

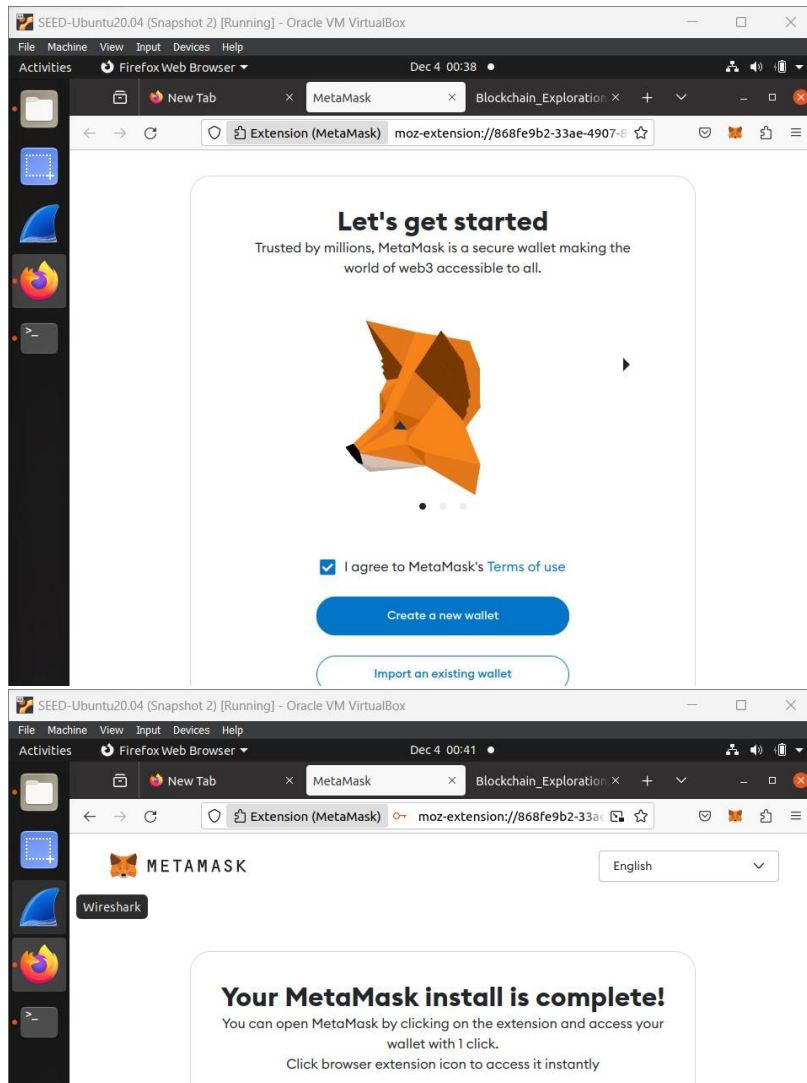
NAME: YASH SNEHAL SHETIYA

SUID: 9276568741

LAB: BLOCKCHAIN EXPLORATION LAB

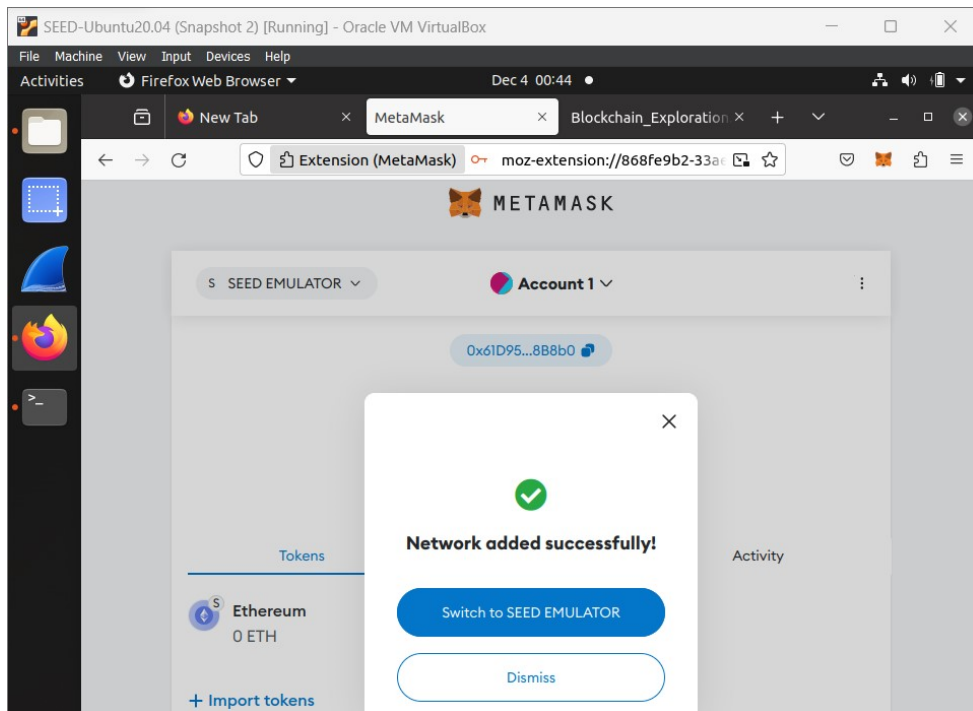
TASK 1

a) Adding metamask as an addon to firefox and adding our own network to it.

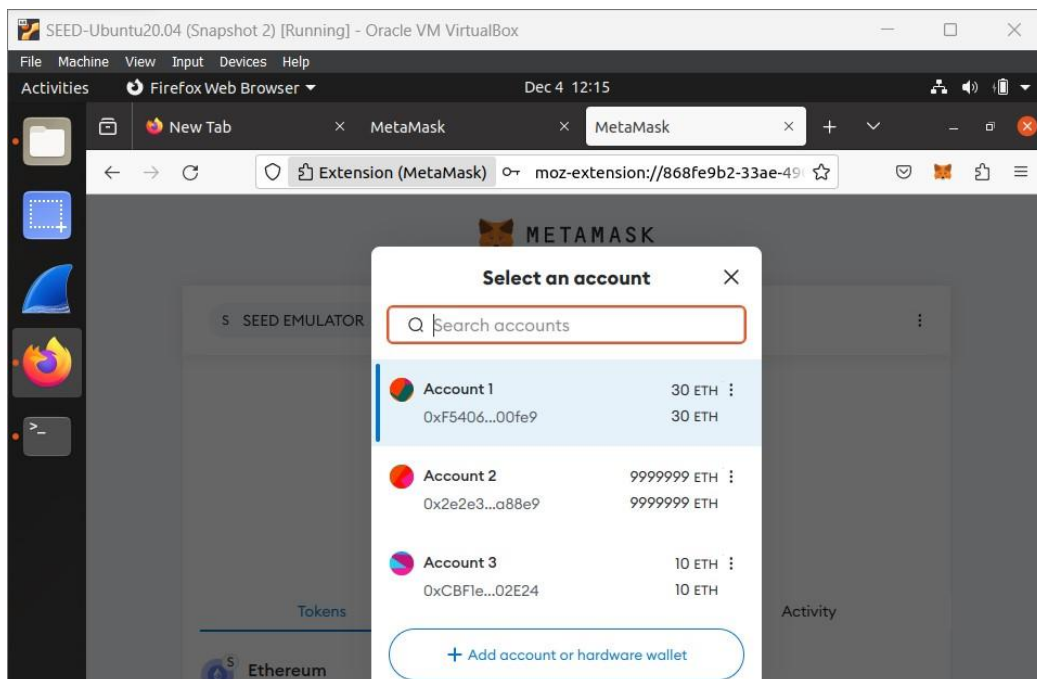


b) Choosing the first entry i.e IP 10.151.0.71 for our network

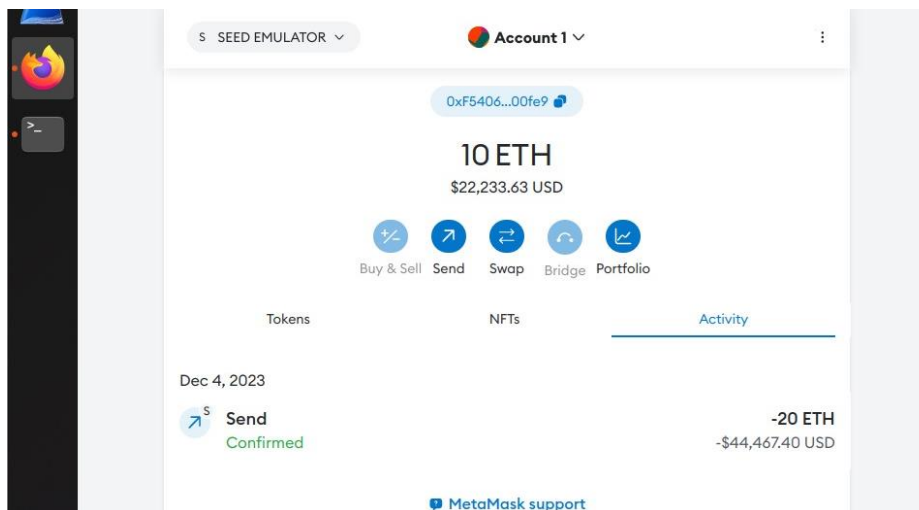
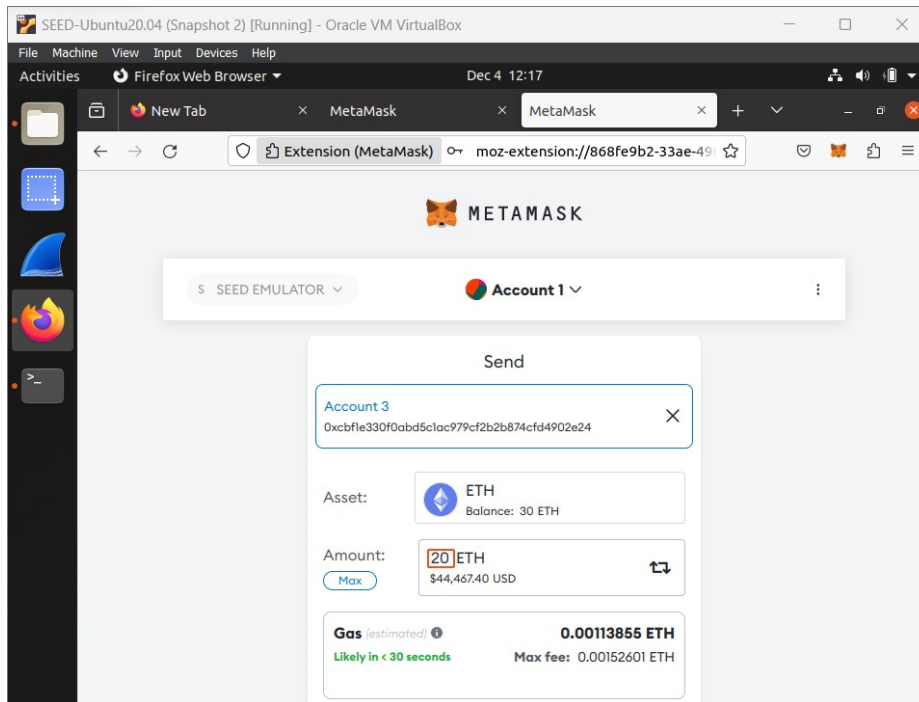
```
[12/04/23] seed@VM:~/.../emulator_10$ dockps | grep Eth
f16c7e29ee44 as151h-Ethereum-POA-01-10.151.0.71
19eefb530389 as163h-Ethereum-POA-08-Signer-10.163.0.71
b3967f45ae32 as154h-Ethereum-POA-04-Signer-10.154.0.71
dc9c3c083c4a as164h-Ethereum-POA-09-BootNode-10.164.0.71
6ed2079c3047 as153h-Ethereum-POA-03-BootNode-10.153.0.71
08fa325f8f75 as162h-Ethereum-POA-07-10.162.0.71
7a7cc3d454e8 as160h-Ethereum-POA-05-10.160.0.71
d4377dbcc003 as150h-Ethereum-POA-00-Signer-BootNode-10.150.0.71
e3625e86e5b9 as161h-Ethereum-POA-06-Signer-BootNode-10.161.0.71
1a0b8d881e0e as152h-Ethereum-POA-02-Signer-10.152.0.71
[12/04/23] seed@VM:~/.../emulator_10$
```



c) As given, we use the phrase provided to add these accounts.



d) Sending 20 ETH from account 1 to Account 3.

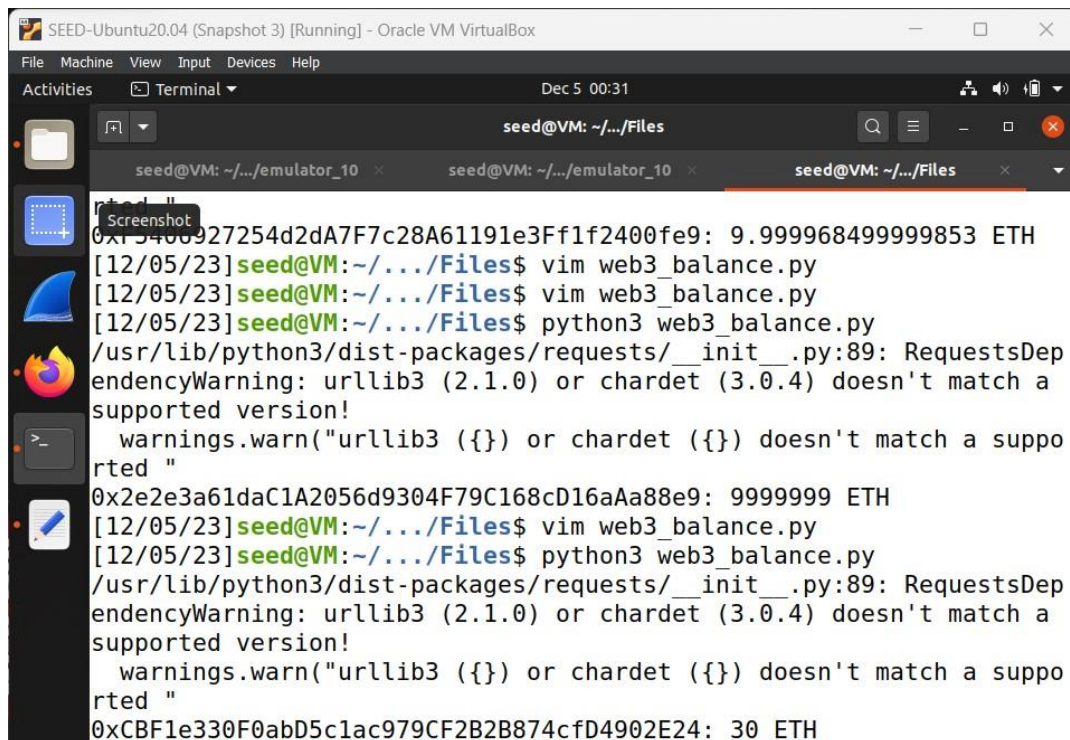


TASK2

a) Executed the given command to install the needed modules.

b) Getting balance using python code as given:

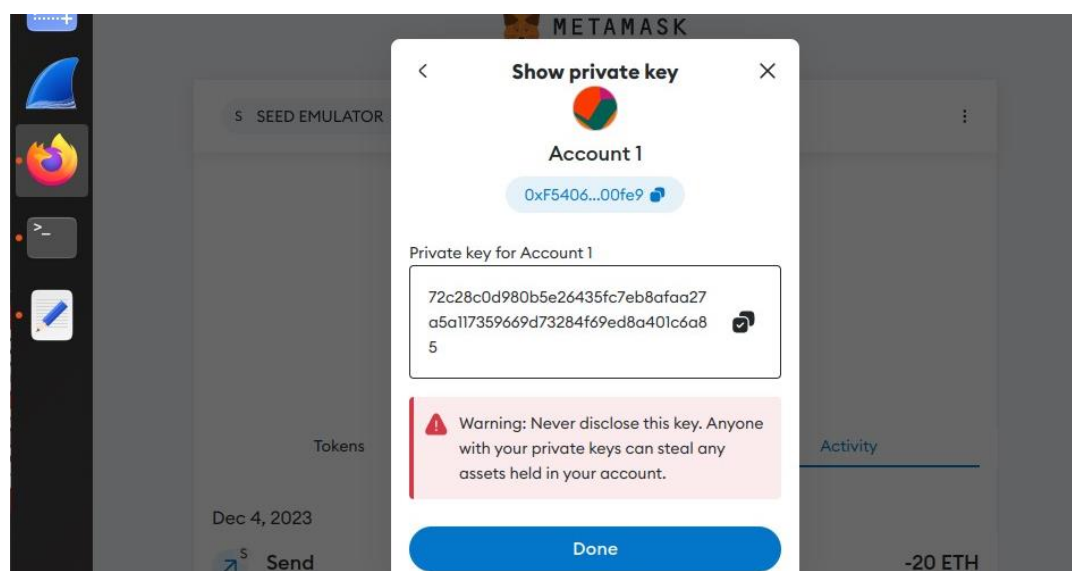
We have ran the code thrice, each time changing the address to access each individual account.



```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Dec 5 00:31
seed@VM: ~/.../Files
seed@VM: ~/.../emulator_10 x seed@VM: ~/.../emulator_10 x seed@VM: ~/.../Files
Screenshot
0x15400927254d2dA7F7c28A61191e3Ff1f2400fe9: 9.999968499999853 ETH
[12/05/23] seed@VM: ~/.../Files$ vim web3_balance.py
[12/05/23] seed@VM: ~/.../Files$ vim web3_balance.py
[12/05/23] seed@VM: ~/.../Files$ python3 web3_balance.py
/usr/lib/python3/dist-packages/requests/__init__.py:89: RequestsDep
endencyWarning: urllib3 (2.1.0) or chardet (3.0.4) doesn't match a
supported version!
warnings.warn("urllib3 ({} or chardet ({} doesn't match a suppo
rted "
0x2e2e3a61daC1A2056d9304F79C168cD16aAa88e9: 9999999 ETH
[12/05/23] seed@VM: ~/.../Files$ vim web3_balance.py
[12/05/23] seed@VM: ~/.../Files$ python3 web3_balance.py
/usr/lib/python3/dist-packages/requests/__init__.py:89: RequestsDep
endencyWarning: urllib3 (2.1.0) or chardet (3.0.4) doesn't match a
supported version!
warnings.warn("urllib3 ({} or chardet ({} doesn't match a suppo
rted "
0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24: 30 ETH
```

c) For making transactions, we need the private key for the sender account:

similarly we found out private key for account 2 and 3.



Now we intend to send money from account 2 to account 3

The code below has the account 2's private key and receiver address is account 3's.

The screenshot shows a terminal window titled "SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox". The terminal output is as follows:

```
seed@VM: ~/.../Files
seed@VM: ~/.../emulator_10
seed@VM: ~/.../emulator_10
seed@VM: ~/.../Files

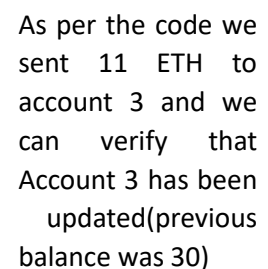
#!/bin/env python3
from web3 import Web3
from eth_account import Account

web3 = Web3(Web3.HTTPProvider('http://10.151.0.71:8545'))

# Sender's private key
key = '20aec3a7207fcda31bdef03001d9caf89179954879e595d9a190d6ac8204e498'
sender = Account.from_key(key)

recipient = Web3.toChecksumAddress('0xCBf1e330F0abD5c1ac979CF2B2B874cfD490E24')
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'),
    'data': ""
}

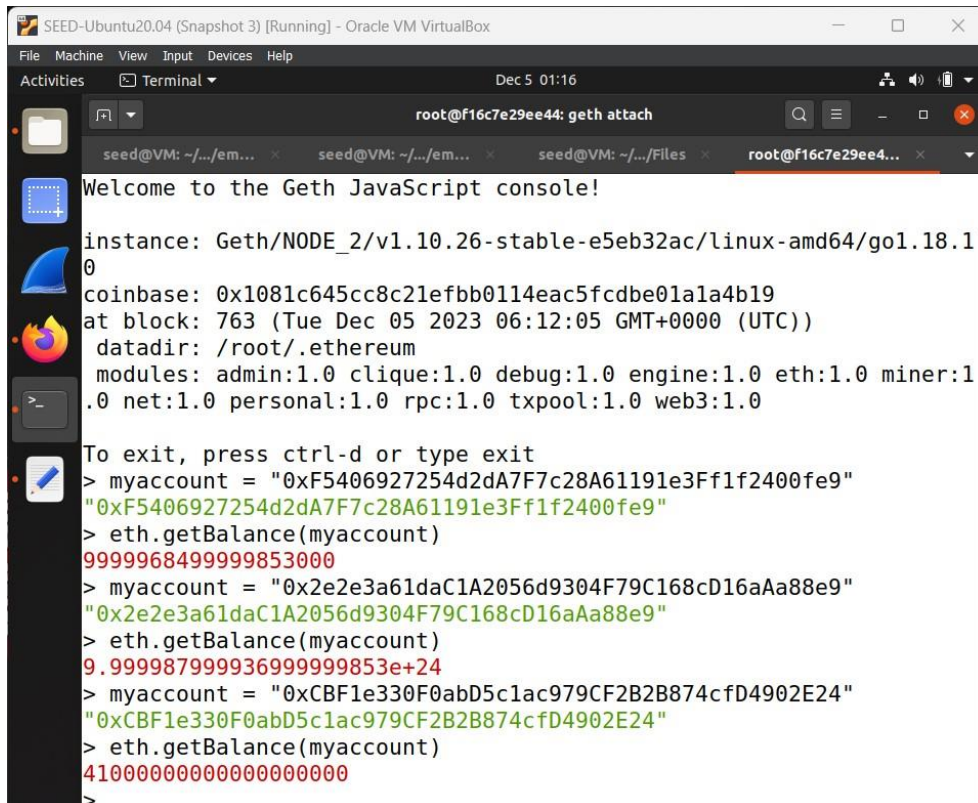
"web3 raw tx.py" 31L, 1059C      8,71      Top
```

[illegible]

As per the code we sent 11 ETH to account 3 and we can verify that Account 3 has been updated(previous balance was 30)

TASK3

a) Checking balance in each account



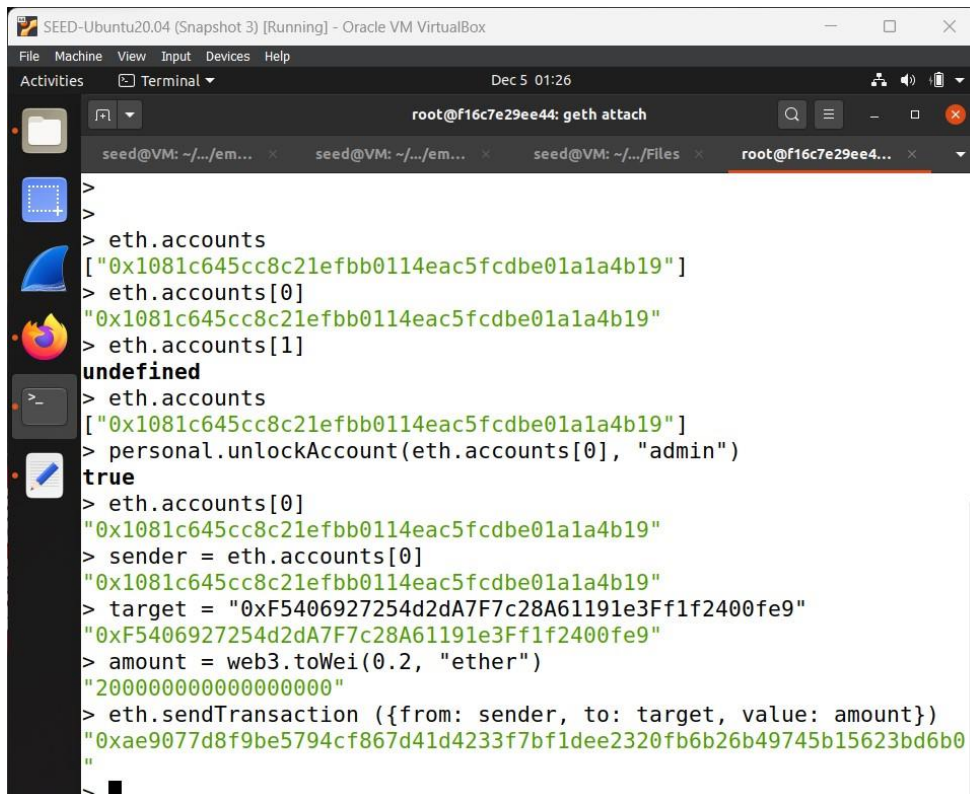
```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Dec 5 01:16
root@f16c7e29ee44: geth attach

Welcome to the Geth JavaScript console!

instance: Geth/NODE_2/v1.10.26-stable-e5eb32ac/linux-amd64/go1.18.1
0
coinbase: 0x1081c645cc8c21efbb0114eac5fcdbe01a1a4b19
at block: 763 (Tue Dec 05 2023 06:12:05 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

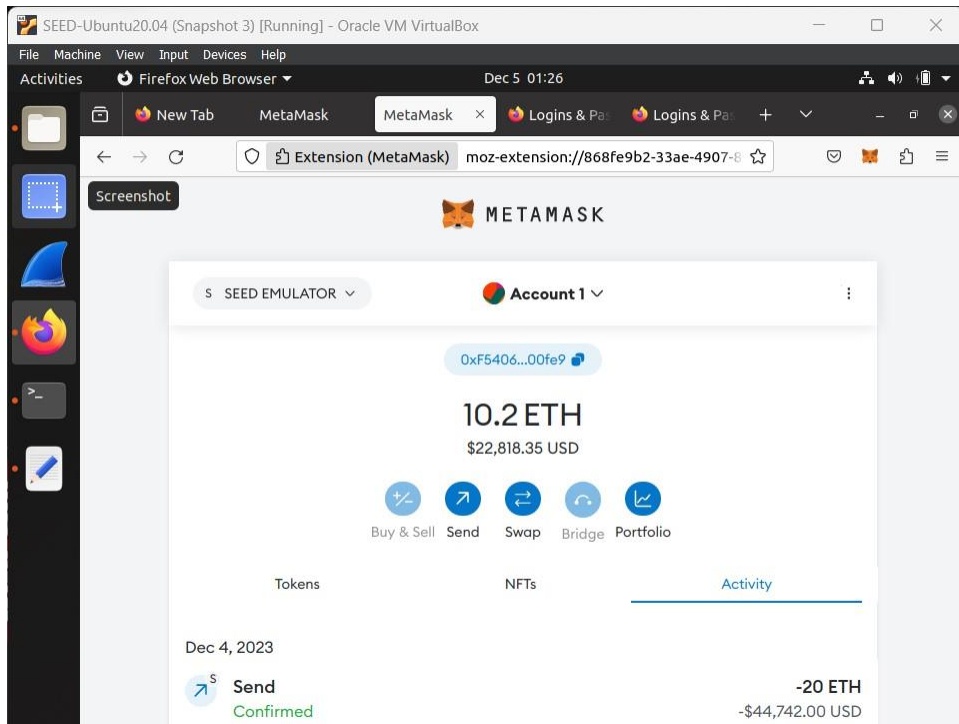
To exit, press ctrl-d or type exit
> myaccount = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> eth.getBalance(myaccount)
9999968499999853000
> myaccount = "0x2e2e3a61daC1A2056d9304F79C168cD16aAa88e9"
"0x2e2e3a61daC1A2056d9304F79C168cD16aAa88e9"
> eth.getBalance(myaccount)
9.99998799993699999853e+24
> myaccount = "0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24"
"0xCBf1e330F0abD5c1ac979CF2B2B874cfD4902E24"
> eth.getBalance(myaccount)
410000000000000000
>
```

b) Sending transactions, for this we need to unlock the account first. We verify it using the metamask view to see that Account1 has been credited with the amount.

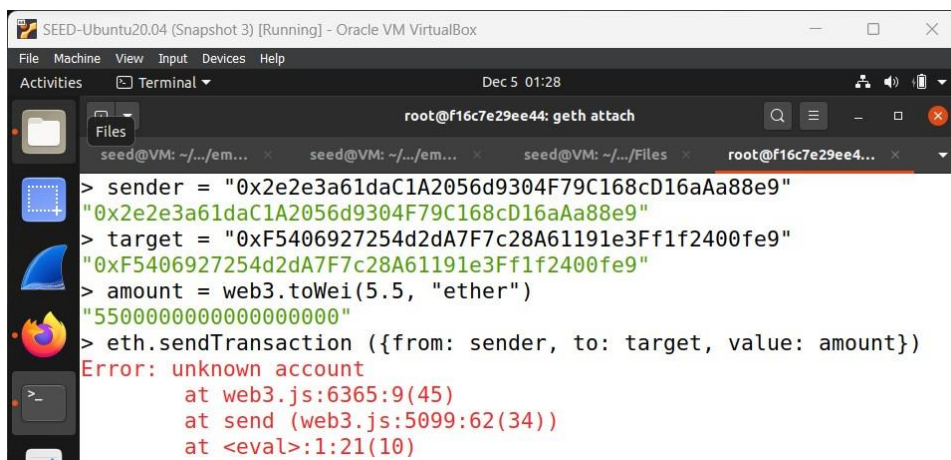


```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Dec 5 01:26
root@f16c7e29ee44: geth attach

>
>
> eth.accounts
["0x1081c645cc8c21efbb0114eac5fcdbe01a1a4b19"]
> eth.accounts[0]
"0x1081c645cc8c21efbb0114eac5fcdbe01a1a4b19"
> eth.accounts[1]
undefined
> eth.accounts
["0x1081c645cc8c21efbb0114eac5fcdbe01a1a4b19"]
> personal.unlockAccount(eth.accounts[0], "admin")
true
> eth.accounts[0]
"0x1081c645cc8c21efbb0114eac5fcdbe01a1a4b19"
> sender = eth.accounts[0]
"0x1081c645cc8c21efbb0114eac5fcdbe01a1a4b19"
> target = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> amount = web3.toWei(0.2, "ether")
"200000000000000000"
> eth.sendTransaction ({from: sender, to: target, value: amount})
"0xae9077d8f9be5794cf867d41d4233f7bf1dee2320fb6b26b49745b15623bd6b0"
>
```



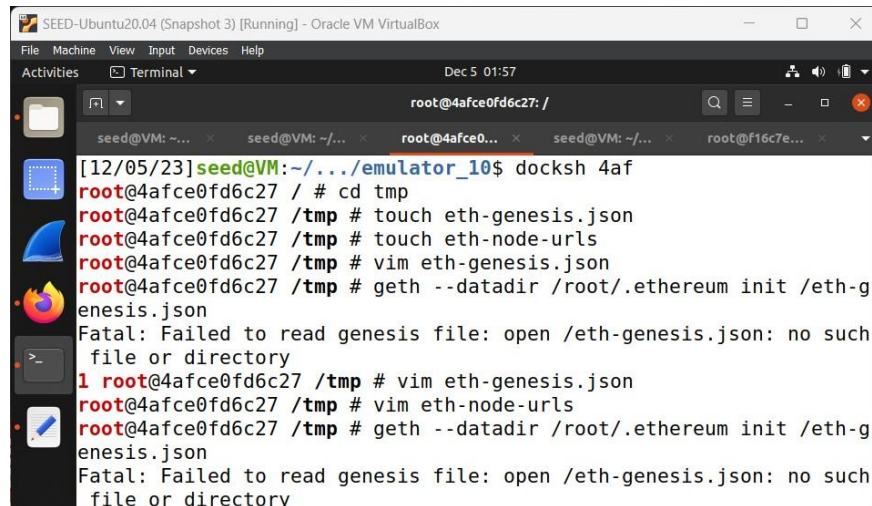
c)



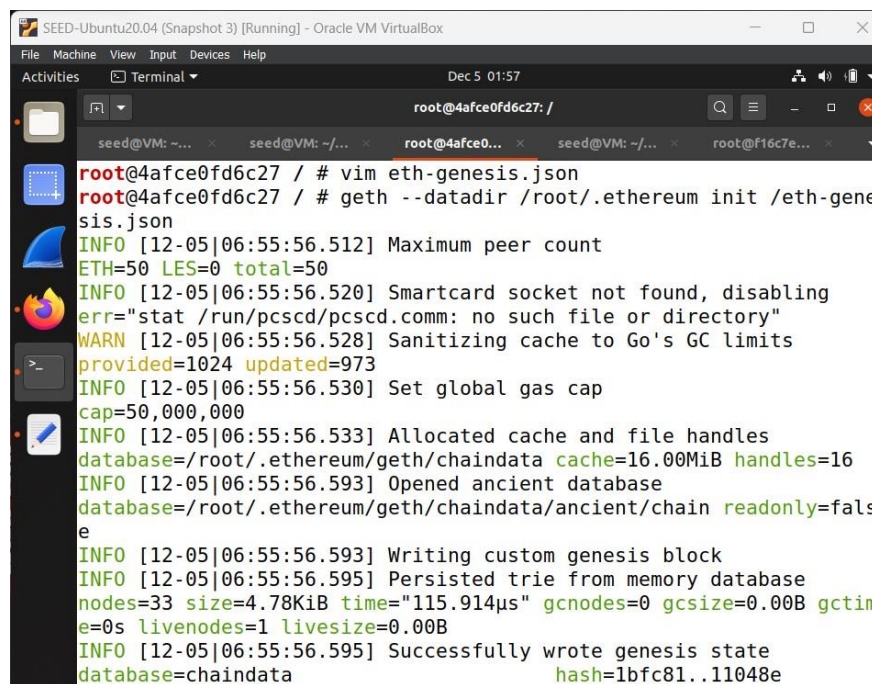
TASK 4

```
[12/05/23]seed@VM:~/.../emulator_10$  
[12/05/23]seed@VM:~/.../emulator_10$  
[12/05/23]seed@VM:~/.../emulator_10$ dockps | grep new  
4afce0fd6c27 as150h-new eth_node-10.150.0.74  
[12/05/23]seed@VM:~/.../emulator_10$
```

Created the new files required for adding it to the chain. First I copied the content of these files from a node which already exists. Once done, execute the given commands.



```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
Activities Terminal Dec 5 01:57  
root@4afce0fd6c27: /  
seed@VM: ~/... x seed@VM: ~/... x root@4afce0... x seed@VM: ~/... x root@f16c7e... x  
[12/05/23]seed@VM:~/.../emulator_10$ docksh 4af  
root@4afce0fd6c27 / # cd tmp  
root@4afce0fd6c27 /tmp # touch eth-genesis.json  
root@4afce0fd6c27 /tmp # touch eth-node-urls  
root@4afce0fd6c27 /tmp # vim eth-genesis.json  
root@4afce0fd6c27 /tmp # geth --datadir /root/.ethereum init /eth-g  
enesis.json  
Fatal: Failed to read genesis file: open /eth-genesis.json: no such  
file or directory  
1 root@4afce0fd6c27 /tmp # vim eth-genesis.json  
root@4afce0fd6c27 /tmp # vim eth-node-urls  
root@4afce0fd6c27 /tmp # geth --datadir /root/.ethereum init /eth-g  
enesis.json  
Fatal: Failed to read genesis file: open /eth-genesis.json: no such  
file or directory
```



```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
Activities Terminal Dec 5 01:57  
root@4afce0fd6c27: /  
seed@VM: ~/... x seed@VM: ~/... x root@4afce0... x seed@VM: ~/... x root@f16c7e... x  
root@4afce0fd6c27 / # vim eth-genesis.json  
root@4afce0fd6c27 / # geth --datadir /root/.ethereum init /eth-gene  
sis.json  
INFO [12-05|06:55:56.512] Maximum peer count  
ETH=50 LES=0 total=50  
INFO [12-05|06:55:56.520] Smartcard socket not found, disabling  
err="stat /run/pcscd/pcscd.comm: no such file or directory"  
WARN [12-05|06:55:56.528] Sanitizing cache to Go's GC limits  
provided=1024 updated=973  
INFO [12-05|06:55:56.530] Set global gas cap  
cap=50,000,000  
INFO [12-05|06:55:56.533] Allocated cache and file handles  
database=/root/.ethereum/geth/chaindata cache=16.00MiB handles=16  
INFO [12-05|06:55:56.593] Opened ancient database  
database=/root/.ethereum/geth/chaindata/ancient/chain readonly=fals  
e  
INFO [12-05|06:55:56.593] Writing custom genesis block  
INFO [12-05|06:55:56.595] Persisted trie from memory database  
nodes=33 size=4.78KiB time="115.914µs" gcnodes=0 gcsize=0.00B gctim  
e=0s livenodes=1 livesize=0.00B  
INFO [12-05|06:55:56.595] Successfully wrote genesis state  
database=chaindata hash=1bfc81..11048e
```



```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Dec 5 14:24
root@4afce0fd6c27: /
seed@VM: ~/.../emulator_10
seed@VM: ~/.../emulator_10
root@4afce0fd6c27: /
WARN [12-05|07:05:57.102] Engine API enabled protocol=eth
WARN [12-05|07:05:57.102] Engine API started but chain not configured for merge yet
^C WARN [12-05|07:16:25.619] HTTP server graceful shutdown timed out
WARN [12-05|07:16:25.625] HTTP server graceful shutdown timed out
geth --datadir /root/.ethereum --identity="NEW_NODE_01" --networkid=1337 ful 5.22s user 2.75s system 1
root@4afce0fd6c27 / # geth --datadir /root/.ethereum --identity="NEW_NODE_01" --networkid=1337 \
--syncmode full --snapshot=False --verbosity=2 --port 30303 \
--bootnodes "$(cat /tmp/eth-node-urls)" --allow-insecure-unlock \
```

Creating a new account on this node and performing the given task:

Modified the python code for sending transactions, updated the receiving address to the new account's address and executed. The output can be seen as follows that our new account now has 11 ETH.

```
SEED-Ubuntu20.04 (Snapshot 3) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Dec 5 21:40
root@4afce0fd6c27: geth attach
seed@VM: ~/... seed@VM: ~/... root@4afce0... root@f16c7e... root@4afce0...
[12/05/23] seed@VM: ~/.../emulator_10$ docksh 4af
root@4afce0fd6c27 / # geth attach
Welcome to the Geth JavaScript console!

instance: Geth/NEW_NODE_01/v1.10.26-stable-e5eb32ac/linux-amd64/go1.18.10
at block: 1072 (Wed Dec 06 2023 02:16:21 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
> personal.newAccount()
Passphrase:
Repeat passphrase:
"0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
> myaccount = "0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
"0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
> eth.getBalance(myaccount)
11000000000000000000
>

[12/05/23] seed@VM: ~/.../emulator_10$ cd ..
[12/05/23] seed@VM: ~/.../Labsetup$ cd Files
[12/05/23] seed@VM: ~/.../Files$ vim web3_raw_tx.py
[12/05/23] seed@VM: ~/.../Files$ ./web3_raw_tx.py
/usr/lib/python3/dist-packages/requests/__init__.py:89: RequestsDependencyWarning: urllib3 (2.1.0) 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)
Transaction sent, waiting for receipt ...
Transaction Receipt: AttributeDict({'blockHash': HexBytes('0x90f21e8a48c08869b14790d85d083307e784c690b05e207de5d279ab0c9804d7'), 'blockNumber': 1123, 'contractAddress': None, 'cumulativeGasUsed': 21000})
```

Now, let our Account Z be the sender, and account 1 now is the receiver. As per previous screenshots we could see that Account Z had 11 ETH, now it has a changed value.C

```
> sender = "0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
"0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
> target = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> amount = web3.toWei(0.2, "ether")
"200000000000000000"
> eth.sendTransaction ({from: sender, to: target, value: amount})
Error: authentication needed: password or unlock
    at web3.js:6365:9(45)
    at send (web3.js:5099:62(34))
    at <eval>:1:21(10)

> sender = "0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
"0x8ce1eddbde9efd4e77116d2ba6c64d07cb4c5b31"
> target = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> amount = web3.toWei(2, "ether")
"200000000000000000"
> eth.sendTransaction ({from: sender, to: target, value: amount})
"0x1a3da47a6211ae4b4b645a4024416ab8653ea633bd4664d040d6a988f8db8bfd"
"
> myaccount = "0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
"0xF5406927254d2dA7F7c28A61191e3Ff1f2400fe9"
> eth.getBalance(myaccount)
12199968499999853000
> eth.getBalance(sender)
899997899999853000
>
```