DAO Homework

In this homework, you will learn about smart contracts. We have developed a smart contract on Ethereum that contains a set of proposals which people can cast votes for using the *quadratic voting* method. The first part of this homework is to be completed by yourself, in a sandbox, while the second part will involve the entire class where you will work with your classmates to make your favorite proposal win.

Background on Quadratic Voting

In a quadratic voting system, each person is allocated a set of votes. They can then use them to vote for different proposals. If you vote for N different proposals once, you would spend N votes. However, to vote N times for the same proposal, you would have to spend N^2 votes. This encourages you to spread out your votes while making it difficult for a small group of people to make a single proposal win.

In the course, you will be further exploring the concept of quadratic voting along with other types of voting methods. For now, you are going to get an intuitive appreciation of what quadratic voting entails by completing this homework.

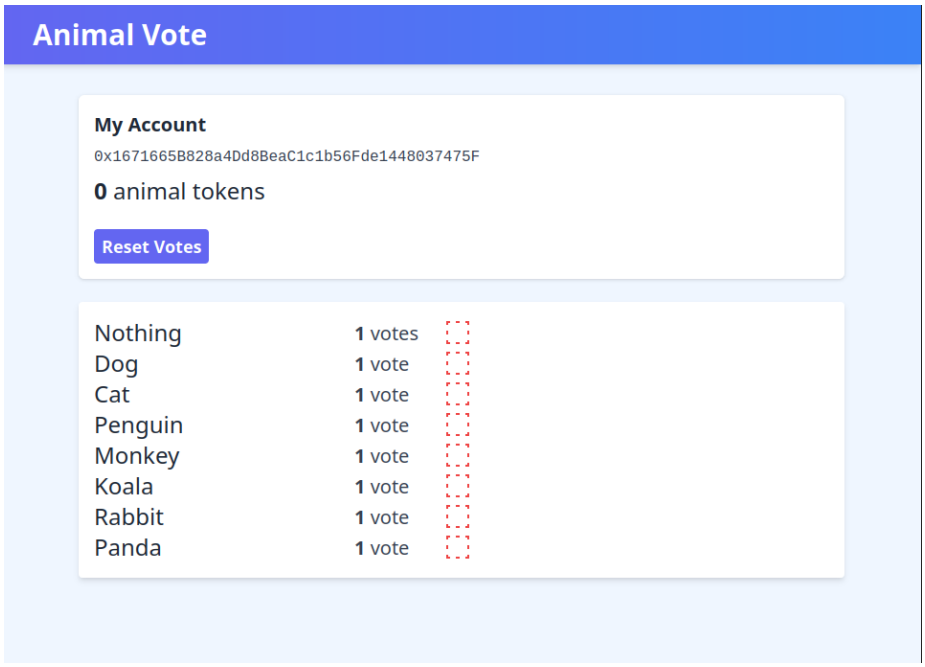
Part 1: Solo Voting

In this first part, you will work by yourself and learn how to interact with Ethereum smart contracts. The instructions for this part can be found here:

https://gist.github.com/cronokirby/9ae094faf74fd94305596dd4db2277f1

Part 2: Interactive Voting

In this part, you will be interacting with a smart contract we developed and deployed on a public blockchain and competing with your classmates to make your favorite animal win.



Right now, the animal "Nothing" is winning, and you need to team up if you want your favorite animal to win instead!

Setup

Before you can start interacting with the homework itself, you will need to do a few setup steps.

Installing MetaMask

The first step is installing **MetaMask**, a browser extension that manages Ethereum wallets. MetaMask allows websites to interact with its API to make (transaction) requests based on the actions you take on the website.

After completing the MetaMask setup instructions, a wallet should be created.

Getting some ETH

We will be giving you the tokens that you are going to use to vote on proposals, but to be able to transact with the contract, you need *ether* - the currency on the Ethereum blockchain. We will not be working on the Ethereum mainnet since transactions would be costly, and instead work on an Ethereum *testnet* called **Ropsten**.

A testnet is an alternative blockchain following the same protocols as the mainnet but is to be used solely for testing purposes. Since the entire class will be working on the same testnet, all transactions will be visible to everyone.

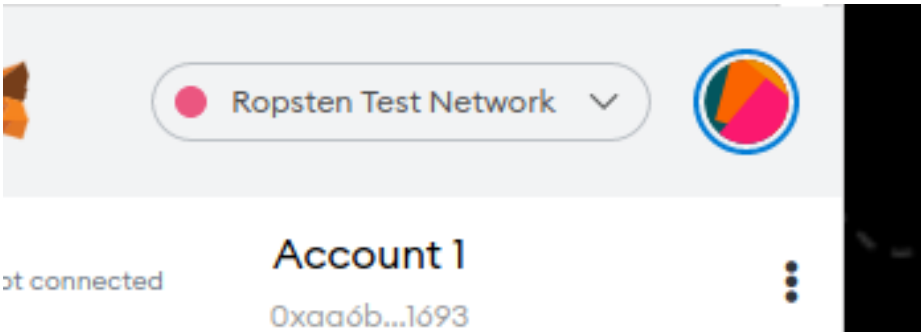
Since ether on a testnet has no value, instead of needing to mine ether, or to buy it with real currency through an exchange, you can receive ether for *free* using what is called a faucet - a mechanism that distributes free ether.

There are several faucets you can use. We suggest that you use one of the following:

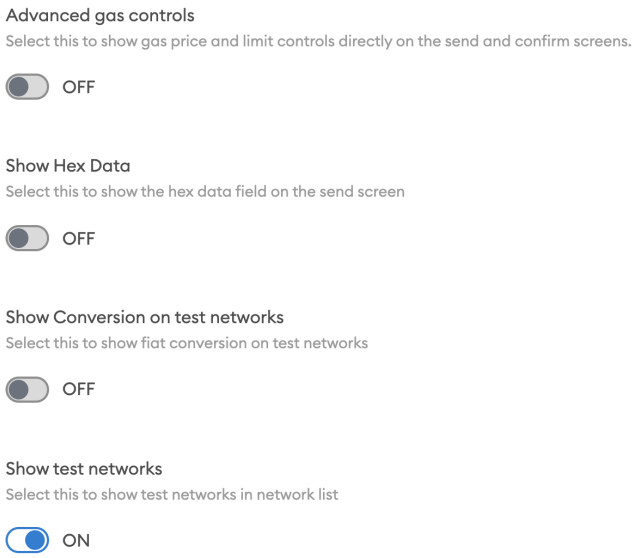
- **https://faucet.ropsten.be/**
- **https://faucet.dimensions.network/**

You will need to enter in your Ethereum wallet **public address** located in MetaMask.

You can check that you have received some ether by changing the network MetaMask is using to *Ropsten*:



(In case you do not see the Ropsten network, you will need to enable test networks in Metamask under `Settings > Advanced`):



Getting Animal Tokens

To vote on your favorite animal, you will need *animal tokens*. We have set up a form for you to tell us your public address on the Ropsten testnet so that we may issue you animal tokens:

https://forms.gle/4FFaRDEsJFqgmTse9

You should use the *same* public address that you used in the previous step for the faucets. This way, your wallet contains ether to pay the transaction fees and animal tokens to cast votes on our deployed smart contract.

Voting on the proposals

Now you will need to visit the website where the voting takes place:

https://cs234-dao-interactive.cronokirby.com/

You will need to give the website permission to use your Ethereum wallet through MetaMask. Make sure you are connected to the *Ropsten* network since that is the testnet where the contract has been deployed, and where you will be interacting with other students.

You will be given 9 animal tokens, and you can use those tokens to vote on different proposals. The voting method is the same as in part 1: to get a total of N votes for a single proposal, you need to spend a total of N^2 tokens. You

can vote for any proposal by clicking on the empty box beside it. You can also take back all of your votes at any point if you decide to change your mind.

Keep in mind that interacting with the contract requires posting a transaction on the blockchain, which may take up to 30 seconds or so. Therefore, you might have to wait some time after you submit your transaction to see its effects.

As you might have noticed, you will not be able to make your favorite proposal win by yourself, instead, you will have to collaborate with the other students. Since there is a single contract deployed on the testnet, all of the students are interacting with the same state, so you can all influence the vote.

You will need to work together to figure out a way to make your proposal win!

Good luck!