CCST 9080 Semester 2, 2024-25
Tutorial 6 (24/25 March, 2025)

1. TA Introduction and grouping (5 min)

TA will give a short introduction and divide students into smaller groups (about 3 per group)

2. Discussion on aspects related to AI systems (e.g. security, privacy, ChatGPT, applications) (20 min)

Each sub-group can select **two or three** questions related to the third guest lecture provided by the TA. Group members try to discuss among themselves and prepare a five-minute presentation. Students can draw figures on the whiteboard during the discussion.

- 1. Suppose you have a blockchain with 7 blocks. Please try to draw figures to describe the procedures of inserting a new block and modifying the 5th block (if applicable).
- 2. Suppose you want to buy a car from your group mate via the smart contract. Please try to draw figures to describe the procedures.
- 3. Talk about cross-chain operations in blockchains.
- 4. The diagram of the four aspects of money has been proposed at least twice in the three guest lectures. Thus, it is very important to understand the logic behind the diagram. Please try to describe the diagram based on your own understanding without relying on any materials after preparation.
- 5. Try to figure out the 28-byte string whose SHA256 value is 9fcfe781**********d573564a and the 6-digit string whose SHA256 value is 2704b9ea**********8379a8d4. Inspired by this, try to explain why bitcoin mining is difficult and the mined bitcoin based on PoW is acknowledged.
- 6. What will happen if there are two branches after a block in the blockchain? Under what circumstances will the above assumption occur?
- 7. Will there be any benefits if a miner becomes selfish and keeps a block private for a certain period instead of publishing it? Why?
- 8. Why people are worried about quantum computing and more than 50 percent of the network's hash power when referring to Bitcoin mining?
- 9. Talk about the benefits of cryptocurrency.
- 10. How will the global banking system look like in the future?
- 11. Who will "own" the money actually if people save digital money in banks?
- 12. What benefits are brought for internet banking by COVID-19?
- 13. How does cryptocurrency contribute to the stablecoin? Try to make a brief comparison between cryptocurrency, the gold standard, and the dollar standard.
- 14. What are the gaps between the Internet of Information and the Internet of Value?
- 15. Talk about the revolution from Blockchain 1.0, 2.0 to 3.0.

- 16. How do cloud computing and blockchains change the topology of the Internet of Things (IoT)? Please draw some figures for explanations.
- 17. Code as X (e.g. law, trading, proof).
- 18. Please provide some use cases of smart contracts from simple to complex.
- 19. Try to understand the concept of API. You can use something like program functions and HKU Portal logins to assist your understanding.
- 20. Data has become another important factor after labor and capital. On the one hand, wasted data can still be valuable; on the other hand, studies have shown that at least 70% of data is not in circulation, resulting in their value not being realized. While we call for converting these data into value, the process of data can harm personal privacy. Therefore, we often encourage extracting different features from the data and distributing them to different usage channels to make them valuable. Please share your views by combining the above materials and your real-life experiences.

3. Presentation by each group (20 min)
Each group will present their answers to the chosen questions.

4. TA comments on the findings (5 min)
Note that TA will observe how your group conducts the discussion and give individual mark to each student.

[Confidential to TAs, do NOT release this to the students before the tutorial]

TAs can also freely pick any related topics.