

Roll No: 20BCE204

Course Code and Course Name: 2CSDE93 Blockchain Technology

Practical No. 8

Aim: To design and develop end-to-end decentralized applications (Dapps)

Code:

```
//SPDX-License-Identifier: GPL-3.0
pragma solidity ^0.8.18;

// Define a contract for the self-driving car
contract SelfDrivingCar {
    address public owner;
    address public carAddress;
    uint public carSpeed;
    uint public carBalance;
    bool public isDriving;
    mapping(address => uint) public passengerBalances;

    event OwnershipTransferred(address indexed previousOwner, address indexed newOwner);
    event CarSpeedUpdated(uint newSpeed);
    event CarBalanceUpdated(uint newBalance);
    event DrivingStatusUpdated(bool isDriving);
    event PassengerBalanceUpdated(address passenger, uint newBalance);

    constructor() {
        owner = msg.sender;
        carAddress = address(this);
        carSpeed = 0;
        carBalance = 0;
        isDriving = false;
    }

    modifier onlyOwner() {
        require(msg.sender == owner, "Only the owner can perform this action");
        _;
    }

    modifier notDriving() {
        require(!isDriving, "The car is currently in motion");
        _;
    }
```

```

receive() external payable {
    // Handle incoming Ether (e.g., refilling car balance)
    carBalance += msg.value;
    emit CarBalanceUpdated(carBalance);
}

fallback() external {
    // Handle unexpected transactions
}

function transferOwnership(address newOwner) public onlyOwner {
    require(newOwner != address(0), "Invalid address");
    emit OwnershipTransferred(owner, newOwner);
    owner = newOwner;
}

function updateCarSpeed(uint newSpeed) public onlyOwner notDriving {
    carSpeed = newSpeed;
    emit CarSpeedUpdated(newSpeed);
}

function startDriving() public onlyOwner notDriving {
    isDriving = true;
    emit DrivingStatusUpdated(true);
}

function stopDriving() public onlyOwner {
    isDriving = false;
    emit DrivingStatusUpdated(false);
}

function addPassenger(address passenger, uint balance) public onlyOwner {
    require(passenger != address(0), "Invalid address");
    passengerBalances[passenger] = balance;
    emit PassengerBalanceUpdated(passenger, balance);
}

function payPassenger(address passenger, uint amount) public onlyOwner {
    require(passengerBalances[passenger] >= amount, "Insufficient funds for the passenger");
}

```

```

passengerBalances[passenger] -= amount;
carBalance -= amount;
emit PassengerBalanceUpdated(passenger, passengerBalances[passenger]);
}
}

```

Output:
Deploying it in goerli etherscan:

The screenshot shows the Etherscan Goerli Testnet interface. The top navigation bar includes 'Home', 'Blockchain', 'Tokens', 'NFTs', and 'Misc'. The main header displays the contract address: **Contract** 0x60fed0e532605bc95b7eb492575d9e1e46840f28. Below this, there are three tabs: 'Source Code', 'Token Transfers (ERC-20)', and 'Contract' (which is selected). The 'Contract' tab shows a table of transactions. The table has columns: Transaction Hash, Method, Block, Age, From, To, Value, and Txn Fee. Two transactions are listed:

Transaction Hash	Method	Block	Age	From	To	Value	Txn Fee
0x7c59451c707fe004e...	Pay Passenger	9894688	10 hrs 16 mins ago	0x8cA5A5...BB3d2518	0x60fed0...46840F28	0 ETH	0.00004044
0x217d0871ef29cddf...	0x60806040	9894658	10 hrs 23 mins ago	0x8cA5A5...BB3d2518	Create: SelfDrivingCar	0 ETH	0.00255361

Below the table, there is a note: "A contract address hosts a smart contract, which is a set of code stored on the blockchain that runs when predetermined conditions are met. Learn more about addresses in our Knowledge Base." There is also a link to download a CSV export.

The screenshot shows the 'Verify & Publish Contract Source Code' interface on Etherscan. The page title is 'Verify & Publish Contract Source Code'. Below the title, there is a section for 'Compiler Type: SINGLE FILE / CONCATENATED METHOD'. The interface is divided into two tabs: 'Contract Source Code' and 'Compiler Output' (which is selected). The 'Compiler Output' tab shows the 'Compiler debug log' with the following information:

- Note: Contract was created during TxHash# 0x217d0871ef29cddf7dce73e28224b3c8e83e86970126af31ebb4354f4349dc8
- Successfully generated Bytecode and ABI for Contract Address [0x60fed0e532605bc95b7eb492575d9e1e46840f28]

Below the debug log, there is a section for 'Compiler Version: v0.8.18+commit.87f61d96' and 'Optimization Enabled: 0'. The 'ContractName' is 'SelfDrivingCar'. The 'ContractBytecode' is displayed as a long hexadecimal string.

goerli.etherscan.io/address/0x60feD0E532605BC95B7eB492575d9E1e46840F28/writeContract

Goerli Testnet

Search by Address / Txn Hash / Block / Token

Overview

ETH BALANCE
0 ETH

TOKEN HOLDINGS
\$0.00 (1 Tokens)

More Info

CONTRACT CREATOR
0x8cA5A5...BB3d2518 at txn 0x217d0871ef29cddfb...

Multi Chain

MULTICHAIN ADDRESS
5 addresses found

Transactions

Token Transfers (ERC-20)

Contract

Events

Code

Read Contract

Write Contract

Connected - Web3 [0x8cA5...2518]

1. addPassenger (0xbb984d16)

passenger (address)
0x8cA5A584235aeD0de76F760C7C6Fd2dBB3d2518

balance (uint256) +
300

Write

MetaMask Notification

Goerli test network

Account 1

0x60f...0F28

https://goerli.etherscan.io

0x60f...0F28 : CONTRACT INTERACTION

DETAILS DATA HEX

Network is busy. Gas prices are high and estimates are less accurate.

Market

Gas (estimated) 0.00010859
Likely in < 30 seconds 0.00010859 GoerliETH
Max fee: 0.00010859 GoerliETH

Total 0.00010859
Amount + gas fee 0.00010859 GoerliETH

Goerli Testnet

Search by Address / Txn Hash / Block / Token

Transaction Details

Overview Logs (1) State

More

[This is a Goerli Testnet transaction only]

Transaction Hash:

0x2cd8e988d87455048260d70aa2c4a96b2768ff435249d20a369eb0e599bee2f

Status:

Success

Block:

9897200 1 Block Confirmation

Timestamp:

11 secs ago (Oct-20-2023 01:28:48 AM +UTC)

Method:

Add Passenger

From:

0x8cA5A584235aeD0de76F760C7C6Fd2dBB3d2518

To:

0x60feD0E532605BC95B7eB492575d9E1e46840F28

Value:

0 ETH (\$0.00)

Transaction Fee:

0.000072391500772176 ETH (\$0.00)

Gas Price:

1.500000016 Gwei (0.000000001500000016 ETH)

More Details: + Click to show more