

Blockchain technologies  
Assignment 2  
Yakupov Yernazar SE-2201  
Github for practice: [https://github.com/yernazarious/assignment\\_2\\_blockchain](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

Sepolia (11155111) network

ACCOUNT 0x610..63141 (0. ether)

GAS LIMIT  
3000000

VALUE  
3 Wei

CONTRACT  
LW3Token - LW3Token.sol

evm version: shanghai

Deploy ggrents.GTS

LW3Token.sol

```
// 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);
    }
}
```