Introduction to FinTech

Homework 1

1 Announcement

- There are four problems, and if the total score surpasses 100, it will be capped at 100.

- Please notice that there is a discussion forum available on NTU Cool.

  1. Avoid sharing your answers on the forum to prevent any instances of plagiarism; You will get zero point in this assignment if engaging in such behavior.

  2. We encourage you to participate in discussions and answer questions on the forum rather than reaching out to the TA via email, as the forum allows for more immediate responses.

- If you encounter any issues with Homework 1, please find online resources and review the discussion on the forum initially. If challenges persist, contact `**@csie.ntu.edu.tw` following the provided guidelines:

  1. Title your email `[Fintech-HW1][Summary-Of-Your-Issue]`. Please note that we will **NOT** receive emails in other formats as we have applied filters to our email system.

  2. Outline the methods you attempted previously, the resources you consulted, the steps you followed, and the results of your efforts.

  3. Note that ambiguous requests, such as attaching screenshots without proper descriptions, will not be answered.

2 Preliminaries

1. Do not fork or clone the repository directly, please use the template to create repository.

2. After creating a new repository, rename the repository to **Homework 1** and adjust the visibility settings to **private**.

3. When you push the code to GitHub, it will automatically run the pipeline, you can check the result in the Git Action section.

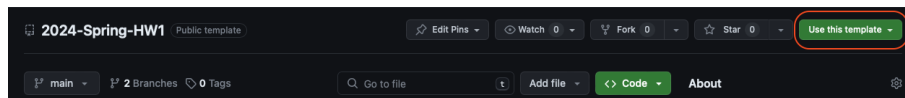4. We will check the Git Action result as your final score.

Figure 1: Template creation button

3   LiaoToken (30 pt)

Professor Liao expresses great enthusiasm for students enrolling in the "Introduction to Fintech" course and is considering holding an ICO (Initial Coin Offering). He seeks assistance in designing a new token, LiaoToken. Please help him complete the missing part in the smart contract.

In this problem, you need to develop a basic ERC-20 token in `./src/LiaoToken/LiaoToken.sol` and pass the unit tests in `./test/LiaoToken/LiaoToken.t.sol`. This problem can be divided into the following three parts, each part takes 10 points.

Run each test to see the points you get:

1. `forge test --mt test_check_transfer_points -vvv`

2. `forge test --mt test_check_approve_points -vvv`

3. `forge test --mt test_check_transferFrom_points -vvv`

4   NFinTech (40 pt)

Besides distributing tokens away, Professor Liao appreciate students who regularly show up for class. He came up with an awesome idea: making his own non-fungible token for these hardworking students. Now, he needs help to finish setting up this reward system in NFinTech.

In this problem, you need to develop a basic ERC-721 token in `./src/NFinTech/NFinTech.sol` and pass the unit tests in `./test/NFinTech/NFinTech.t.sol`. This problem can be divided into the following three parts, each part takes 10 points.

Run each test to see the points you get:

1. `forge test --mt test_check_approve_related_points -vvv`

2. `forge test --mt test_check_transferFrom_points -vvv`

3. `forge test --mt test_check_safeTransferFrom_points -vvv`

4. `forge test --mt test_check_mix_operation -vvv`

5   Classroom (30 pt)

Run each test to see the points you get:

1. `forge test --mt test_check_student_v1 -vvv`

2. `forge test --mt test_check_student_v2 -vvv`

3. `forge test --mt test_check_student_v3 -vvv`

6   Delegation (10 pt)

Run each test to see the points you get:

1. `forge test --mt test_check_exploit -vvv`

7 History

Date	Version	Description
2024-02-19	1.0	Initial release