

## 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** X

**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	⋮
	0x1be9288f9a7d2f809250f1...	\$0.00	⋮
	0xa403f63ad02a557d5ddcb...	\$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 > To  
 Account 3...  Account 6

Network  Seed Emulator

Network fee  0  ETH

Speed

Cancel Confirm

### Confirmation

Account 30eth  ≡<sup>6</sup>  
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 X

Tokens DeFi NFTs **Activity**

Seed Emulator 

Nov 28, 2025

 Sent -5 ETH  
 L Confirmed -\$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 X

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 X

Tokens DeFi NFTs Activity

Seed Emulator ▾ ≡ ⋮

 Ethereum No conversion rate available  
15 ETH

On EtherView

## Recent Transactions

78: [0xe42f...9768](#) (0xF54...fe --> 0xCB...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 "
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 ⓘ

\$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

After running

## Check balances

The screenshot shows the MetaMask wallet interface. At the top, it displays "Account 30eth" and "10 network addresses". The main balance area shows "\$0.00" with a note "+\$0.00 (+0.00%) Discover". Below the balance are four buttons: "Buy", "Swap", "Send", and "Receive". A prominent pop-up message in the center says "Jump into Monad" and informs that "The Monad network is now live on MetaMask". At the bottom, the "Activity" tab is selected, showing a recent transaction from "Nov 28, 2025": "Sent -5 ETH Confirmed". A notification icon in the top right corner indicates 6 pending items.

The image displays two side-by-side screenshots of the MetaMask mobile application interface.

**Top Screenshot (Account 30eth):**

- Header:** Account 30eth ▾ (with a red notification badge showing 6), 10 network addresses ⓘ.
- Balances:** \$0.00, +\$0.00 (+0.00%) Discover ⓘ.
- Actions:** Buy, Swap, Send, Receive.
- Notification:** A purple box says "Jump into Monad" and "The Monad network is now live on MetaMask".
- Tab Bar:** Tokens (selected), DeFi, NFTs, Activity.
- Seed Emulator:** Ethereum (No conversion rate available, 14 ETH).

**Bottom Screenshot (Account 6):**

- Header:** Account 6 ▾ (with a red notification badge showing 6), 10 network addresses ⓘ.
- Balances:** \$0.00, +\$0.00 (+0.00%) Discover ⓘ.
- Actions:** Buy, Swap, Send, Receive.
- Notification:** A purple box says "Jump into Monad" and "The Monad network is now live on MetaMask".
- Tab Bar:** Tokens (selected), 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", "0x5551ee6a5e1c07a91b8a8f0ec795
d664b6f5f984" ]
> 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

The image consists of two vertically stacked screenshots of the MetaMask web interface.

**Screenshot 1 (Top):**

- Header:** Account 6 (with a dropdown arrow), 10 network addresses (with a link icon).
- Balance:** \$0.00, +\$0.00 (+0.00%) [Discover](#).
- Buttons:** Buy, Swap, Send, Receive.
- Notification:** A modal window titled "Jump into Monad" states "The Monad network is now live on MetaMask".
- Bottom Navigation:** Tokens (underlined), DeFi, NFTs, Activity.
- Ethereum Section:** Ethereum icon, No conversion rate available, 26 ETH.

**Screenshot 2 (Bottom):**

- Header:** Account 6 (with a dropdown arrow), 10 network addresses (with a link icon).
- Balance:** \$0.00, +\$0.00 (+0.00%) [Discover](#).
- Buttons:** Buy, Swap, Send, Receive.
- Notification:** A modal window titled "Jump into Monad" states "The Monad network is now live on MetaMask".
- Bottom Navigation:** Tokens (underlined), DeFi, NFTs, Activity.
- Ethereum Section:** Ethereum icon, No conversion rate available, 26.2 ETH.

## Task 3.c: Sending Transactions from a different account

```

> sender = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> target = "0xCB1e330F0abD5c1ac979CF2B2B874cfD4902E24"
"0xCB1e330F0abD5c1ac979CF2B2B874cfD4902E24"
> amount = web3.toWei(0.8, "ether")
"8000000000000000"
> 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@c061f2b32fce / # geth --datadir /root/.ethereum init /tmp/eth-genesis.json

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
root/.ethereum/geth/chaindata cache=16.00MiB handles=16
INFO [11-28|18:45:03.322] Opened ancient database        database=/r
root/.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 gcsize=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
root/.ethereum/geth/lightchaindata cache=16.00MiB handles=16
INFO [11-28|18:45:03.437] Opened ancient database        database=/r
root/.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" gcsize=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://33dd17eb1582fb649dff55978542beddbc7f4799bec24bd5f3b7510afc9e5425a62a0f610db11dfb38495e28201a9dbec40af724
a7f894689de556db202d5894@10.162.0.71:30303",
  id: "003422858bcf879747bf84f1c09f36430ae91dde86f50bee511b447a75ac680",
  name: "Geth/NODE_8/v1.10.26-stable-e5eb32ac/linux-amd64/g01.18.10",
  network: {
    inbound: false,
    localAddress: "10.150.0.74:36602",
    remoteAddress: "10.162.0.71:30303",
    static: false,
    trusted: false
  },
  protocols: {
    eth: {
      difficulty: 863,
      head: "0xb2687fea080ee5195b8eda1b1efe23d266b9220b57cec797223ffb534eee5ce",
      version: 67
    }
  }
}, {
  caps: ["eth/66", "eth/67"],
  enode: "enode://4c3c1f724446155120ae6bcbb2f8c2a1ac8630d2c27d6fb4616b27568c3de0705fe4fba8c3a649f58320b4a4b63cc9196e781fbe
c77266ebe9674b729eee0dca@10.151.0.71:30303",
  id: "0d0e411d3d20f00ee859bb01ecfbf9398de38b242f58f90484213d62f4af49acf",
  name: "Geth/NODE_2/v1.10.26-stable-e5eb32ac/linux-amd64/g01.18.10",
  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://42a248eedbe8d46ab9be4743a2466c2e6fe8110c0f8114183cadd32176aa22ccaeaf1757051dee2076012fcf2dba82f45c14099d
d327049317c1dee7b737db68@10.160.0.71:30303",
  id: "66628db1dd2c6e34cb7e5c94a47c9224ca6ca62b8605463d58f68cc00b94bc65",
  name: "Geth/NODE_6/v1.10.26-stable-e5eb32ac/linux-amd64/g01.18.10",
  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

## Check balance

```
|> eth.getBalance("0x6e959c5362fc22178110eb2db4d0479602bb98f2")
|11000000000000000000000000
```

Now unlock and send back

```
> personal.unlockAccount("0x6e959c5362fc22178110eb2db4d0479602bb98f2", "seed")
true
> eth.sendTransaction({from: "0x6e959c5362fc22178110eb2db4d0479602bb98f2", to: "0xCB1e330F0abD5c1ac979CF2B2B874cfD4902E24", value: web3.toWei(0.5, "ether")})
"0xd10d9caa04a3bb5b60b7fc3be8a2971e804e756c2b9b22ac47abd136d6a82f1d"
```

## Check balance

