

# CS+ Decentralized Finance: Blockchain and Cryptocurrency on the Internet Computer

## Meeting Minutes

6/24/2021 10:00 – 11:00 AM EST

Present:

Prof. Luyao Zhang - Lead

Prof. Kartik Nayak – Co-Lead

Prof. Yulin Liu – Co-Lead

Derrick Adam – Graduate Mentor

Dylan Paul – Full-Time Researcher

Urjit Banerjee – Full-Time Researcher

Oum Banerjee – Full-Time Researcher

Malika Rawal – Full-Time Researcher

Tianyu Wu – Research Support

Elliot Ha – Research Support

Saad Lahrichi – Research Support

Ray Zhu – Research Support

**Project Expectations from Prof. Kartik Nayak (Computer Science), Prof. Yulin Liu (Economics), and Prof. Luyao Zhang (Economics):**

**Prof. Kartak Nayak (Computer Science):**

Review the following papers for differences and similarities on what DFINITY calls

orthogonal persistence:

- <https://dl.acm.org/doi/abs/10.5555/615224.615226>
- <https://arxiv.org/pdf/1006.3448.pdf>

**Prof Yulin (Economics):**

Aave team: A treasury canister can mint 1100 ICP tokens and 1100 cycle tokens. This is the Treasury canister. Create a second user: user A and user B. You transfer 1000 ICP tokens to user A and 100 ICP tokens to user B. 100 cycle tokens are to be transferred to user A and 1000 cycle tokens to user B.

Make a diagram of the above. On the right hand side, you have the product canister. Now we create one more canister called price oracle which can tell other canisters what the current price

exchange rate between cycles is and ICP. For simplicity, use 1 cycle = 1 ICP token. The product canister can send a query call to the price oracle canister and ask what the current exchange rate between ICP and cycle tokens is. In short, there's one more user canister and oracle canister.

Now there are 5 canisters. Now we consider two periods. In period 1, user A is endowed with 1000 ICP and 100 cycles. User A could deposit 1000 ICP into the product cycle and receive 1000 AICP as a receipt. User B deposits 1000 cycles in the product canister and receives 1000 acycle tokens as the receipt.

Borrowing: User A could send 1000 AICP tokens back to the product canister and borrow cycles. The product cycles needs to define the minimum collateral ratio, e.g. 200%. User A deposits 1000 ICP into the product canister and 1 ICP = 1 cycle and with 200% collateral ratio, it means user A could borrow maximally 500 cycles. For user B, it's vice versa. It sends back 1000 acycles and borrows 500 ICP tokens. This is period 1.

In the product cycle, you need to figure out the interest rate and the collateral ratio. The exchange rate is always 1:1. This is period 1.

In period 2, user A needs to pay back the principal and interest. The principal is 500 cycles it borrowed. If the interest is 20%, it needs to pay back 600 cycles. It receives back 1000 AICPs. User B could send back 600 ICP tokens to receive its 1000 acycle receipt. This is the end of period 2. At the end, user A has 1000 AICPs. User B has 1000 acycle. In the product canister, it has 1100 cycles and 1100 ICP tokens.

In period 3, user A could redeem its 1000 ICP by sending back 1000 AICP tokens. The same for user B. What is left is user A has 1000 ICP, user B has 1000 cycles, and the product canister has 100 ICP and 100 cycles.

In the ppt slides, show the diagram in period 1 and what's going on in the frontend. In period 2, what's happening with the diagram and on the frontend. Also for period 3 and the frontend for both teams.

### **Prof. Luyao Zhang (Economics):**

Compare which design will be better. Pick one of the research questions and figure out how to design something new based on the basic elements Prof. Yulin suggested.

Research side:

Write the potential contribution to the literature. For example, Prof. Nayak provided literature on orthogonal persistence. You would need to draw a contribution map – what are the existing contributions and what is there left to be done and can it be done by the implementations of the Internet Computer. Describe and draw a lucid chart of the contribution map. One can be orthogonal persistence, the reverse gas fee model, the chain key technology, or solving the under collateral problems. In 100 words, what will be your new contribution and how your contribution is similar or different. For next week, complete the minimal protocol demonstrations and the minimal version of the research proposal. From next week, you start to innovate.

**Prof. Fan Zhang (Computer Science):**

Be more precise and specific about your research findings. As constructed, the slides are a little unclear and lead to many questions from the audience. Try to present your finding clearly.