EE 465: Cryptocurrency and Blockchain Technologies (Autumn 2018)
Instructor: Saravanan Vijayakumaran
Indian Institute of Technology Bombay

Assignment 4: 20 points   Date: September 20, 2018

1. [20 points] Initial Coin Offerings (ICOs) are contracts in Ethereum which allow any-one to issue new tokens (coins) in return for ether. Tokens issued via ICOs are called ERC20 tokens where ERC abbreviates Ethereum Request for Comments. The number 20 is a consequence of the token standard being proposed in Ethereum Improvement Proposal 20 `https://github.com/ethereum/EIPs/blob/master/EIPS/eip-20.md`.

   An ICO contract is instantiated on the Ethereum blockchain and the contract address is shared with prospective token buyers. Buyers can receive tokens by sending ether to the contract address. The contract specifies the amount of tokens the buyer will receive in return for each ether sent. The token sale end time can be specified in terms of a duration starting from the time the contract is instantiated on the blockchain. The contract creator can specify a bonus period at the beginning of the token sale where early buyers receive more tokens than later buyers.

   Install the Metamask browser extension (`https://metamask.io/`) and perform the following tasks in Ethereum's Ropsten test network. There is no written submission required for this exercise. Send an email with the details requested in parts (c)-(f) to the TA (email address available in Moodle).

   (a) Copy the code at `https://github.com/bitfwdcommunity/ICO-tutorial/blob/master/ico-contract.sol` into the Remix IDE `https://remix.ethereum.org`. Upon compilation, you will see some warnings.

      • Fix the constructor-related warnings using the suggestion in the warning.
      • Fix the event-related warnings using the suggestion in the warning.

   (b) Modify the name of the token in line 102 to some other name which includes your first name.

   (c) Modify the constructor fields in lines 119 to 123 as follows.

      • Change `symbol` to a value consisting of the first three letters of your first name.
      • Change `name` to some name which includes your first name.

      Include the `symbol` and `name` values you chose in the email to the TA.

   (d) Install the contract on the Ropsten blockchain using the Deploy button in the Run tab of the Remix IDE. The contract creation transaction itself needs to be sent using Metamask. Include the Etherscan link to the contract in your email to the TA. It will look like `https://ropsten.etherscan.io/address/0x83a2fbcce57e3f7c7f732c5296ce637e4f4c22ae`.

   (e) Send 1.1 ETH to the contract address before the bonus period ends. Include the Etherscan link to this transaction in your email to the TA. It will look like `https://ropsten.etherscan.io/tx/0x475acbb1397e2d0cc02ef17c25c1b528e878f1293234f08914a98` Note the "Token Transferred" field on this page.

   (f) Transfer 1000 of your tokens to the address `0xcd8569d1089286038578d68ee6fdcaa539c0aa7c` using the Remix interface and Metamask. Include the Etherscan link to this transaction in your email to the TA. It will look like `https://ropsten.etherscan.io/tx/0x1fa977dc082355da14bed5c5d84c08c8eec260c9cf5f2a38aa66873b84b775c2`.