

Blockchain technologies
Assignment 2
Yakupov Yernazar SE-2201
Github for practice: https://github.com/yernazarious/assignment_2_blockchain

Featured Badge

Master of the Craft

You've completed a comprehensive course of study! This badge is awarded for completing a degree.

DEGREE TITLE	XP
Ethereum Developer Degree	100,000

This badge has not been minted on-chain yet.

LearnWeb3

	Claimed badge for: Ethereum Developer Degree	+100,000 XP	Jan 15
	Claimed badge for: Ethereum Developer Degree - Senior 😊	+50,000 XP	Jan 15
	Completed lesson: Build your own MEV searcher using Flashbots	+15,000 XP	Jan 15
	Completed lesson: Using metatransaction to pay for your users' gas	+15,000 XP	Jan 15
	Completed lesson: Optimize gas in your Solidity code	+15,000 XP	Jan 15
	Completed lesson: Identifying genuine-looking contracts which are actually malicious	+15,000 XP	Jan 15
	Completed lesson: NEVER use tx.origin again	+15,000 XP	Jan 15
	Completed lesson: Executing a denial of service on a smart contract	+15,000 XP	Jan 15
	Completed lesson: Generating random numbers on-chain	+15,000 XP	Jan 15
	Completed lesson: Run code from other contracts inside your own using delegatecall	+15,000 XP	Jan 15
	Completed lesson: Access private data in smart contracts	+15,000 XP	Jan 15
	Completed lesson: The bug which cost Ethereum \$60 million dollars: Re-entrancy	+15,000 XP	Jan 15
	Completed lesson: Borrow millions without collateral from Aave using Flash Loans	+15,000 XP	Jan 15
	Completed lesson: How Ethereum nodes store data and executes smart contracts	+15,000 XP	Jan 15
	Completed lesson: How to create Merkle Trees for airdrops	+15,000 XP	Jan 15
	Claimed badge for: Ethereum Developer Degree - Sophomore 🌟	+30,000 XP	Jan 15
	Completed lesson: Intro to React and Next.js	+7,000 XP	Jan 15
	Claimed badge for: Ethereum Developer Degree - Junior 🧑	+40,000 XP	Jan 14
	Completed lesson: Indexing data using The Graph's Indexer	+10,000 XP	Jan 14



⭐ Freshman ⚡

Learn the fundamentals of blockchain and crypto technology. Set up your first wallet, get into developer mode, and deploy your first few contracts!

Team
LearnWeb3

XP
+20,000 XP

Lessons
9 lessons



How to get started with programming?

Understand the basics of programming web technologies, how to get started, what mindset to go in with, and what path to follow.

⌚ 9 mins

🏆 +4,000 XPI



What even is a blockchain?

Understand the basics of blockchain and its various applications across different industries.

⌚ 5 mins

🏆 +4,000 XPI



What is Web3?

Learn about the web3 and how it is different from web2.

⌚ 4 mins

🏆 +4,000 XPI



What is Ethereum?

Learn about the history of Ethereum and what it offers.

⌚ 5 mins

🏆 +4,000 XPI



Setting up a crypto wallet

In this lesson, you will learn about Crypto Wallets and how to download one.

⌚ 6 mins

🏆 +4,000 XPI



Introduction to Solidity

In this lesson, you will learn what Solidity is and the basic syntax of the language.

⌚ 7 mins

🏆 +4,000 XPI



Build your first dApp on Ethereum

A simple tutorial on how to create and deploy a Solidity smart contract and interact with it from a frontend website.

⌚ 8 mins

🏆 +4,000 XPI





Sophomore 🌱

Explore the web3 world further, learn about gas, mining, and how Proof of Work works, and build full dApps with custom contracts, NFTs, DAOs, and even a decentralized exchange!

Team LearnWeb3 | XP +30,000 XP | Lessons 12 lessons



Intro to React and Next.js

Learn about the basics of React, NextJS, backend, routing and much more.

⌚ 27 mins ⚡ +7,000 XPI

What is Gas, and why is it needed?

Learn about the gas, how is it calculated, why it exists, and how to pay the minimum gas fees.

⌚ 14 mins ⚡ +4,000 XPI

What is mining, and why is it done?

Learn about mining and how to become a miner.

⌚ 7 mins ⚡ +4,000 XPI

How does Proof of Work work?

In this lesson we go over the Proof of Work consensus algorithm used by Bitcoin and previously also used by Ethereum to understand how it works.

⌚ 13 mins ⚡ +7,000 XPI

How does Proof of Stake work?

In this lesson we go over the Proof of Stake consensus algorithm used by Ethereum and many other blockchains and explore how it actually works.

⌚ 13 mins ⚡ +7,000 XPI

Demystifying the Ethereum Virtual Machine (EVM)

Let's dig into the Ethereum Virtual Machine (EVM) and understand how it works.

⌚ 7 mins ⚡ +7,000 XPI

Digging deeper into Solidity's syntax

A step up from An Introduction to Solidity - to learn about mappings, enums, structs, and more!

⌚ 13 mins ⚡ +7,000 XPI

Junior

Move beyond Solidity and start exploring ecosystem tools, protocols, and apps to make your life as a developer easier and more productive

Team LearnWeb3 | XP +40,000 XP | Lessons 8 lessons

What is a Layer 2 blockchain?
Understand the different types of Layer 2 blockchains that exist and their pros and cons
16 mins +10,000 XPI

What is ENS and how to integrate into your DApp
Learn about what is Ethereum Name Service(ENS) and how to integrate ENS(.eth) domains into your DApp
8 mins +10,000 XPI

Testing smart contracts on a local blockchain node using Hardhat
Learn how to test your smart contracts locally (100x faster than testnets)
6 mins +10,000 XPI

Introduction to IPFS: The InterPlanetary File System
In this lesson, we take a dive into IPFS and understand what makes it so special and why you should care about it.
13 mins +10,000 XPI

Build your own NFT collection with metadata stored on IPFS
Learn how to build your own NFT collection and store metadata on IPFS.
17 mins +10,000 XPI

User-owner data profiles using Ceramic Network
Learn about building sovereign user-owned data profiles using Ceramic Network.
16 mins +10,000 XPI

Secure on-chain randomness using Chainlink VRFs
Learn about Chainlink VRF and how to use it to build on-chain game using it.
16 mins +10,000 XPI



Senior 😎

Learn low level fundamentals, borrow millions for free with no collateral, bribe miners and have them play by your rules, and learn how to hack (and secure) smart contracts!

Team LearnWeb3 | XP +50,000 XP | Lessons 13 lessons





How to create Merkle Trees for airdrops

Let's learn about merkle trees and how they can be used to create airdrops in a gas-efficient way.

⌚ 15 mins | 🏆 +15,000 XPI | >



How Ethereum nodes store data and executes smart contracts

Let's learn about how Ethereum nodes store data and how smart contracts run in EVM.

⌚ 11 mins | 🏆 +15,000 XPI | >



Borrow millions without collateral from Aave using Flash Loans

Let's learn how to borrow a loan worth millions in crypto without paying a single cent using Aave Flash Loans.

⌚ 16 mins | 🏆 +15,000 XPI | >



The bug which cost Ethereum \$60 million dollars: Re-entrancy

Let's learn about the Re-Entrancy attack that cost \$60 million

⌚ 9 mins | 🏆 +15,000 XPI | >



Access private data in smart contracts

Let's learn about how to read the private data in smart contracts

⌚ 6 mins | 🏆 +15,000 XPI | >



Run code from other contracts inside your own using delegatecall

Let's learn about delegatecall attacks, where one contract can change data in another contract.

⌚ 12 mins | 🏆 +15,000 XPI | >



Generating random numbers on-chain

Let's learn about how to use oracles to generate random numbers on-chain

⌚ 6 mins | 🏆 +15,000 XPI | >

DEPLOY & RUN TRANSACTIONS ✓

ENVIRONMENT Injected Provider - MetaMask

ACCOUNT 0x610..63141 (0. ether)

GAS LIMIT 3000000

VALUE 3 Wei

CONTRACT LW3Token - LW3Token.sol

evm version: shanghai

Deploy ggrents, GTS

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.19;

import "https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20.sol";

contract LW3Token is ERC20 {
    constructor(string memory _name, string memory _symbol) ERC20(_name, _symbol) {
        _mint(msg.sender, 10 * 10 ** 18);
    }
}
```

Sepolia Testnet

Etherscan

Contract 0xFd635b49057e2d7418D8d5f8d790b7cCda71659e

Overview ETH BALANCE 0 ETH

More Info CONTRACT CREATOR 0xCc89b5...49Bb7a2F at tx 0x78f960773ed20688b...

TOKEN TRACKER yernazar (w)

Multichain Info N/A

Transactions Token Transfers (ERC-20) Contract Events

Latest 1 from a total of 1 transactions

Transaction Hash	Method	Block	Age	From	To	Value	Txn Fee
0x78f960773ed20688b...		5098406	42 secs ago	0xCc89b5...49Bb7a2F	Contract Creation	0 ETH	0.01343395

[Download: CSV Export]

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.

Address: 0xFd635b49057e2d7418D8d5f8d790b7cCda71659e

NFT Contract Address: 0xAADaD26212476e61120A9D60483b4E29eA8d725f

Compiled 1 Solidity file successfully (evm target: paris).

Whitelist Contract Address: 0xd61Aff75962eE45549635C7cDCdD1B8B0417a61E

Successfully submitted source code for contract

contracts/Whitelist.sol:Whitelist at 0xd61Aff75962eE45549635C7cDCdD1B8B0417a61E

for verification on the block explorer. Waiting for verification result...

Successfully verified contract Whitelist on the block explorer.

<https://sepolia.etherscan.io/address/0xd61Aff75962eE45549635C7cDCdD1B8B0417a61E#code>

Compiled 15 Solidity files successfully (evm target: paris).

NFT Contract Address: 0xCD9b2014D4961C7bD438758773be2E37c0ec3cf4

Successfully submitted source code for contract

contracts/CryptoDevs.sol:CryptoDevs at 0xCD9b2014D4961C7bD438758773be2E37c0ec3cf4

for verification on the block explorer. Waiting for verification result...

Successfully verified contract CryptoDevs on the block explorer.

<https://sepolia.etherscan.io/address/0xCD9b2014D4961C7bD438758773be2E37c0ec3cf4#code>

Transaction Details

Overview State More ▾

[This is a Sepolia Testnet transaction only]

② Transaction Hash:	0x98f2cc8f1cbd8a76a50cc31c1101a150d4c3ffa14d056f2fe6c7a55dade8c5	🔗
② Status:	Success	
② Block:	5098532	3 Block Confirmations
② Timestamp:	35 secs ago (Jan-16-2024 09:52:36 PM +UTC)	
⚡ Transaction Action:	Call 0x60896040 Method by 0xCc89b5...49Bb7a2F 🔍	
② From:	0xCc89b59cFF4070D45CA9b3D87BDe4a3e49Bb7a2F	
② To:	[0xd61aff75962ee45549635c7cdcd1b8b0417a61e Created] ↗ ⓘ	
② Value:	0 ETH (\$0.00)	
② Transaction Fee:	0.002469680704750962 ETH (\$0.00)	
② Gas Price:	6.638676783 Gwei (0.000000006638676783 ETH)	

More Details: + Click to show more

ⓘ A transaction is a cryptographically signed instruction that changes the blockchain state. Block explorers track the details of all transactions in the network. Learn more about transactions in our Knowledge Base.



ZOMBIE CRYPTO-COLLECTIBLE

100% completed

Solidity: Beginner to Intermediate Smart Contracts

Solidity • Beginner • Intermediate

Get up to speed with the basics of Solidity.

Start Now



SESSION COMPLETE

100% completed

Advanced Solidity: Get In-depth Knowledge

Solidity • Advanced

Deploying Ethereum DApps with Truffle will walk you through the process of deploying your smart contracts with Truffle.

Start Now