PRACTICAL - 10

To write a contract code to implement a two-player game (with a wager on the line) of Tic-Tac-Toe, also known as Noughts and Crosses: (Ethereum programming)

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CODE:

```
pragma solidity 0.4.24;

contract TicTacToe {

 address public player1_;

 address public player2_;

 address public lastPlayed_;

 address public winner_;

 bool public gameOver_;

 uint256 public turnsTaken_;

 mapping(address => uint256) public wagers_;

 address[9] private gameBoard_;


 function startGame(address _player1, address _player2) external

 {

    player1_ = _player1;

    player2_ = _player2;

 }


 /**
```

```
 * @notice Take your turn, selecting a board location

 * @param _boardLocation Location of the board to take

 */

 function takeTurn(uint256 _boardLocation) external {

     require(!gameOver_, "Sorry game has concluded.");

     require(msg.sender == player1_ || msg.sender == player2_, "Not a valid
player.");

     require(gameBoard_[_boardLocation] == 0, "Spot taken!");

     require(msg.sender != lastPlayed_, "Not your turn.");



     gameBoard_[_boardLocation] = msg.sender;

     lastPlayed_ = msg.sender;

     turnsTaken_++;



     if (isWinner(msg.sender))

     {

        winner_ = msg.sender;

        gameOver_ = true;

        msg.sender.transfer(address(this).balance);
```

```
    }
    else if (turnsTaken_ == 9)
    {
        gameOver_ = true;
        player1_.transfer(wagers_[player1_]);
        player2_.transfer(wagers_[player2_]);
    }
}

/**
* Winning filters:
* 0, 1, 2
* 3, 4, 5
* 6, 7, 8
*
* 3 in a row:
* [0,1,2] || [3,4,5] || [6,7,8]
*
```

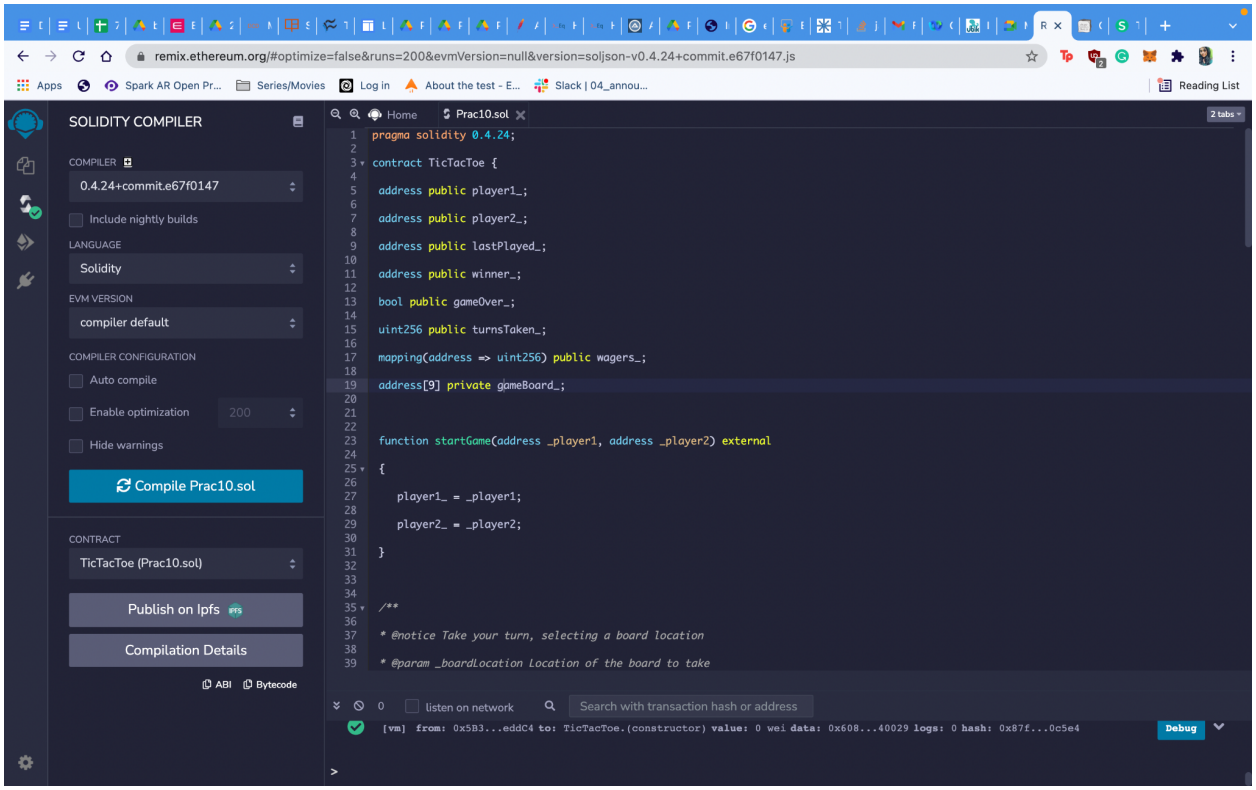
```
* 3 in a column:
* [0,3,6] || [1,4,7] || [2,5,8]
*
* Diagonals:
* [0,4,8] || [6,4,2]
*/
function isWinner(address player) private view returns(bool)
{
    uint8[3][8] memory winningFilters = [
    [0,1,2],[3,4,5],[6,7,8], // rows
    [0,3,6],[1,4,7],[2,5,8], // columns
    [0,4,8],[6,4,2] // diagonals
    ];

    for (uint8 i = 0; i < winningFilters.length; i++)
    {
        uint8[3] memory filter = winningFilters[i];
        if (gameBoard_[filter[0]]==player && gameBoard_[filter[1]]==player &&
gameBoard_[filter[2]]==player)
```

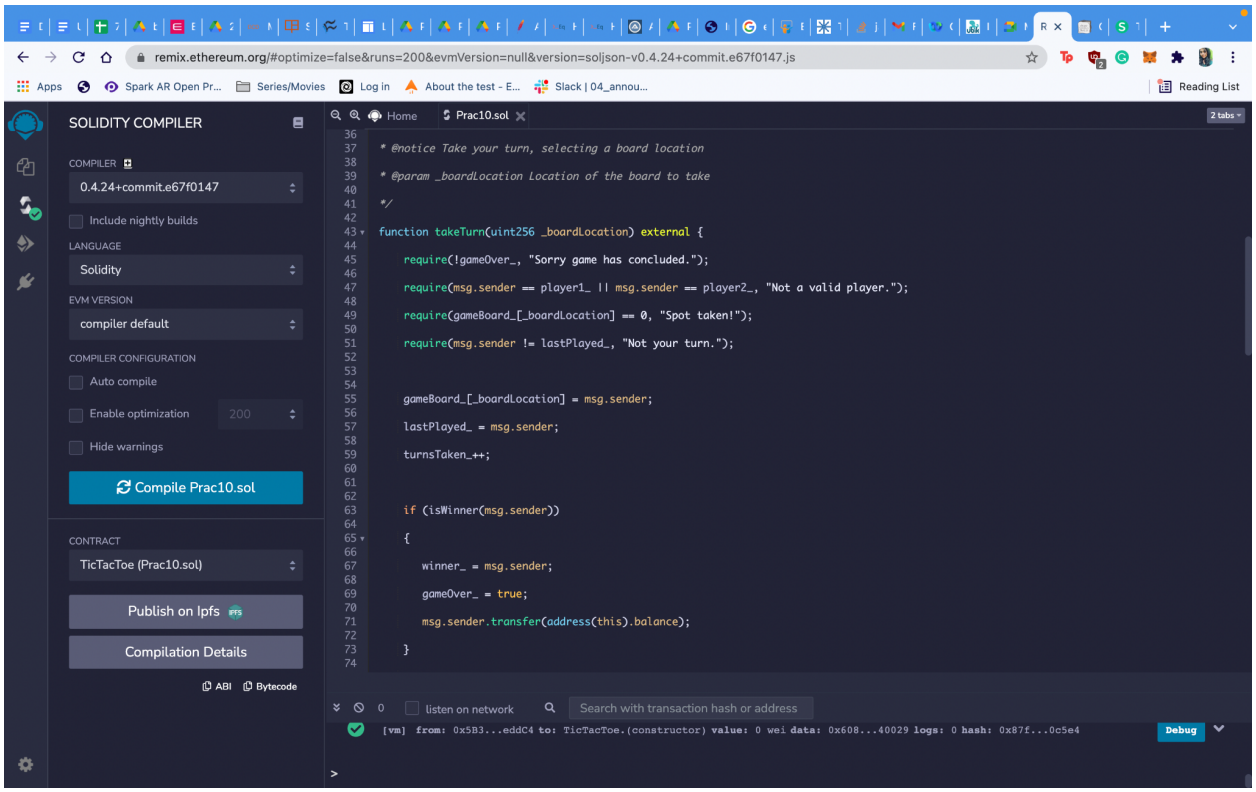
```
        {
         return true;
        }
      }
  }
```

```
 function placeWager() external payable
 {
    require(msg.sender == player1_ || msg.sender == player2_, "Not a valid
player.");
    wagers_[msg.sender] = msg.value;
 }
```

```
 function getBoard() external view returns(address[9])
 {
    return gameBoard_;
 }
}
```

OUTPUT SCREENSHOTS:


remix.ethereum.org/#optimize=false&runs=200&evmVersion=null&version=soljson-v0.4.24+commit.e67f0147.js
SOLIDITY COMPILER
COMPILER
0.4.24+commit.e67f0147
Include nightly builds
LANGUAGE
Solidity
EVM VERSION
compiler default
COMPILER CONFIGURATION
Auto compile
Enable optimization
200
Hide warnings
Compile Prac10.sol
CONTRACT
TicTacToe (Prac10.sol)
Publish on Ipfs
Compilation Details
ABI
Bytecode
Home
Prac10.sol
2 tabs
pragma solidity 0.4.24;
contract TicTacToe {
address public player1_;
address public player2_;
address public lastPlayed_;
address public winner_;
bool public gameOver_;
uint256 public turnsTaken_;
mapping(address => uint256) public wagers_;
address[9] private gameBoard_;
function startGame(address _player1, address _player2) external
{
player1_ = _player1;
player2_ = _player2;
}
/**
* @notice Take your turn, selecting a board location
* @param _boardLocation Location of the board to take
listen on network
Search with transaction hash or address
[vm] from: 0x5B3...eddC4 to: TicTacToe.(constructor) value: 0 wei data: 0x608...40029 logs: 0 hash: 0x87f...0c5e4
Debug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Compile Prac10.sol
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* @notice Take your turn, selecting a board location
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function takeTurn(uint256 _boardLocation) external {
require(!gameOver_, "Sorry game has concluded.");
require(msg.sender == player1_ || msg.sender == player2_, "Not a valid player.");
require(gameBoard_[_boardLocation] == 0, "Spot taken!");
require(msg.sender != lastPlayed_, "Not your turn.");
gameBoard_[_boardLocation] = msg.sender;
lastPlayed_ = msg.sender;
turnsTaken_++;
if (isWinner(msg.sender))
{
winner_ = msg.sender;
gameOver_ = true;
msg.sender.transfer(address(this).balance);
}
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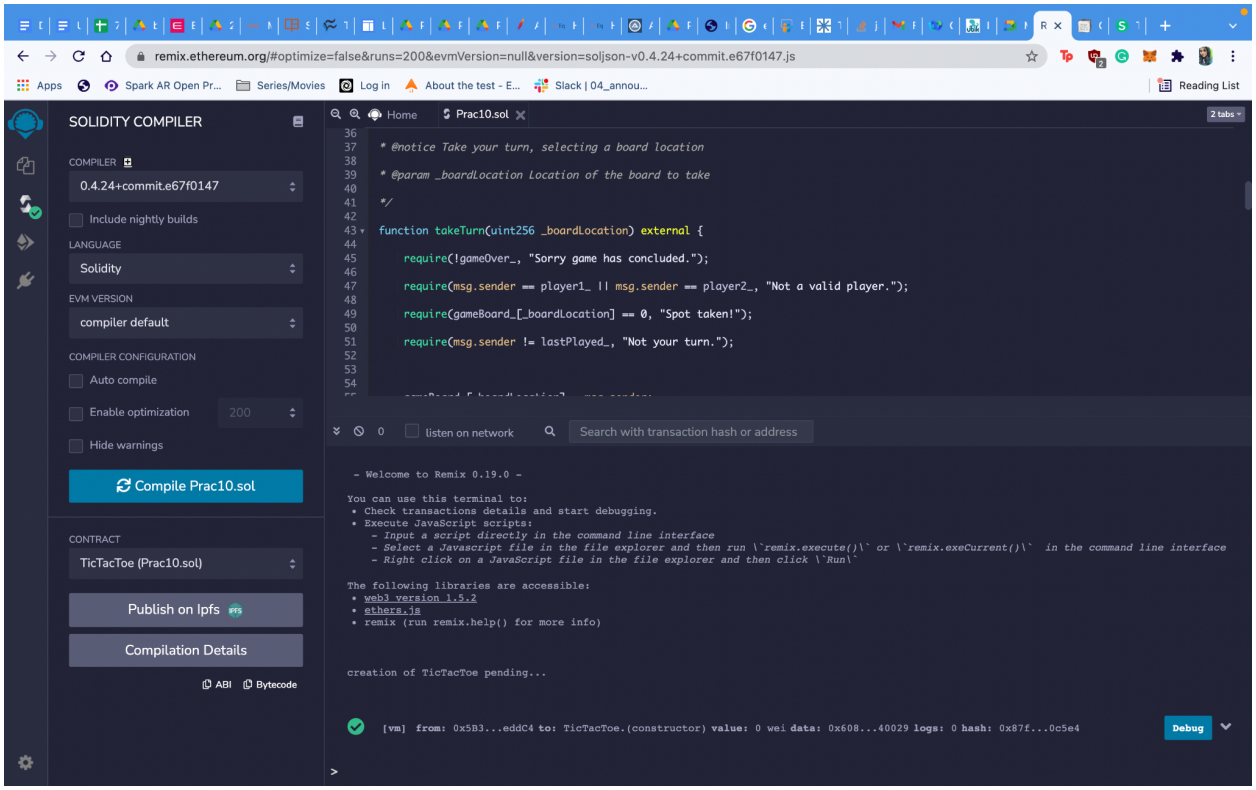
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Search with transaction hash or address
- Welcome to Remix 0.19.0 -
You can use this terminal to:
• Check transactions details and start debugging.
• Execute JavaScript scripts:
- Input a script directly in the command line interface
- Select a Javascript file in the file explorer and then run \`remix.execute()\` or \`remix.exeCurrent()\` in the command line interface
- Right click on a JavaScript file in the file explorer and then click \`Run\`
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix (run remix.help() for more info)
creation of TicTacToe pending...
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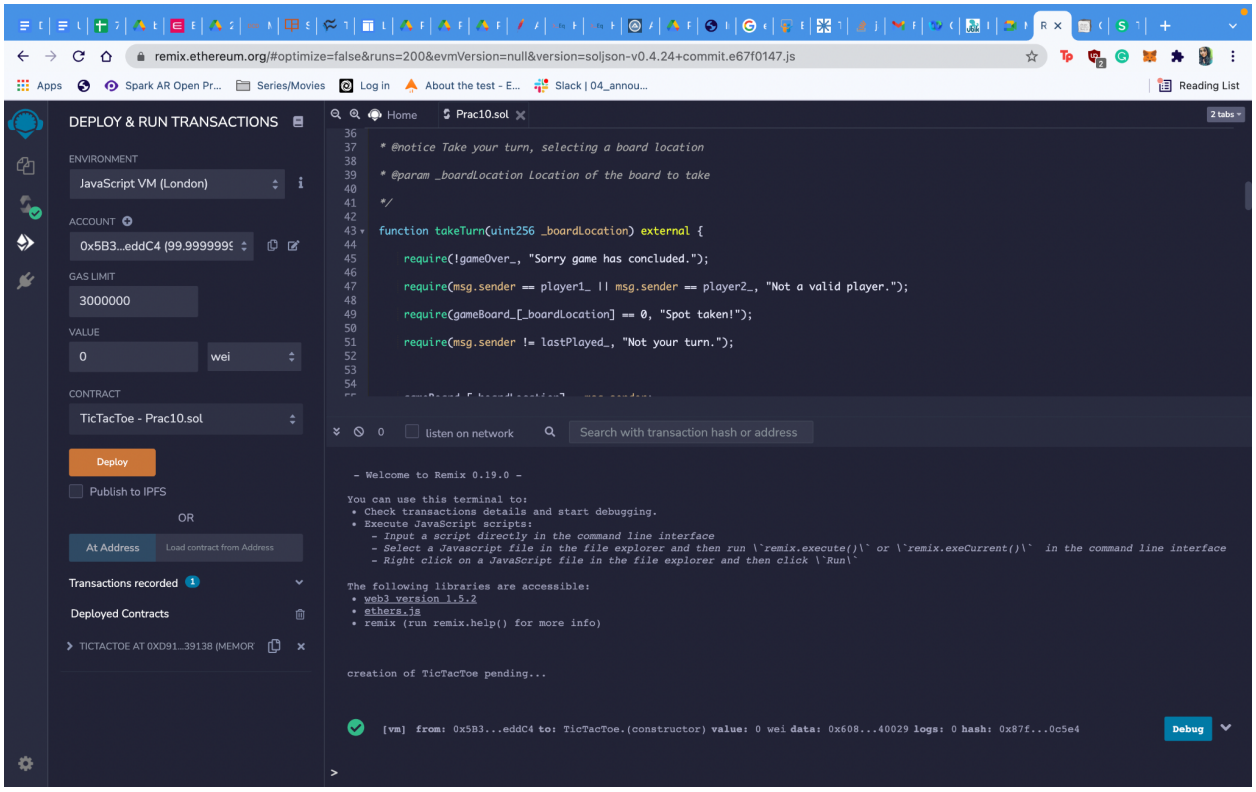
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DEPLOY & RUN TRANSACTIONS
ENVIRONMENT
JavaScript VM (London)
ACCOUNT
0x5B3...eddC4 (99.999999
GAS LIMIT
3000000
VALUE
0
wei
CONTRACT
TicTacToe - Prac10.sol
Deploy
Publish to IPFS
OR
At Address
Load contract from Address
Transactions recorded 1
Deployed Contracts
TICTACTOE AT 0XD91...39138 (MEMOR
Home
Prac10.sol
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require(!gameOver_, "Sorry game has concluded.");
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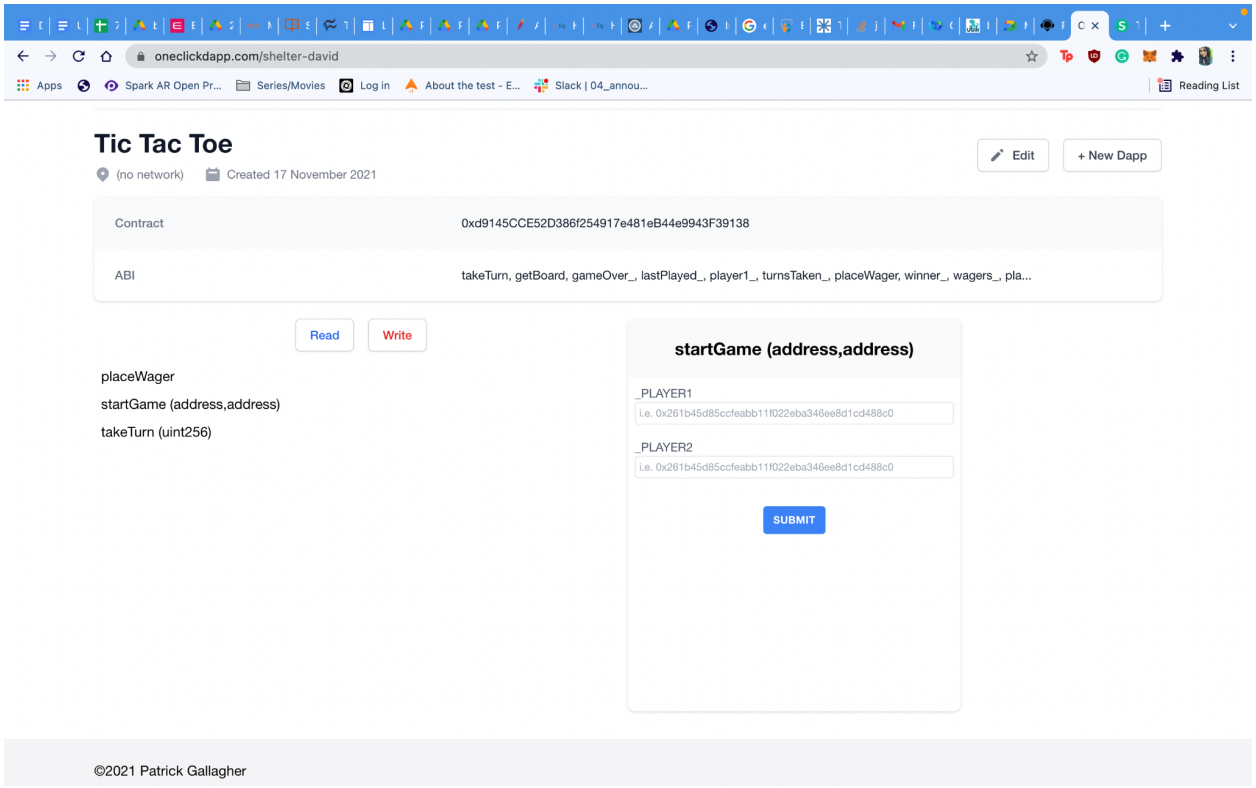

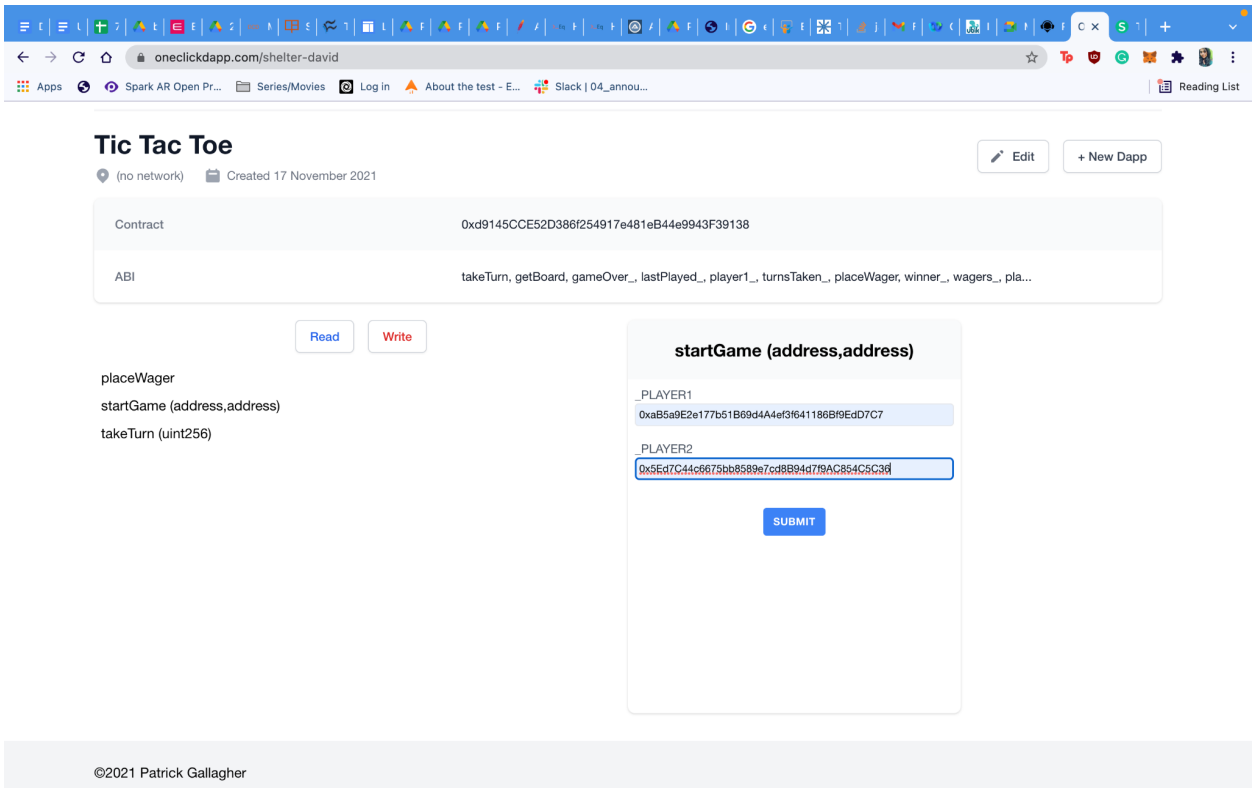

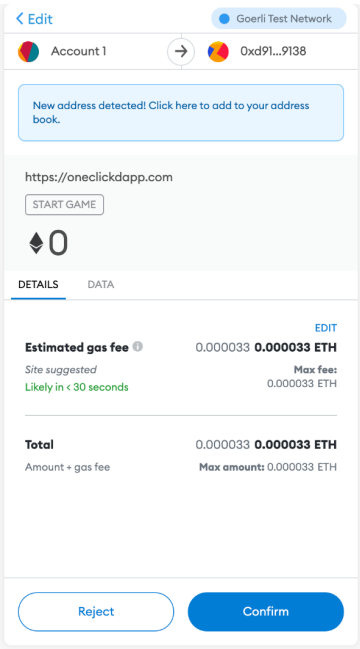

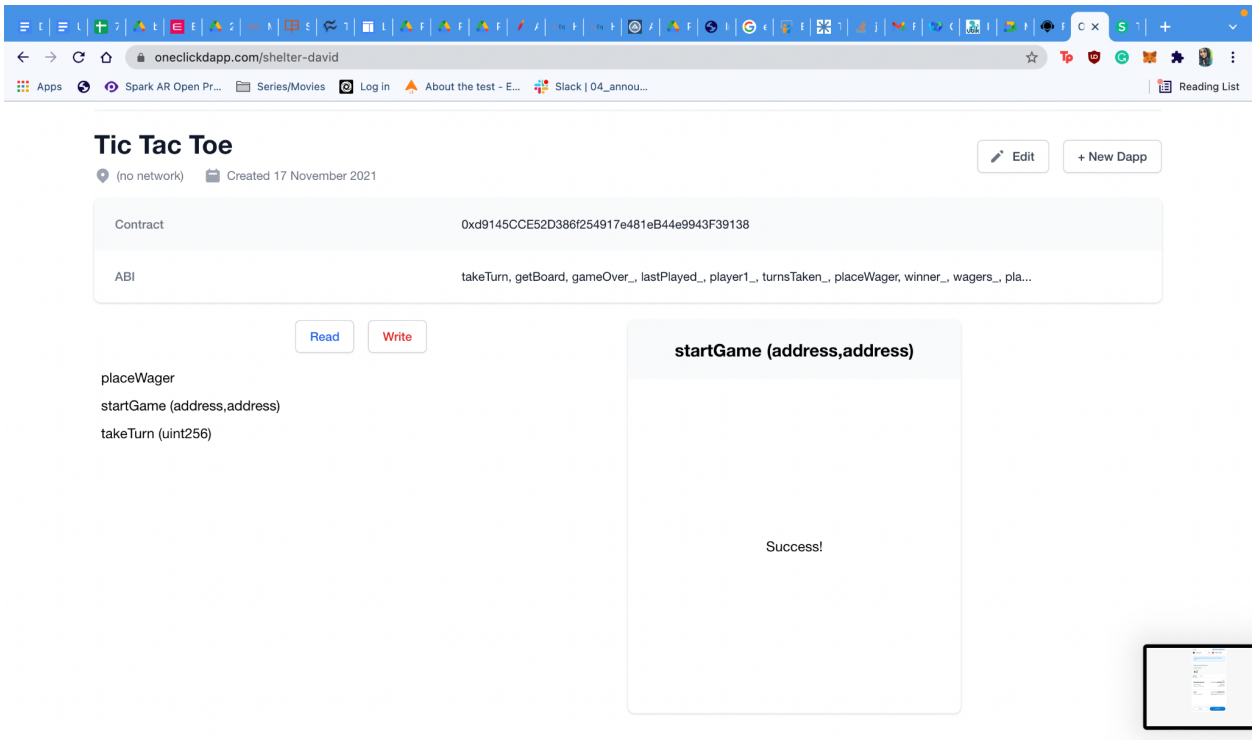

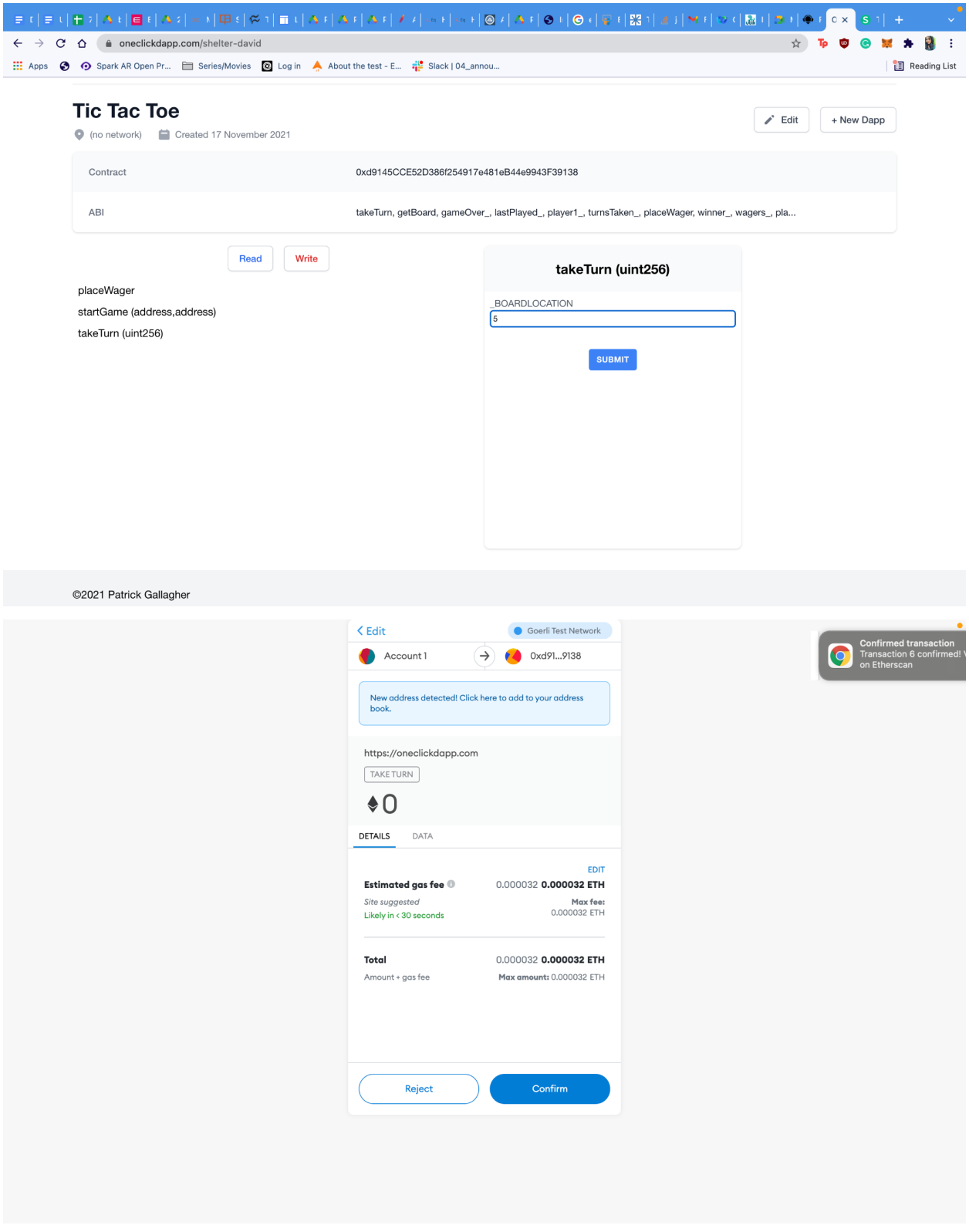
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Apps
Spark AR Open Pr...
Series/Movies
Log in
About the test - E...
Slack | 04_annou...
Reading List
Tic Tac Toe
(no network)
Created 17 November 2021
Edit
+ New Dapp
Contract
0xd9145CCE52D386f254917e481eB44e9943F39138
ABI
takeTurn, getBoard, gameOver_, lastPlayed_, player1_, turnsTaken_, placeWager, winner_, wagers_, pla...
Read
Write
placeWager
startGame (address,address)
takeTurn (uint256)
takeTurn (uint256)
_BOARDLOCATION
5
SUBMIT
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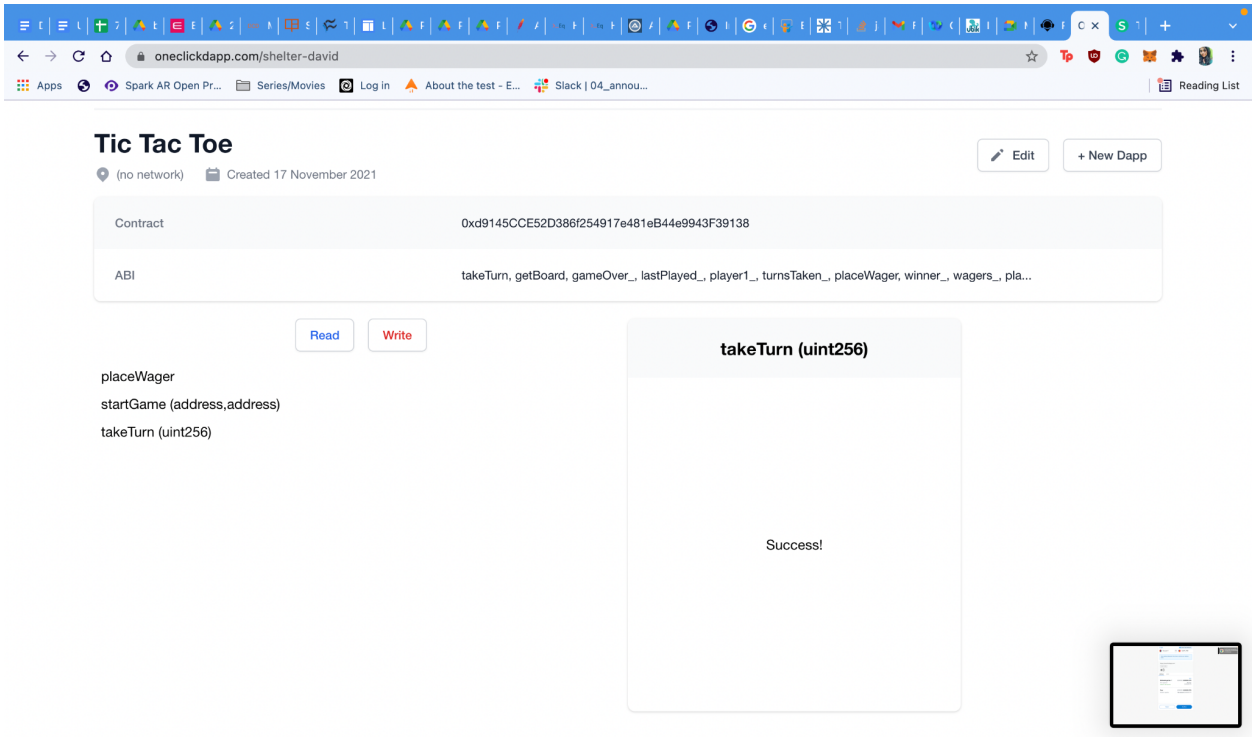
Edit
Goerli Test Network
Account 1
0xd91...9138
New address detected! Click here to add to your address book.
https://oneclickdapp.com
TAKE TURN
0
DETAILS
DATA
EDIT
Estimated gas fee
0.000032 0.000032 ETH
Site suggested
Likely in < 30 seconds
Max fee:
0.000032 ETH
Total
0.000032 0.000032 ETH
Amount + gas fee
Max amount: 0.000032 ETH
Reject
Confirm
Confirmed transaction
Transaction 6 confirmed!
on Etherscan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ABI
takeTurn, getBoard, gameOver_, lastPlayed_, player1_, turnsTaken_, placeWager, winner_, wagers_, pla...
Read
Write
placeWager
startGame (address,address)
takeTurn (uint256)
takeTurn (uint256)
Success!
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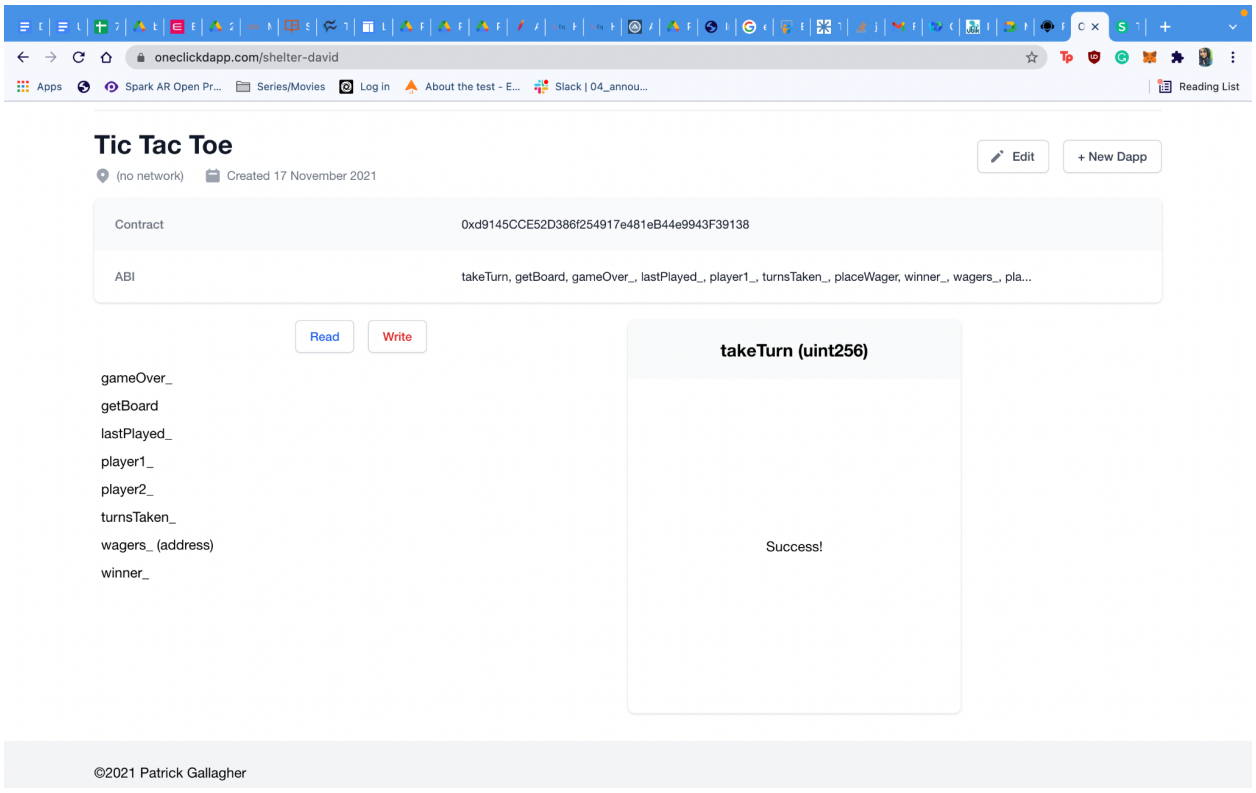
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Read
Write
gameOver_
getBoard
lastPlayed_
player1_
player2_
turnsTaken_
wagers_ (address)
winner_
takeTurn (uint256)
Success!
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