Solidity and Smart Contract Development: Homework 1

Exercise 1 - Part A - Question 5

My current account balance is 298644792086040400 Wei. It is the same as my MetaMask balance, except with more precise decimals as on my MetaMask account. It is expressed in ETH, and on the Class Directory, it is in Wei.

Exercise 1 - Part B - Question 1

The Software Package Data Exchange could be succinctly defined as an open standard for communicating that aims at representing digital elements as bills of materials. The latter consists of all the elements, tools and processes used to develop, build and publish a software artifact. This whole initiative helps the whole community by reducing reformatting costs and efforts, making it easier to share information.

Exercise 1 - Part B - Question 2

Setup 1: You are starting a new DeFi project which uses a novel way of rewarding investors who lock their tokens in your staking contract.

We could use an MIT license, as it is a permissive software license, thus putting minimal restrictions on reuse. This leads to high license compatibility. Hence, it enables users to build on your service to make it even simpler to stack, making the process less burdensome. This license also allows to still give credit to the original author, making it possible to acquire commercial gains from this project.

Setup 2: Google Cloud Web3 is developing an enterprise grade software which allows other companies to build their own custom blockchain. Google would like to open source certain libraries for the community to maintain while keeping the core technology proprietary.

We could use an Apache License 2.0, which is also a permissive software license. Thus, it still tries to minimize restrictions on reuse, but also puts an emphasis on patent rights, enabling Google to keep the core technology protected. An equilibrium is then found between enabling the community to maintain some libraries while protecting the core technology.

Exercise 1 - Part C - Question 1

A Virtual Machine (VM) takes advantage of software, using it to run programs and deploy apps, instead of using hardware. Nevertheless, a VM is still hosted on one or multiple physical computers. One of the most well-known applications for the general public would be cloud services. In the DeFi world, a VM allows the deployment and execution of smart contracts, essential to dApps on numerous blockchain networks.

Exercise 1 - Part C - Question 2

The Ethereum Virtual Machine (EVM) is powers the Ethereum ecosystem while Solana Virtual Machine (SVM) powers the Solana ecosystem. While the EVM is recognized for its reliability and secure design, the SVM is recognized for its ability to process transactions efficiently and at high speed. One of the main differences in terms of architecture is that the SVM allows multiple smart contracts to run at the same time, in other words il supports parallel processing, while the EVM processes transactions one by one. When looking at the respective communities, we directly see that the EVM is way bigger than SVM, with a total number of developers of 10,110 compared to

3,254. Even if the total number of developers on the EVM has decreased by 34% in the last 2 years, the number of established developers has increased substantially over the same period, by around 76%. In addition to that, the EVM accounts for 177,000 repositories and 68 million total commits. On the other hand, even if the SVM is smaller, with 54,000 repositories and 15 million total commits, the community has been increasing in the last 2 years, with an increase of 5% in the total number of developers and an astonishing 190% in the number of established developers. While the EVM community seems to have reach somehow of a stable point, the SVM community is expanding, especially with the recent event on the Solana blockchain.

Exercise 2 – Part A and C

Deployment proof:

[This is a Sepolia **Testnet** transaction only]

Transaction Hash:	0x5abad013d6746a24a990c268f45f012dcb942cb03e1e5dd5cb37c852c19b6355
Status:	✔ Success
Block:	⧗ 7597814 3 Block Confirmations
Timestamp:	⏱ 27 secs ago (Jan-29-2025 06:49:12 PM UTC)
Transaction Action:	▶ Call 0x60806040 Method by 0x856dFc3C...CFD0253Da ✎
From:	0x856dFc3C0AB1A371C1d00F962C20f24CFD0253Da
To:	[📄 0x6f25ffc0cff74017f6b06403b39f2911d4962dcb Created] ✔
Value:	◈ 0 ETH
Transaction Fee:	0.001333211691289968 ETH
Gas Price:	5.235837174 Gwei (0.000000005235837174 ETH)

Exercise 2 – Part A

Deployment proof:

[This is a Sepolia **Testnet** transaction only]

Transaction Hash:	0xa201075eef742bedb521749afbb5350f5e2330806be09cf753f8661529c3bf31
Status:	✔ Success
Block:	⧗ 7597840 3 Block Confirmations
Timestamp:	⏱ 37 secs ago (Jan-29-2025 06:54:24 PM UTC)
Transaction Action:	▶ Call 0x60806040 Method by 0x856dFc3C...CFD0253Da ✎
From:	0x856dFc3C0AB1A371C1d00F962C20f24CFD0253Da
To:	[📄 0x5c45642b0c4fbc2d4e129984c3443e35c56d7b30 Created] ✔
Value:	◈ 0 ETH
Transaction Fee:	0.00102244242875084 ETH
Gas Price:	4.832415298 Gwei (0.000000004832415298 ETH)

Exercise 2 – Part C

I called Sami Kader Yettefti's contract and I believe it worked. I inputted 1110 and it returned 14, as it should.

```
CALL    [block: txIndex:-] from: 0x856...253Da to: 0x7Dd54189E1F8087da992722a5e6Cb6Ab894E6aB8 0x7Dd...E6aB8
        value: 0 wei data: 0x2ef...00000 logs: 0 hash:

status              null

from                0x856dFc3C0AB1A371C1d00F962C20f24CFD0253Da  ⧉

to                  0x7Dd54189E1F8087da992722a5e6Cb6Ab894E6aB8  ⧉

input               0x2ef...00000  ⧉

output              00000000000000000000000000000014  ⧉

decoded output       -  ⧉
```