Blockchain HW1

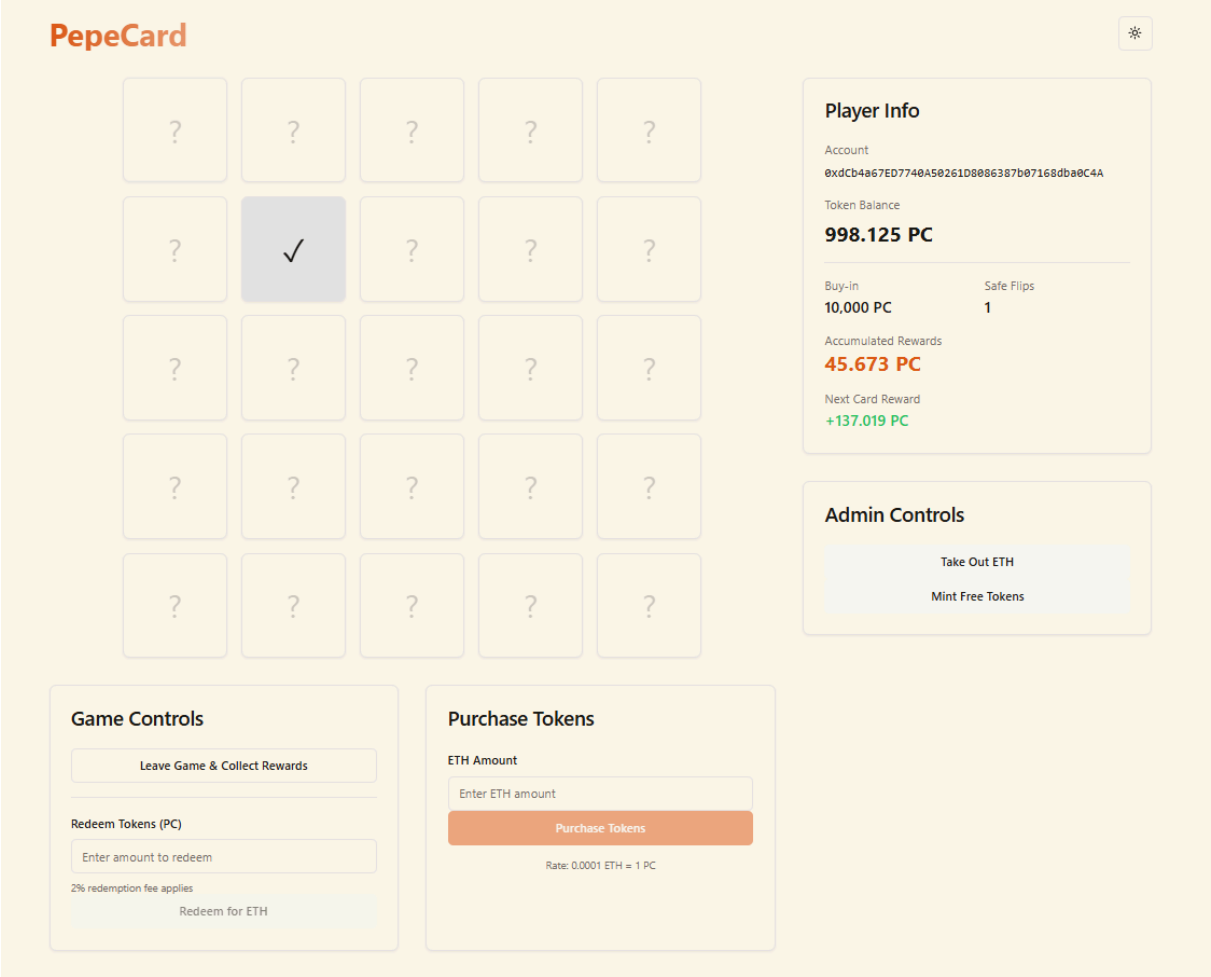
資工四 110590004 林奕廷

* All the contracts in this assignment are deployed on the Sepolia testnet. You can view them on Sepolia Etherscan by clicking the contract address.

* All the contracts and websites can be accessed from the PepeCard repository https://github.com/Error0229/PepeCard

Task 1: Deploy ERC20 Token

Contract Address: `0x8a899A996b233bFFc73cBDEf0BDB8817fcd6a4Fb`



Demo website: `https://pepe-card.vercel.app/`

Game Description

PepeCard is a risk-reward card flipping game implemented as a smart contract. Here's how it works:

Game Rules

- Players start by buying in with tokens (minimum 100 wei)
- There's a 5x5 grid of cards (25 total)
- One card is randomly selected as the "ghost card"
- Players flip cards one at a time

- Each safe flip earns increasing rewards
- If the ghost card is flipped, the game ends and all accumulated rewards are lost
- Players can “Leave” at any time to collect their accumulated rewards

Reward Mechanism

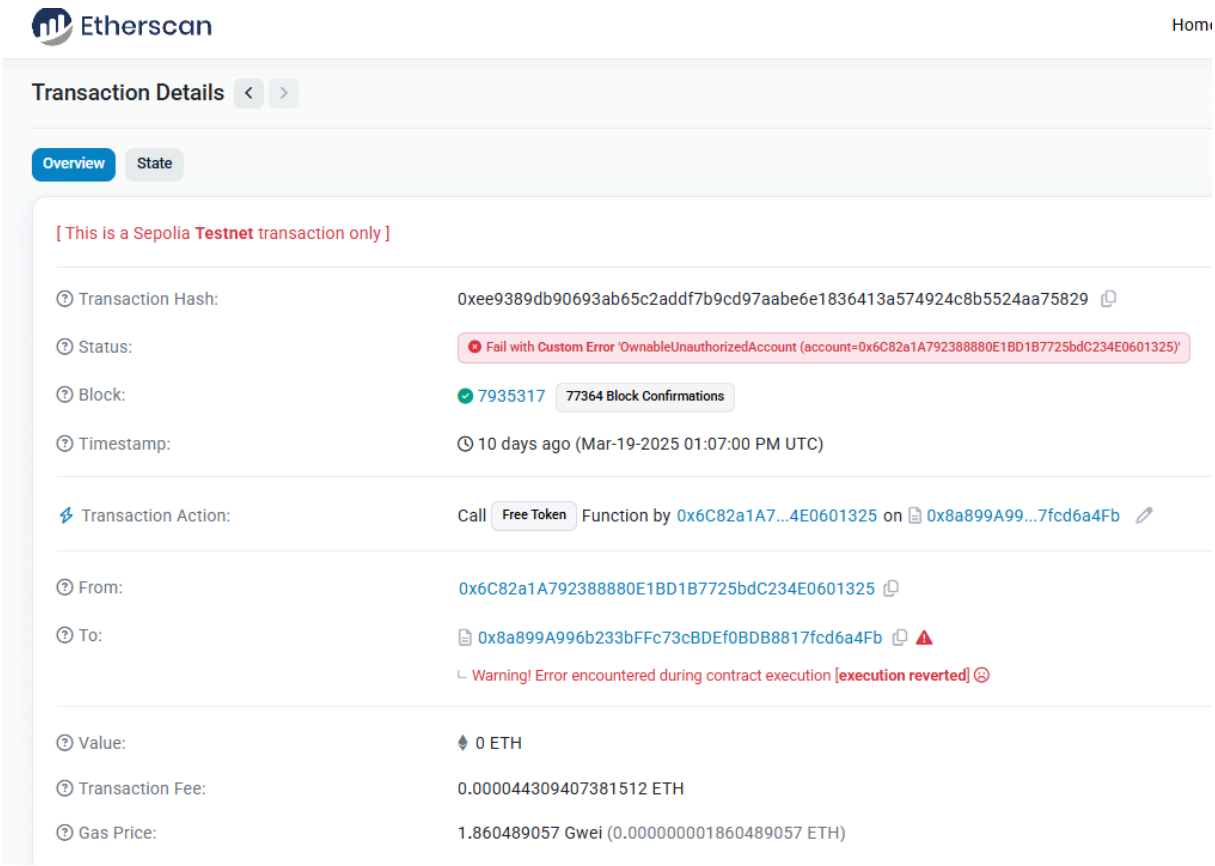
- Rewards increase quadratically with each successful flip
- House edge is 5%
- Base reward formula: A * (n^2 + n), where:
  - A = (25 * buyin * 0.95) / (5200 * 2)
  - n = number of successful flips
- Players can redeem(burn) tokens for ETH at a rate of 10000:1 with a 2% redemption fee

Only Owner Functions

- `TakeOut()`: Allows the owner to withdraw all ETHs from the contract
- `FreeToken()`: Mints 10000 tokens to the owner

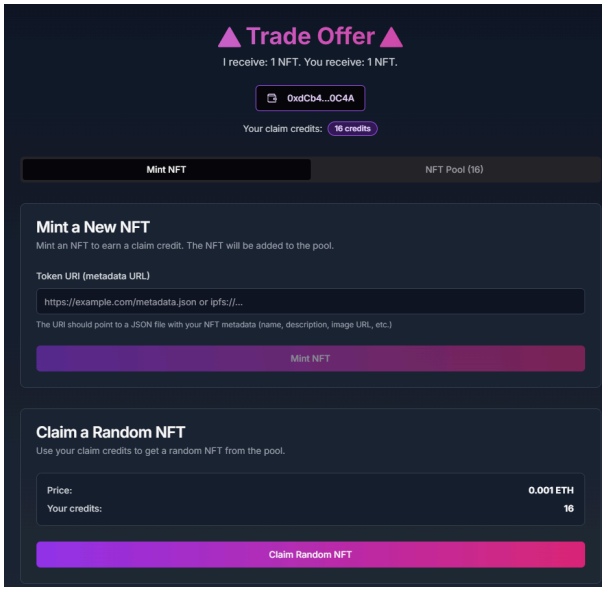
Failed Transaction

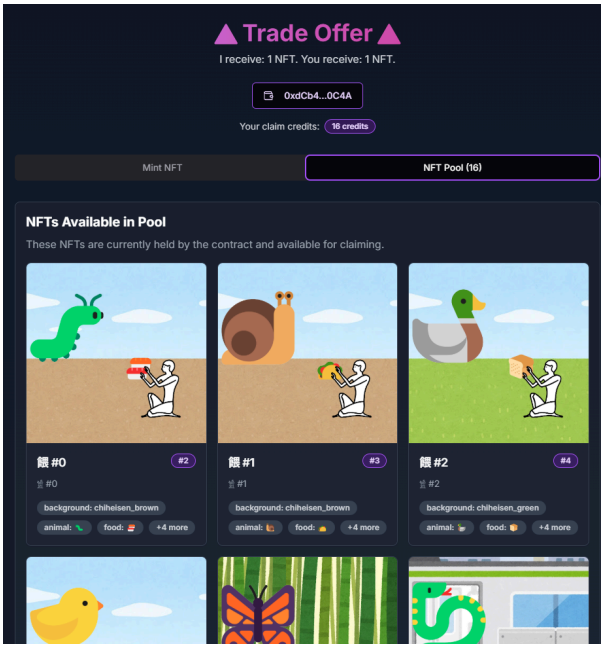
When a non-owner tries to call the `FreeToken()` function, the transaction will fail with `OwnableUnauthorizedAccount` message. ex:
`0xee9389db90693ab65c2addf7b9cd97aabe6e1836413a574924c8b5524aa75829`



Task 2: Deploy ERC721 Token

Contract Address: `0xdb319C816aec7cb4F44bC8e825Fe00248457E837`





Demo website: `https://trade-offer-ten.vercel.app/`

The Trade Offer contract implements a unique NFT trading system where users can mint and Gacha NFTs.

Core Mechanics

- Users can mint new NFTs by providing metadata URIs
- Each minted NFT is held by the contract and adds to the pool
- Minters receive 1 claim credit for each NFT they mint
- Users can claim random NFTs from the pool using their credits (additional fee needed)

Only Owner Functions

- `withdraw()`: Allows the owner to withdraw all ETHs from the contract

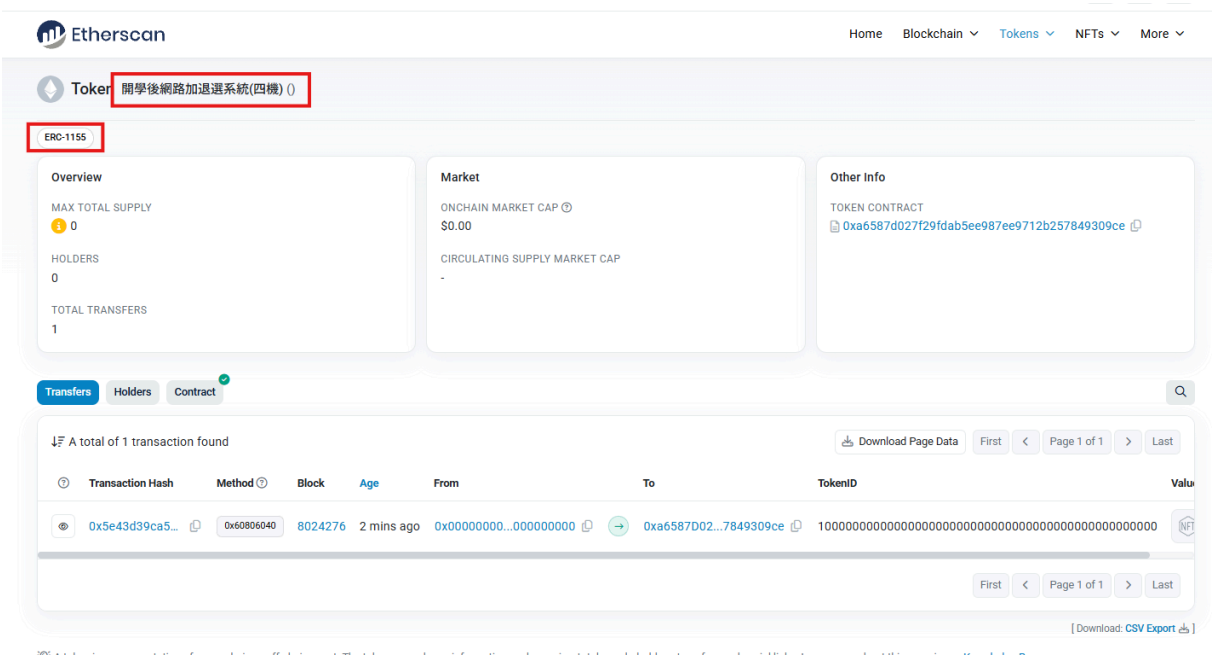
Known Issues

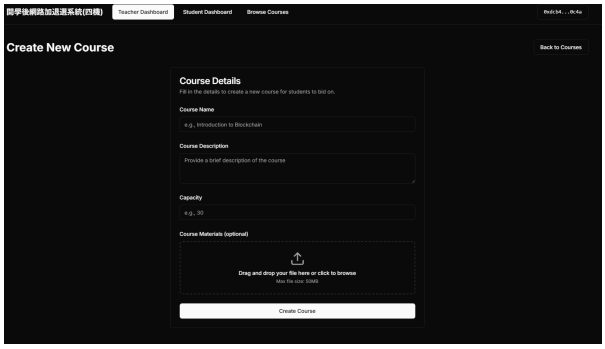
- Since you getting a different randomness from the contract every time interacting with it, you may repeatedly try to claim an NFT until you get the one you want.

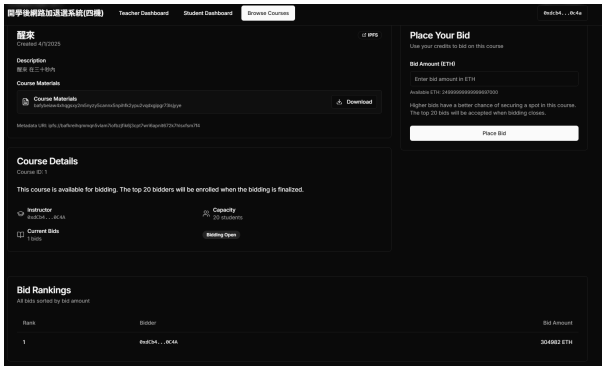
* Note: You may check the NFTs on the OpenSea testnet by clicking this text.

Task 3: Deploy ERC1155 Token

Contract Address: `0xa6587d027f29fdab5ee987ee9712b257849309ce`







Demo website: `https://isms-nagios.vercel.app/`

The **開學後網路加退選系統(四機)** implements a course bidding system with the following features:

Core Mechanics

- Students must register to receive 25 ETH initial credits
- Teachers can create courses with specified capacity and metadata
- Students bid on courses using their credits
- Credits are locked during active bids
- When bidding ends, top N bidders (based on capacity) win course slots
- Losing bidders get their credits refunded

Key Functions

1. **Registration**
   - New students receive 25 ETH initial credits
   - Each address can only register once
2. **Course Creation**

- Only addresses with TEACHER_ROLE can create courses
- Teachers specify capacity and course metadata
- Each course gets a unique courseId
- NFTs are minted to represent course slots

3. **Bidding Process**
   - Students can bid multiple times on the same course
   - Subsequent bids are added to their existing bid amount
   - Credits are locked during active bids
   - Must have sufficient credits to place bid

4. **Finalization**
   - Only course teacher can finalize bidding
   - System automatically selects top N highest bidders
   - Winners receive course NFT as proof of enrollment
   - Losing bidders get credits refunded
   - Course status changes to “finalized”

Task 4: Deploy ERC721A Token

Contract Address: `0x6a3E113c919E03b3270359461DcacBaaf31C8469`

No Demo website available.

- The contract is a simple ERC721A implementation with maximum supply of 500 NFTs.
- Only function implementation is `airdrop(to, quantity)` which allows the owner to mint NFTs to a specified address.

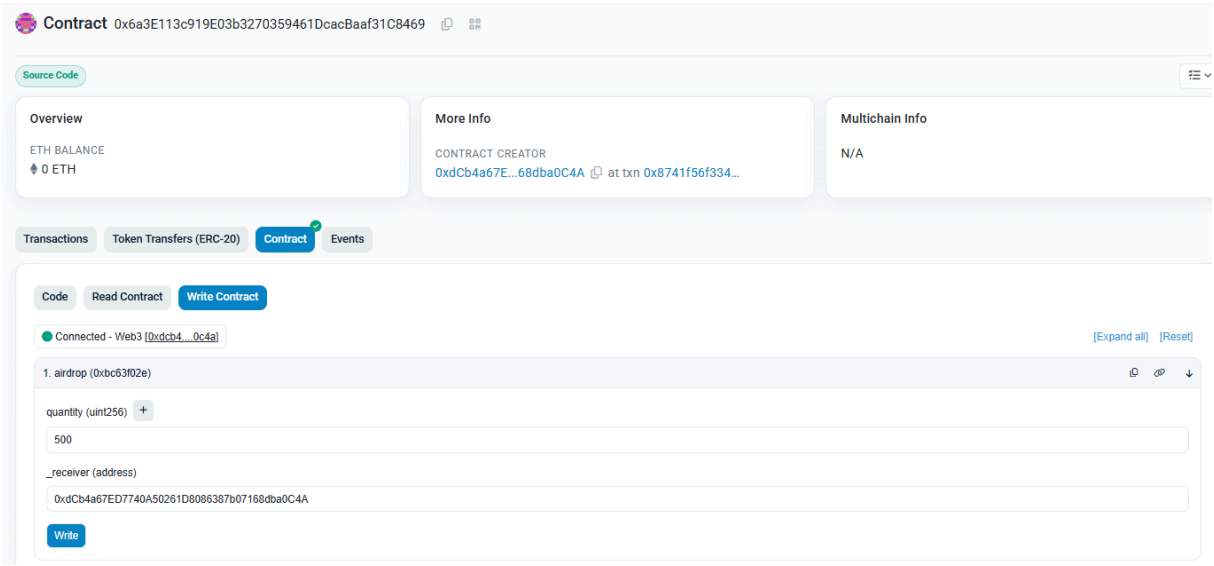


Figure 1: The contract

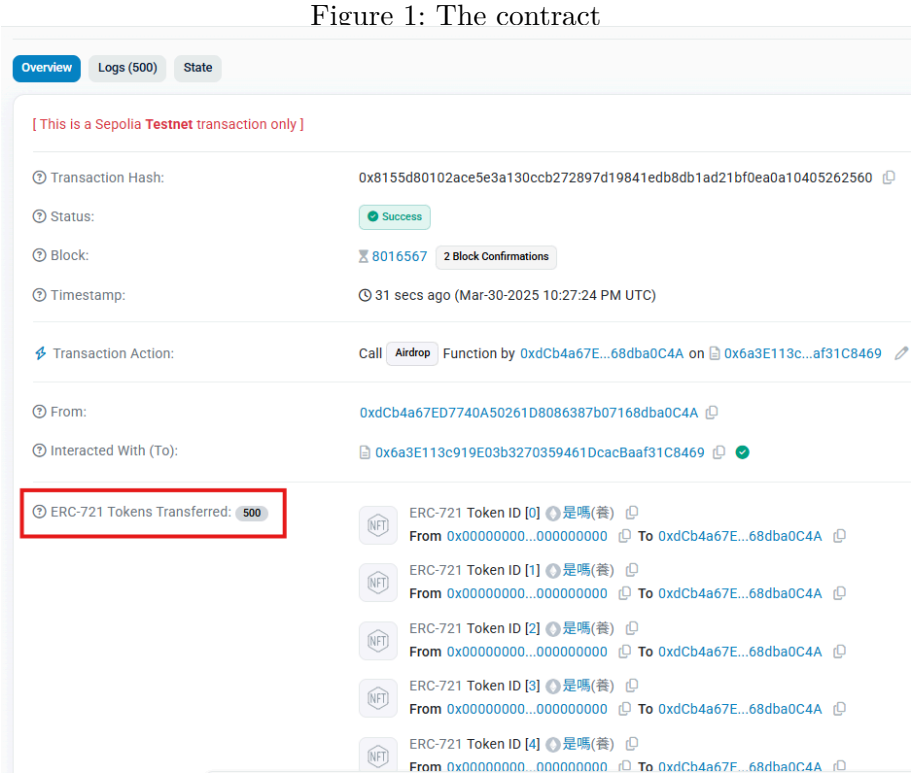


Figure 2: 500 NFTs minted in single transaction

You can check the batch minted NFTs on the OpenSea testnet by the following link: https://testnets.opensea.io/ja/collection/shi-ma