

Blockchain Exploration Lab

Task 1: Setting Up MetaMask Wallet

Task 1.a Installing the MetaMask extension

Install the MetaMask extension



MetaMask was added.

Manage your add-ons and themes through the application menu.

OK

Task 1.b Connecting to the Blockchain

< **Add a custom network** ×

Network name

Seed Emulator

According to our records, the network name may not correctly match this chain ID.
Suggested name: [Localhost 8545](#)

Default RPC URL

10.153.0.71:8545 ▼



















Chain ID













1337

Currency symbol

ETH

Task 1.c Adding Accounts

	Account 30eth	\$0.00	
	Account2-999	\$0.00	
	Account 3	\$0.00	
	Account 4	\$0.00	
	Ox1be9288f9a7d2f809250f1...	\$0.00	
	Oxa403f63ad02a557d5ddcb...	\$0.00	
	Accounta1	\$0.00	
	Bob	\$0.00	
	Account 9	\$0.00	

	Account 10	\$0.00	
	Account 11	\$0.00	
	Account 12	\$0.00	
	Account 13	\$0.00	
	Account 14	\$0.00	
	Account 15	\$0.00	


Task 1.d: Sending transactions
Starting

Account 30eth ▾

10 network addresses 



\$0.00

+\$0.00 (+0.00%) [Discover](#) 

\$
Buy

↕
Swap

▶
Send

↵
Receive



Jump into Monad

The Monad network is now live on MetaMask



Tokens DeFi NFTs Activity

Seed Emulator ▾



Ethereum

No conversion rate available


30 ETH

Account 6 ▾

10 network addresses 



\$0.00

+\$0.00 (+0.00%) [Discover](#) 

\$
Buy

↕
Swap

▶
Send

↵
Receive



Jump into Monad

The Monad network is now live on MetaMask



Tokens DeFi NFTs Activity

Seed Emulator ▾



Ethereum

No conversion rate available


10 ETH

Sending

<

Review

⋮



5 ETH

From

Account 3...

>

To

Account 6

Network

Seed Emulator

Network fee ⓘ

0 ETH

Speed

Cancel

Confirm

Confirmation

Account 30eth ▾

10 network addresses ⓘ

⋮ 6

\$0.00


+\$0.00 (+0.00%) [Discover](#) ⓘ

\$ Buy

↕ Swap

▶ Send

◀ Receive



Jump into Monad


The Monad network is now live on MetaMask

×

Tokens DeFi NFTs Activity

Seed Emulator ▾

Nov 28, 2025



Sent

Confirmed

-5 ETH

-\$15,095.00

Account 30eth

10 network addresses

\$0.00

+\$0.00 (+0.00%) [Discover](#)

\$
Buy

↕
Swap

▶
Send

◀
Receive

Jump into Monad
The Monad network is now live on MetaMask

Tokens

DeFi

NFTs

Activity

Seed Emulator

Ethereum

No conversion rate available
25 ETH

Account 6

10 network addresses

\$0.00

+\$0.00 (+0.00%) [Discover](#)

\$
Buy

↕
Swap

▶
Send

◀
Receive

Jump into Monad
The Monad network is now live on MetaMask

Tokens

DeFi

NFTs

Activity

Seed Emulator

Ethereum

No conversion rate available
15 ETH

On EtherView

Recent Transactions

78: [0xe42f...9768](#) (0xF54...fe --> 0xCBF...E2)

Task 2: Interacting with Blockchain using Python

Task 2.a: Installing Python Modules

```
[11/28/25]seed@VM:~/.../emulator_10$ pip3 install web3==5.31.1 docker
```

Task 2.b: Checking Account Balance

```
#!/bin/env python3
from web3 import Web3

url = 'http://10.153.0.71:8545'
web3 = Web3(Web3.HTTPProvider(url)) # Connect to a blockchain node

addr = Web3.toChecksumAddress('0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9')
balance = web3.eth.get_balance(addr) # Get the balance
print(addr + ": " + str(Web3.fromWei(balance, 'ether')) + " ETH")

addr = Web3.toChecksumAddress('0xCBF1e330F0abD5c1ac979CF2B2B874cfD4902E24')
balance = web3.eth.get_balance(addr) # Get the balance
print(addr + ": " + str(Web3.fromWei(balance, 'ether')) + " ETH")

addr = Web3.toChecksumAddress('0x1be9288f9a7d2f809250f15c487e3a5a9cf71f4f')
balance = web3.eth.get_balance(addr) # Get the balance

[11/28/25]seed@VM:~/.../Files$ python3 web3_balance.py
/usr/lib/python3/dist-packages/requests/__init__.py:89: RequestsDependencyWarning: urllib3 (2.2.3) or chardet (3.0.4) doesn't match a supported version!
  warnings.warn("urllib3 ({}), or chardet ({}), doesn't match a supported version!".format(urllib3.__version__, chardet.__version__), RequestsDependencyWarning)
0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9: 24.999978999060586 ETH
0xCBF1e330F0abD5c1ac979CF2B2B874cfD4902E24: 15 ETH
0x1be9288f9a7d2f809250f15c487e3a5a9cf71f4f: 1000 ETH
```

Task 2.c: Sending transactions

```
#!/bin/env python3
from web3 import Web3
from eth_account import Account

web3 = Web3(Web3.HTTPProvider('http://10.153.0.71:8545'))

# Sender's private key
key = '72c28c0d980b5e26435fc7eb8afaa27a5a117359669d73284f69ed8a401c6a85'
sender = Account.from_key(key)

recipient = Web3.toChecksumAddress('0xCBF1e330F0abD5c1ac979CF2B2B874cfD4902E24')
tx = {
    'chainId': 1337,
    'nonce': web3.eth.getTransactionCount(sender.address),
    'from': sender.address,
    'to': recipient,
```

Before

Account 30eth

10 network addresses

6

\$0.00

+\$0.00 (+0.00%) [Discover](#)

\$
Buy

↕
Swap

▶
Send

↵
Receive

Jump into Monad

The Monad network is now live on MetaMask

Tokens

DeFi

NFTs

Activity

Seed Emulator

Ethereum

No conversion rate available

25 ETH

Account 6

10 network addresses

6

\$0.00

+\$0.00 (+0.00%) [Discover](#)

\$
Buy

↕
Swap

▶
Send

↵
Receive

Jump into Monad

The Monad network is now live on MetaMask

Tokens

DeFi

NFTs

Activity

Seed Emulator

Ethereum

No conversion rate available

15 ETH

After running

Account 30eth

10 network addresses

6

\$0.00

+\$0.00 (+0.00%) [Discover](#)

\$
Buy

↕
Swap

▶
Send

◀
Receive

Jump into Monad
The Monad network is now live on MetaMask

Tokens

DeFi

NFTs

Activity

Seed Emulator

Ethereum

No conversion rate available
14 ETH

Account 6

10 network addresses

6

\$0.00

+\$0.00 (+0.00%) [Discover](#)

\$
Buy

↕
Swap

▶
Send

◀
Receive

Jump into Monad
The Monad network is now live on MetaMask

Tokens

DeFi

NFTs

Activity

Seed Emulator

Ethereum

No conversion rate available
26 ETH

Task 3: Interacting with Blockchain Using Geth

Task 3.a: Check balances using geth

```
[11/28/25]seed@VM:~/.../Files$ docksh 6f2a
```

```
root@6f2ac2de975c / # geth attach
```

```
Welcome to the Geth JavaScript console!
```

```
instance: Geth/NODE_4/v1.10.26-stable-e5eb32ac/linux-amd64/go1.18.10
```

```
coinbase: 0xd4cc43e3f2830f9082495dba904b57fc2ca95cbd
```

```
at block: 258 (Fri Nov 28 2025 18:18:56 GMT+0000 (UTC))
```

```
datadir: /root/.ethereum
```

```
modules: admin:1.0 clique:1.0 debug:1.0 engine:1.0 eth:1.0 miner:1.0 net:1.0
```

```
personal:1.0 rpc:1.0 txpool:1.0 web3:1.0
```

```
To exit, press ctrl-d or type exit
```

```
> eth.getBalance("0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9")
```

```
13999915999060439000
```

```
> eth.getBalance("0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24")
```

```
26000000000000000000
```

```
> eth.getBalance("0x1be9288f9a7d2f809250f15c487e3a5a9cf71f4f")
```

```
1e+21
```

This matches with the 14, 26 and 1000 respectively

Task 3.b: Sending transactions

```
> eth.accounts
```

```
["0xd4cc43e3f2830f9082495dba904b57fc2ca95cbd", "0x5551ee6a5e1c07a91b8a8f0ec795d664b6f5f984"]
```

```
> personal.unlockAccount(eth.accounts[0], "admin")
```

```
true
```

```
> personal.unlockAccount(eth.accounts[1], "admin")
```

```
true
```

```
> eth.getBalance(eth.accounts[0])
```

```
1e+21
```

```
> sender = eth.accounts[0]
```

```
"0xd4cc43e3f2830f9082495dba904b57fc2ca95cbd"
```

```
> target = "0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24"
```

```
"0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24"
```

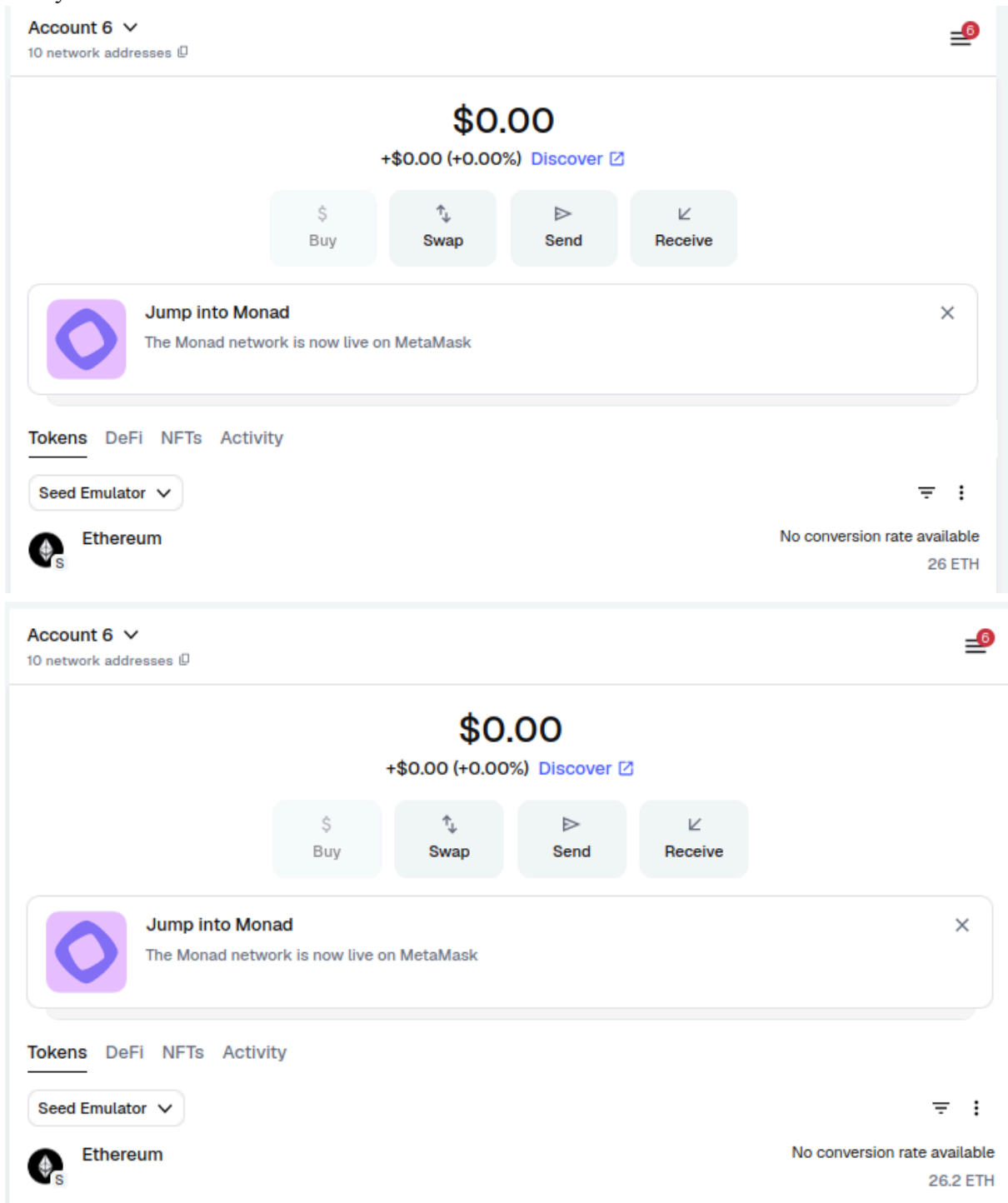
```
> amount = web3.toWei(0.2, "ether")
```

```
"200000000000000000"
```

```
> eth.sendTransaction({from: sender, to: target, value: amount})
```

```
"0x99e4e4927f7a30ab38e9f425d8fa1cc17d45cd74c50d9ca3fe959116ea810aff"
```

Verify on MetaMask



Task 3.c: Sending Transactions from a different account

```

> sender = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> target = "0xCBF1e330F0abD5c1ac979CF2B2B874cfD4902E24"
"0xCBF1e330F0abD5c1ac979CF2B2B874cfD4902E24"
> amount = web3.toWei(0.8, "ether")
"80000000000000000000"
> eth.sendTransaction({from: sender, to: target, value: amount})
Error: unknown account
    at web3.js:6365:9(45)
    at send (web3.js:5099:62(34))
    at <eval>:1:20(10)

> █

```

We can see that if we try to send it, it returns an error message that we cannot find the account.

Task 4: Adding a Full Node

```

root@061f2b32fce / # geth --datadir /root/.ethereum init /tmp/eth-genesis.js
on

INFO [11-28|18:45:03.208] Maximum peer count                      ETH=50 LES=
0 total=50
INFO [11-28|18:45:03.210] Smartcard socket not found, disabling   err="stat /
run/pcscd/pcscd.comm: no such file or directory"
INFO [11-28|18:45:03.215] Set global gas cap                      cap=50,000,
000
INFO [11-28|18:45:03.217] Allocated cache and file handles       database=/r
oot/.ethereum/geth/chaindata cache=16.00MiB handles=16
INFO [11-28|18:45:03.322] Opened ancient database                 database=/r
oot/.ethereum/geth/chaindata/ancient/chain readonly=false
INFO [11-28|18:45:03.322] Writing custom genesis block
INFO [11-28|18:45:03.327] Persisted trie from memory database    nodes=49 si
ze=7.00KiB time="974.347µs" gcnodes=0 gcsiz=0.00B gctime=0s livenodes=1 lives
ize=0.00B
INFO [11-28|18:45:03.329] Successfully wrote genesis state       database=ch
aindata hash=95898d..afd777
INFO [11-28|18:45:03.329] Allocated cache and file handles       database=/r
oot/.ethereum/geth/lightchaindata cache=16.00MiB handles=16
INFO [11-28|18:45:03.437] Opened ancient database                 database=/r
oot/.ethereum/geth/lightchaindata/ancient/chain readonly=false
INFO [11-28|18:45:03.437] Writing custom genesis block
INFO [11-28|18:45:03.439] Persisted trie from memory database    nodes=49 si
ze=7.00KiB time="215.148µs" gcnodes=0 gcsiz=0.00B gctime=0s livenodes=1 lives
ize=0.00B
INFO [11-28|18:45:03.440] Successfully wrote genesis state       database=li
ghtchaindata hash=95898d..afd777

> personal.newAccount("seed")
"0x6e959c5362fc22178110eb2db4d0479602bb98f2"

```

```
> admin.peers
[
  {
    caps: ["eth/66", "eth/67"],
    enode: "enode://33dd17eb1582fb649dff55978542beddbc7f4799bec24bd5f3b7510afc9e5425a62a0f610db11dfb38495e28201a9dbec40af724a7f894689de556db202d5894@10.162.0.71:30303",
    id: "003422858bcacf879747bf84f1c09f36430ae91dde86f50bee511b447a75ac680",
    name: "Geth/NODE_8/v1.10.26-stable-e5eb32ac/linux-amd64/go1.18.10",
    network: {
      inbound: false,
      localAddress: "10.150.0.74:36602",
      remoteAddress: "10.162.0.71:30303",
      static: false,
      trusted: false
    },
    protocols: {
      eth: {
        difficulty: 863,
        head: "0x0b2687fea080ee5195b8eda1b1efe23d266b9220b57cec797223ffb534eee5ce",
        version: 67
      }
    }
  },
  {
    caps: ["eth/66", "eth/67"],
    enode: "enode://4c3c1f724446155120ae6bcbb2f8c2a1ac8630d2c27d6fb4616b27568c3de0705fe4fba8c3a649f58320b4a4b63cc9196e781fbec77266ebe9674b729eeedca@10.151.0.71:30303",
    id: "0d0e411d3d20feee859bb01ecfbf9398de38b242f58f90484213d62f4af49acf",
    name: "Geth/NODE_2/v1.10.26-stable-e5eb32ac/linux-amd64/go1.18.10",
    network: {
      inbound: false,
      localAddress: "10.150.0.74:46506",
      remoteAddress: "10.151.0.71:30303",
      static: false,
      trusted: false
    },
    protocols: {
      eth: {
        difficulty: 873,
        head: "0x1bce0422180a7428041e65977df052729caadf5d236e3a7d36bdf3902a26bb06",
        version: 67
      }
    }
  },
  {
    caps: ["eth/66", "eth/67"],
    enode: "enode://42a248eedbe8d46ab9be4743a2466c2e6fe8110c0f8114183cadd32176aa22cceaef1757051dee2076012fcf2dba82f45c14099dd327049317c1dee7b737db68@10.160.0.71:30303",
    id: "66628db1dd2c6e34cb7e5c94a47c9224ca6ca62b8605463d58f68c00b94bc65",
    name: "Geth/NODE_6/v1.10.26-stable-e5eb32ac/linux-amd64/go1.18.10",
    network: {
      inbound: false,
      localAddress: "10.150.0.74:60866",
      remoteAddress: "10.160.0.71:30303",
    }
  }
]
```

Modify web3_raw_tx.py

```
#!/bin/env python3
from web3 import Web3
from eth_account import Account

web3 = Web3(Web3.HTTPProvider('http://10.153.0.71:8545'))

# Sender's private key
key = '72c28c0d980b5e26435fc7eb8afaa27a5a117359669d73284f69ed8a401c6a85'
sender = Account.from_key(key)

recipient = Web3.toChecksumAddress('0x6e959c5362fc22178110eb2db4d0479602bb98f2')
tx = {
  'chainId': 1337,
  'nonce': web3.eth.getTransactionCount(sender.address),
  'from': sender.address,
  'to': recipient,
  'value': Web3.toWei("11", 'ether'),
  'gas': 200000,
  'maxFeePerGas': Web3.toWei('4', 'gwei'),
  'maxPriorityFeePerGas': Web3.toWei('3', 'gwei'),
}
```


And send it

[illegible]

Check balance

```
> eth.getBalance("0x6e959c5362fc22178110eb2db4d0479602bb98f2")
11000000000000000000
```

Now unlock and send back

```
> personal.unlockAccount("0x6e959c5362fc22178110eb2db4d0479602bb98f2", "seed")
true
> eth.sendTransaction({from: "0x6e959c5362fc22178110eb2db4d0479602bb98f2", to: "0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24",
value: web3.toWei(0.5, "ether")})
"0xd10d9caa04a3bb5b60b7fc3be8a2971e804e756c2b9b22ac47abd136d6a82f1d"
```

Check balance

