UNICOIN: A Campus Crypto-token to improve student academic standards

UNICOIN is an ERC20-compliant Ethereum-based crypto-token that students can earn and spend on a university campus. Student earn tokens through various type of “campus services” (e.g., supporting the organisation of campus events). The tokens can be spent at various shops on campus. Student can also exchange tokens among each other, for instance in return of tutoring or simply small favours. UNICOIN also implements a set of “smart contracts” that aim at improving student academic standards. One example of such smart contracts is the following, which aims at removing “free-riding” in group assignments: let us consider a course requiring an assignment made in groups; when a new group is formed, members of each group must submit a fixed deposit of X tokens to a smart contract. The smart contract locks these deposits; the deposits can be unlocked only at the end of the semester, after the assignment is submitted and all the group members have filled out a peer review form; the deposits are returned back by the smart contract proportionally to the score received by each group member in the peer review.

Your task will be the following:
- Implement UNICOIN as an ERC20-compliant Solidity smart contract;
- Implement a set of Solidity smart contracts (2~3) like the one described above that handle UNICOIN tokens;
- Implement mobile and Web applications for managing a UNICOIN wallet and interact with the smart contract able to handle UNICOIN tokens.

An existing, rudimentary proof-of-concept of smart contracts and Web application is available and can be a starting point for this project (see screenshot above). The requirements of smart contracts will also be provided. The smart contracts and application developed should be tested extensively on both a private Ethereum network and an Ethereum test network (e.g., Ropsten). Regarding the mobile and Web application, a possible implementation strategy is to consider Web3.js coupled with the React framework, using Metamask as Ethereum wallet. However, the students will have maximum flexibility in proposing a different architecture and adopting different tools as they see better fit.

Pre-requisite knowledge:
Ethereum and ERC20 standard
Solidity
Web/mobile programming

Contact: The supervisor of this project is based in Korea (Prof Marco Comuzzi, at the Ulsan National Institute of Science and Technology mcomuzzi@unist.ac.kr). Therefore, to handle the distance and time difference, project meetings will have to be held online and in the morning in Estonia (afternoons in Korea).