**BMIS2003 Blockchain Application Development**

**Task Description**

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Programme : RSD Group : 5

Instruction: Answer **ALL** the questions.

1. Please briefly describe the module(s)/function(s) you engaged in the assignment.

**Timelock Management Module**

The timelock management module provides the timelock ability to the durian in the system. The durian which was the main item in our system has the timelock ability. The durian is TimeLock when the durian is added into the blockchain which is based on the durian’s attribute harvest time and the durian ripen time. The harvest time is the time that the durian is harvested from the durian tree, it represents the TimeLock start time. The ripening time is the time that the retailer expects the durian to be ripe, which represents the TimeLock end time. When the defined ripening time arrives, the durian is available and allowed to be purchased by the consumer. This is to ensure that the quality of the durian is in the best conditions before the durian can sell to the consumer.

**Cancel TimeLock Transaction Function**

The function allows the retailer to cancel the TimeLock transaction which will disable the TimeLock of the durian. For example, the retailer canceled the durian TimeLock because the physical condition of the durian is damaged due to some unexpected circumstances.

**Modify TimeLock Function**

The function allows the retailer to modify the TimeLock waiting period which is the ripe time of the durian in our system. For example, a durian with a ripen time of today's date, the retailer is allowed to modify the ripen time to tomorrow to extend the waiting period of the TimeLock due to the durian condition is still unripe.

1. What are the strengths of the modules/functions created by you?

**Flexibility**

The Modify TimeLock Function allows retailers to adjust the TimeLock period based on the actual ripeness of the durian. This gives the flexibility to help in adapting the physical durian conditions to the system. This is able to give the retailer to ensure the durian has reached the desired quality standards with only the best quality durians reaching the market. The Cancel TimeLock Transaction function is equally valuable. If a batch of durians is found to be damaged or unsuitable for sale, retailers can cancel the timelock, preventing these subpar fruits from entering the market.

**Quality control mechanism**

By implementing a timelock based on harvest and ripening times, this ensures that durians are only made available for sale when they've reached optimal ripeness, hence this will maximize customers satisfaction and maintain the reputation of sellers in the market. This allows the retailer to save their time and effort in controlling the quality of durian as the system and function will help the retailer in controlling the durian quality.

**Enhanced Traceability**

The TimeLock feature also enhances the traceability of each durian within the blockchain system. By linking specific time-based attributes to each durian, the system provides detailed tracking information that can be useful for both retailers and consumers. This traceability ensures transparency in the supply chain and can be a valuable tool for quality control, product recalls, or verifying the authenticity of the product, which is especially important in the high-value durian market.

1. What are the weaknesses of the modules/functions created by you?

**Limited adaptability of the system to complex scenarios**

While the Modify TimeLock Function does offer some degree of flexibility, it may not be sufficient to handle more intricate or unforeseen environmental changes that can affect the ripening process. For instance, unpredictable weather patterns or sudden changes in storage conditions might not be fully accounted for by the current system, leading to a mismatch between the expected and actual ripeness of the durians. This limitation could result in the system failing to deliver the expected quality control benefits in certain situations.

**Resource Intensive**

The resource-intensive nature of managing TimeLock transactions could pose a challenge as the system scales. As the number of durians and transactions increases, the computational load required to process and manage these transactions will also grow. This could lead to slower system performance, longer processing times, and a potentially less responsive user experience. In a high-volume commercial setting, these delays could translate into inefficiencies and reduced operational effectiveness, ultimately impacting the system's scalability and overall value to retailers.

**Manually repeat operation of the functions**

The functions of the TimeLock module required the retailer to manually operate whether to cancel the TimeLock or modify the TimeLock. This process is needed to do on the durian one by one if there are many durian needs to modify. It increases the user's effort which the user needs to perform these repeated tasks. This intangible increase the time usage on operating the system which is time consuming.

1. What have you learned in doing this assignment?

During the working on this assignment, I have learned about the actual implementation of blockchain based decentralized application practical. I have a deeper understanding of the blockchain transaction workflow and its ability such as immutability and transparency of the data. For example, the added blockchain can not be deleted and all the added data are visible to everyone in the blockchain. Besides, I have strengthened my solidity programming skills as well as more proficiency in using the tools such as metamask, remix and ganache. These skills may provide the advantages to me in my future blockchain projects as well as in the industry after my graduation from the university.

Besides, I learned that communication among teammates is important. There are many situations during the assignment that need to have interaction and communication between team members such as module distribution, smart contract functionalities and problems solving. My communication skills have improved and I believe I will have better communication with others not only in the assignment but also in all of the situations.

Lastly, I learned that problem solving skills are important. The problem solving skill can efficiently help in solving the problem faster. For example, when an error occurs in the program, we could find the error part and produce the solution of the error in the shortest time. This is important when we debug the system as well as solve the problems in real life.

1. What are the challenges, if any, faced by you while working on this assignment?

The challenges that I faced during this assignment was always getting the error of “not able to estimate gas”. The problem occurs when I want to add durian into the system. It pops up the metamask transaction confirmation window as usual but it displays a warning and asks if I want to proceed anyways. I was clicked to proceed anyways and clicked on the confirm transaction button but the transaction failed. The solution that I used was to do some research on the internet and ask my teammate for help to solve the problem. Finally, the problems were solved and it gave a great experience on the problems.

Signature: Loh Date: 22/9/2024