such as SHA-256 or SHA3-256.

The second thing that I learned was data input/output streaming. Although this concept was explored a little through labs in class, it was always given through a program shell. See, I wanted all the accounts created to remain in the bank even if the bank program is closed. Accomplishing this goal makes our project much more realistic and interesting to use. The solution was to store all the account information into a text file. This file needed to be updated anytime a transaction occurred. By trying to accomplish this goal, I needed to learn a lot about data streaming and storage. Once, I researched enough information, I implemented it into our program. At first there were many bugs. I even had to look through my notes to remember how to use try-catch blocks. It took a while to figure out, but the rewards were fantastic. It was cool to see how all the accounts being created would “stay” in the program even if it was closed. The experience was very interesting, and I learned a lot about data input/output streaming.

The thing that I struggled to accomplish the most was surprisingly the GUIs. Even is CSA, I had trouble with Java GUIs. Too me, it is very abstract and tedious work. I also do not know much of the syntax for Java GUIs. This led to a constant struggle to build the interface the way I wanted it to be. Another factor that led to me struggling with this work is the sheer lack of practice I have had with GUIs. It has been a long time since I have written such code. On the other hand, I do see the importance of GUIs. They make a program come alive and makes programming a more visual experience. I persevered through the struggles I faced by asking peers for help as well as learning a lot from Alex. Alex was very good with GUIs and whenever I didn’t understand something, I would ask him. After a couple of weeks, I started to get the hang of it. I then created multiple versions of the classes that Alex and I wanted and chose the best one’s that fit our goals for the program.

Another thing we struggled to accomplish was incorporating blockchain into our banking system. I knew what blockchain was and I completed the banking system. The struggle came in putting the two together. Alex and I researched so much about blockchain and implementing it into different programs. In total honesty, we had trouble understanding much of it. Because, of this issue, Alex and I mutually agreed to simply print out the blockchain in the console whenever a transaction was made. This way, it demonstrated our ability to build a blockchain as well as have an immutable record of all transactions.

Although this assignment is over, the project is not done. Alex and I had a lot of fun working on this project together. The next step in this project would be to first finish out the small details missing in the banking system. These include having a username and password to access accounts and having more options such as creating joint accounts. Furthermore, we will continue our research on blockchain. I think it would be extremely fulfilling and overall a tremendous accomplishment if we were able to fully integrate blockchain into our banking system. Another idea we had was providing accounts with a banking statement that showed all the transactions that were made by that account. All these ideas are doable, and I will try to complete as much of these tasks as possible.

My independent learning of blockchain had many ups and downs. Because this technology is very advanced, it sometimes felt as though I was getting nowhere in my learning. There were times when I had no idea what I was reading or how it had anything to do with blockchain and the project I was trying to complete. Without a guide or someone to help me understand this subject, I had to constantly jump around from source to source attempting to understand blockchain. Yet, gradually I did learn. In fact, I really started understanding blockchain when I was actively trying to use or even build it. When I was playing around with the blockchain visual demo, I could clearly see how changing one block would make the whole blockchain invalid. Moreover, when I was building a block and blockchain class, I had to build the structure from the ground up. This showed me all the basic components of blockchain and how they are all necessary for the blockchain to function.

One downside to my independent learning was my inability to stay on track. At one point in the course of the project, Alex and I learned a lot about the cryptographic algorithms used to build hashes. Although this information was interesting, it did not need to be studied for as long as we studied it. We should have focused more of our attention on the task at hand. This was hard for me because I was constantly curious about all the things I was seeing when trying to understand blockchain. I learned about hash algorithms and Merkle trees. Although these can both be related to blockchain, they were not necessary components of my project. That is where the problem was created, I did not know exactly what to look for when learning about blockchain. Maybe it is because it is too big of a subject to learn in one project. Or maybe it is simply because we were not focusing on the right aspects of blockchain. This is not to say that this was a bad experience. On the contrary, this was my favorite project all year. Being able to pick something that I wanted to learn is always interesting and fun. Over the course of this project, I received the help of many fellow students and I returned that help whenever I could. Having t an independent project really forced me to create a schedule and stick to it. I knew that if I procrastinated it would not end well. In the end, I can truly say that I learned about a technology that is becoming increasingly popular and that I built a program that I am proud of.