Ostium Labs Take Home Assessment

May 2023

1 Motivation

You've been trading both crypto and equities for a while, and have become confident that Bitcoin has finally decoupled once and for all from the equities markets. The equities and crypto markets are both currently bearish – but you believe this decoupling means Bitcoin will perform significantly better in the mid-term than the market is currently pricing in.

Your friend Alice doesn't agree. Interest rates will continue rising, and crypto and equities should both suffer as investors cycle out of risky assets, she says.

To settle this debate, you decide to make a bet. You think BTC will hit 50k in the next 90 days; she thinks you're crazy.

Your goal today is to implement a simple protocol allowing you and Alice to place your bets on the future price of Bitcoin.

2 Implementation

The protocol should work as follows:

- User A opens a pending bet, wherein they can select:
  - Side (long/short)
  - Bet amount in USDC
  - Expiration time (how long someone else has to take the other side of the bet)
  - Closing time (when the bet is closed, i.e. at what point in time the conditions of the bet must be evaluated)
- When opening a bet, pending the arrival of a user willing to take the other side of a bet, the bet amount is deposited into an escrow smart contract.
- User B can select a pending bet to join:
  - Bet amount (must be identical amount to bet amount on other side) is deposited into the escrow smart contract
  - When this occurs, the bet becomes active and the opening price is fetched on-chain and saved
- The winner may withdraw their winnings once the trade is closed.

3 Assignment

Your tasks are the following:

- Design the smart contract architecture and implement it. To keep things simple, you should assume:
  - USDC as the only supported token to deposit
  - One single betting asset (BTC)
  - 1:1 bet – each user must deposit the same amount on either side.
- Design and integrate a back-end database to support tracking all pending, active and closed bets (all relevant smart contract events as a result of user action).

4 Bonus

- Build a bot that monitors active bets. When a trade reaches its closing time, the bot requests the betting contract to fetch the closing price and to elect the winner of the bet. The bot should be rewarded by a small fee collected on the betting amount.
- Think through some of the limitations of this betting system. Propose some ideas or changes to the architecture that would make this betting platform more interesting, liquid, and offer more accurate pricing.

5 Guidelines

You have 48h to complete the assignment from file download. Please ask as many questions as necessary to complete the assignment (group chat with @kaledora and @marcoantonioribeiro on telegram).