Department of Computer Engineering

Academic Term: July-November 2023

Class : B.E Computers-A Sem VII
Subject: Blockchain Technology Lab
Subject Code: CSDL7022

Practical No:	6
Title:	Blockchain platform ethereum using Geth
Date of Performance:	
Date of Submission:	
Roll No:	9427
Name of the Student:	Atharva Prashant Pawar

Evaluation:

Sr. No	Rubrics	Grades
1	Time Line (2)	
2	Output (3)	
3	Code optimization (2)	
4	Post lab (3)	

Signature of the Teacher :

Experiment No. 6

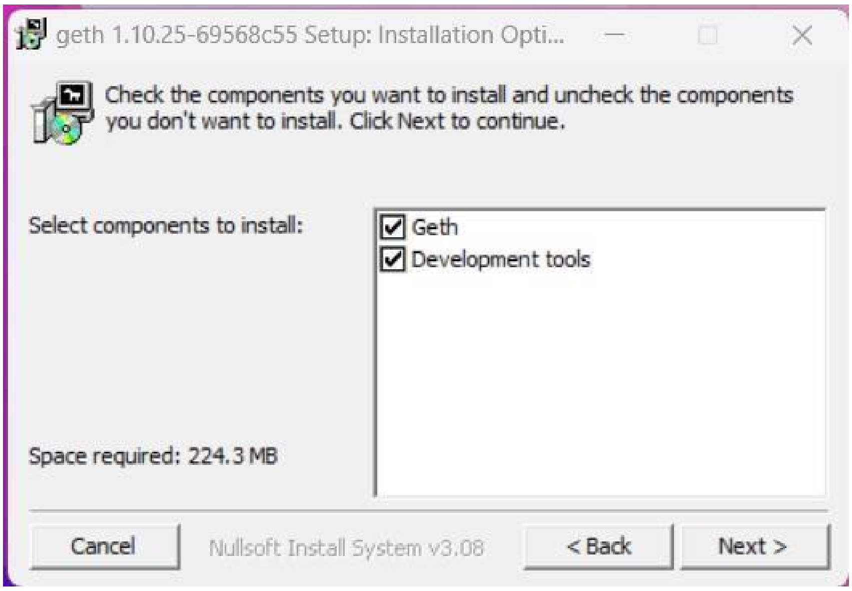
Blockchain platform ethereum using Geth.

Aim: Study of Blockchain platform ethereum using Geth.

Theory:

Step:1

Following link is used to download Geth 1.10.25 for Windows.
https://geth.ethereum.org/downloads/



geth 1.10.25-69568c55 Setup: Installation Opti...

Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.

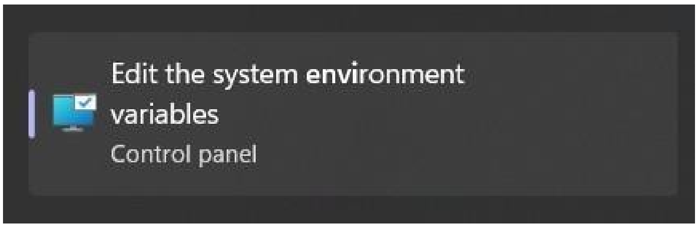
Select components to install:

☑ Geth
☑ Development tools

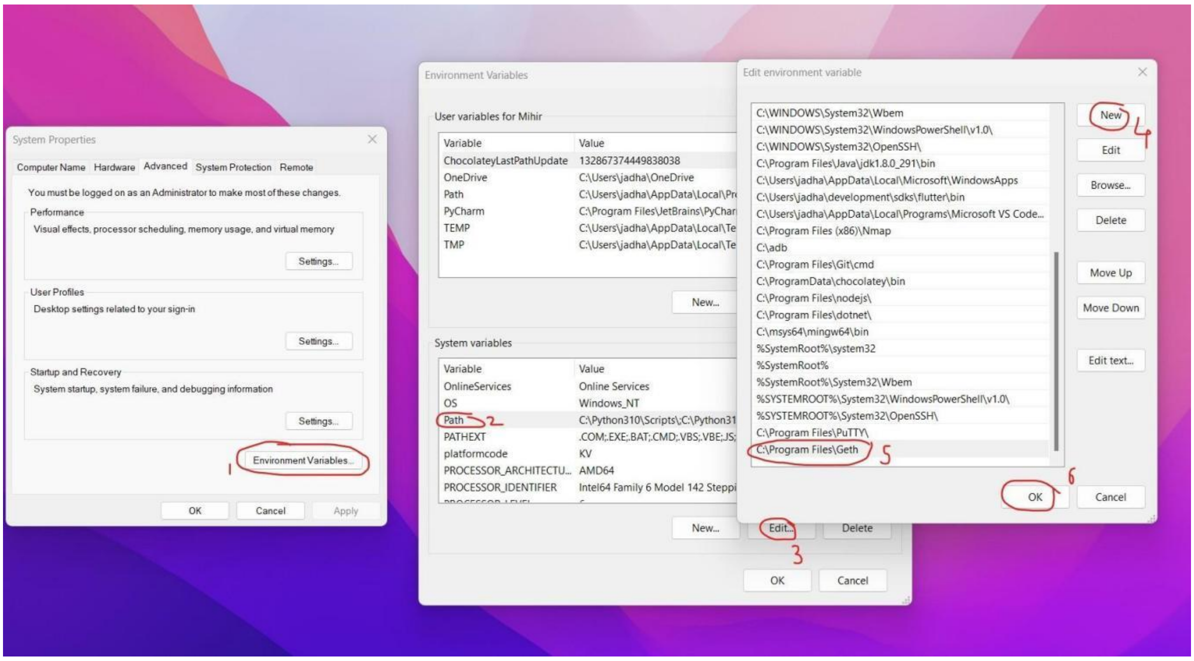
Space required: 224.3 MB

After installation add the Geth to the path

Search Environment Variables in Windows and Open it



After opening, add the Geth location i.e., C:\Program Files\Geth to the path in the Environment Variables



You must be logged on as an Administrator to make most of these changes.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory

User Profiles
Desktop settings related to your sign-in

Startup and Recovery
System startup, system failure, and debugging information

User variables for Mihir

Variable	Value
ChocolateyLastPathUpdate	132867374449838038
OneDrive	C:\Users\jadha\OneDrive
Path	C:\Users\jadha\AppData\Local\Pr
PyCharm	C:\Program Files\JetBrains\PyChar
TEMP	C:\Users\jadha\AppData\Local\Te
TMP	C:\Users\jadha\AppData\Local\Te

System variables

Variable	Value
OnlineServices	Online Services
OS	Windows_NT
Path	C:\Python310\Scripts\;C:\Python31
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;
platformcode	KV
PROCESSOR_ARCHITECTU...	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 142 Steppi

```
C:\WINDOWS\System32\Wbem
C:\WINDOWS\System32\WindowsPowerShell\v1.0\
C:\WINDOWS\System32\OpenSSH\
C:\Program Files\Java\jdk1.8.0_291\bin
C:\Users\jadha\AppData\Local\Microsoft\WindowsApps
C:\Users\jadha\development\sdks\flutter\bin
C:\Users\jadha\AppData\Local\Programs\Microsoft VS Code...
C:\Program Files (x86)\Nmap
C:\adb
C:\Program Files\Git\cmd
C:\ProgramData\chocolatey\bin
C:\Program Files\nodejs\
C:\Program Files\dotnet\
C:\msys64\mingw64\bin
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\PuTTY\
C:\Program Files\Geth
```

OR

Create folder in other drive say D drive and install Geth in that drive in folder Geth.

Following are the steps to be followed.

Steps:

1. create a folder
2. create custom genesis file
3. create custom data directory
4. set custom networkID (ChainID)

Step:2

Create Genesis File

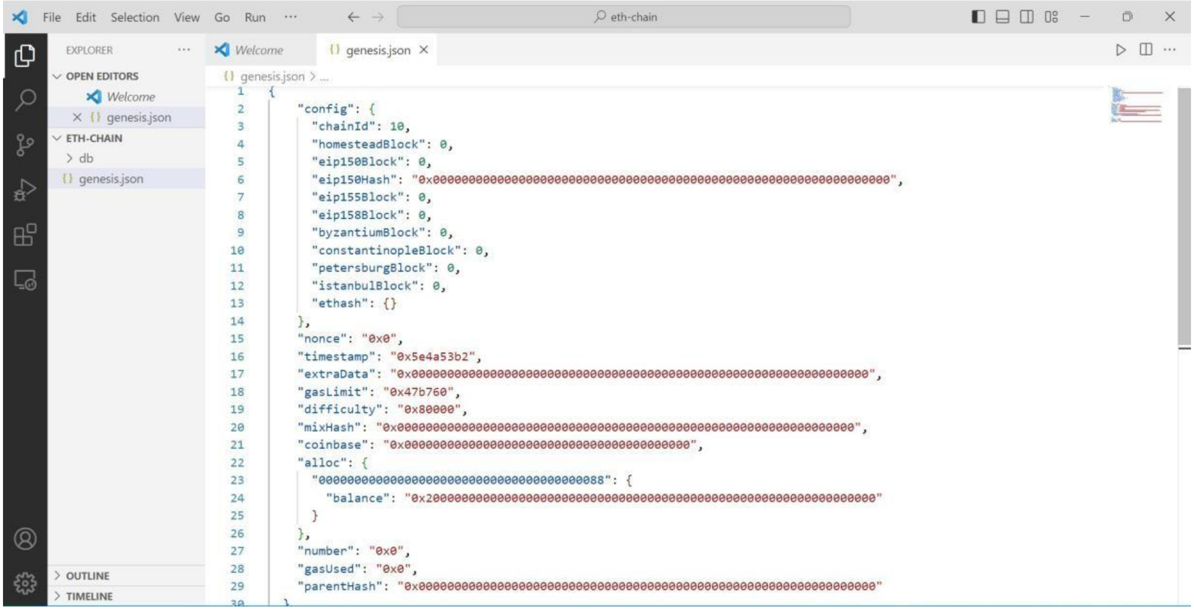
The Genesis block is the start block of the Blockchain — the first block, block 0, and the only block that does not point to a predecessor block. the genesis block is hard coded into clients, but in Ethereum it can be whatever you like. The Genesis file is a JSON file that defines the characteristics of that initial block and subsequently the rest of the blockchain.

1. Create a directory to hold your network files.

```
mkdir eth-chain
cd eth-chain
```

2. Create your genesis file

Open notepad and save file in eth-chain folder with name `genesis.json.` Copy following code in this `Genesis.json file.`



```
{
    "config": {
      "chainId": 10,
      "homesteadBlock": 0,
      "eip150Block": 0,
      "eip150Hash": "0x0000000000000000000000000000000000000000000000000000000000000000",
      "eip155Block": 0,
      "eip158Block": 0,
      "byzantiumBlock": 0,
      "constantinopleBlock": 0,
      "petersburgBlock": 0,
      "istanbulBlock": 0,
      "ethash": {}
    },
    "nonce": "0x0",
    "timestamp": "0x5e4a53b2",
    "extraData": "0x0000000000000000000000000000000000000000000000000000000000000000",
    "gasLimit": "0x47b760",
    "difficulty": "0x80000",
    "mixHash": "0x0000000000000000000000000000000000000000000000000000000000000000",
    "coinbase": "0x0000000000000000000000000000000000000000",
    "alloc": {
      "0000000000000000000000000000000000000088": {
        "balance": "0x200000000000000000000000000000000000000000000000000000000000000"
      }
    },
    "number": "0x0",
    "gasUsed": "0x0",
    "parentHash": "0x0000000000000000000000000000000000000000000000000000000000000000"
}
```

config

chainId — this is your chain's identifier, and is used in replay protection.
homesteadBlock, eip155Block, eip158Block, byzantiumBlock — these relate to chain forking and versioning, so in our case lets leave them 0 since we're starting a new blockchain.

difficulty

This dictates how difficult it is to mine a block.
gasLimit

This is the the total amount of gas that can be used in each block. With such a low mining difficulty, blocks will be moving pretty quick, but you should still set this value pretty high to avoid hitting the limit and slowing down your network.
alloc

Here you can allocate ETH to specific addresses. This won't create the account for you, so make sure its an account you already have control of. You will need to add the account to your private chain in order to use it, and to do that you need access to the keystore/utc file.

Nonce
A scalar value equal to the number of transactions sent by the sender.

mixhash

mixhash is an intermediary calculation to finding the nonce that is not as costly to determine.

coinbase

The ether rewards gained from “mining” the genesis block go to the 160-bit coinbaseaddress.
timestamp
The output of the Unix time() function when the block was created

parentHash

The Keccak 256-bit hash of the previous block’s header. This is meaningless in the genesis block, since block 0 has no parent.

extraData

An optional free, but max. 32 byte long space to conserve smart things for ethernity on the Blockchain.

Step:3

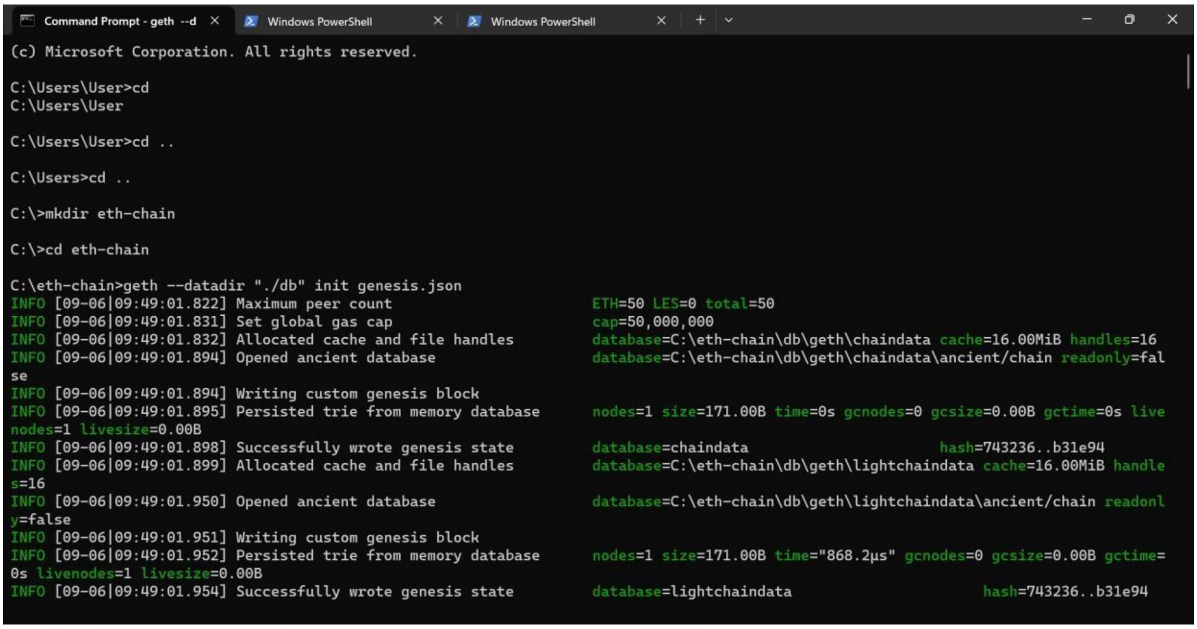
3. Initial the genesis block

Init our blockchain with the settings in the genesis file and define a folder for storing chaindata.

```
>   geth --datadir "./db" init genesis.json
```

datadir : Data directory for the databases and keystore
init : initialize a new genesis block

We get the following output’



```
(c) Microsoft Corporation. All rights reserved.

C:\Users\User>cd
C:\Users\User

C:\Users\User>cd ..

C:\Users>cd ..

C:\>mkdir eth-chain

C:\>cd eth-chain

C:\eth-chain>geth --datadir "./db" init genesis.json
INFO [09-06|09:49:01.822] Maximum peer count                       ETH=50 LES=0 total=50
INFO [09-06|09:49:01.831] Set global gas cap                       cap=50,000,000
INFO [09-06|09:49:01.832] Allocated cache and file handles         database=C:\eth-chain\db\geth\chaindata cache=16.00MiB handles=16
INFO [09-06|09:49:01.894] Opened ancient database                  database=C:\eth-chain\db\geth\chaindata\ancient/chain readonly=fal
se
INFO [09-06|09:49:01.894] Writing custom genesis block
INFO [09-06|09:49:01.895] Persisted trie from memory database      nodes=1 size=171.00B time=0s gcnodes=0 gcsize=0.00B gctime=0s live
nodes=1 livesize=0.00B
INFO [09-06|09:49:01.898] Successfully wrote genesis state         database=chaindata                      hash=743236..b31e94
INFO [09-06|09:49:01.899] Allocated cache and file handles         database=C:\eth-chain\db\geth\lightchaindata cache=16.00MiB handle
s=16
INFO [09-06|09:49:01.950] Opened ancient database                  database=C:\eth-chain\db\geth\lightchaindata\ancient/chain readonl
y=false
INFO [09-06|09:49:01.951] Writing custom genesis block
INFO [09-06|09:49:01.952] Persisted trie from memory database      nodes=1 size=171.00B time="868.2µs" gcnodes=0 gcsize=0.00B gctime=
0s livenodes=1 livesize=0.00B
INFO [09-06|09:49:01.954] Successfully wrote genesis state         database=lightchaindata                      hash=743236..b31e94
```

Data Directory

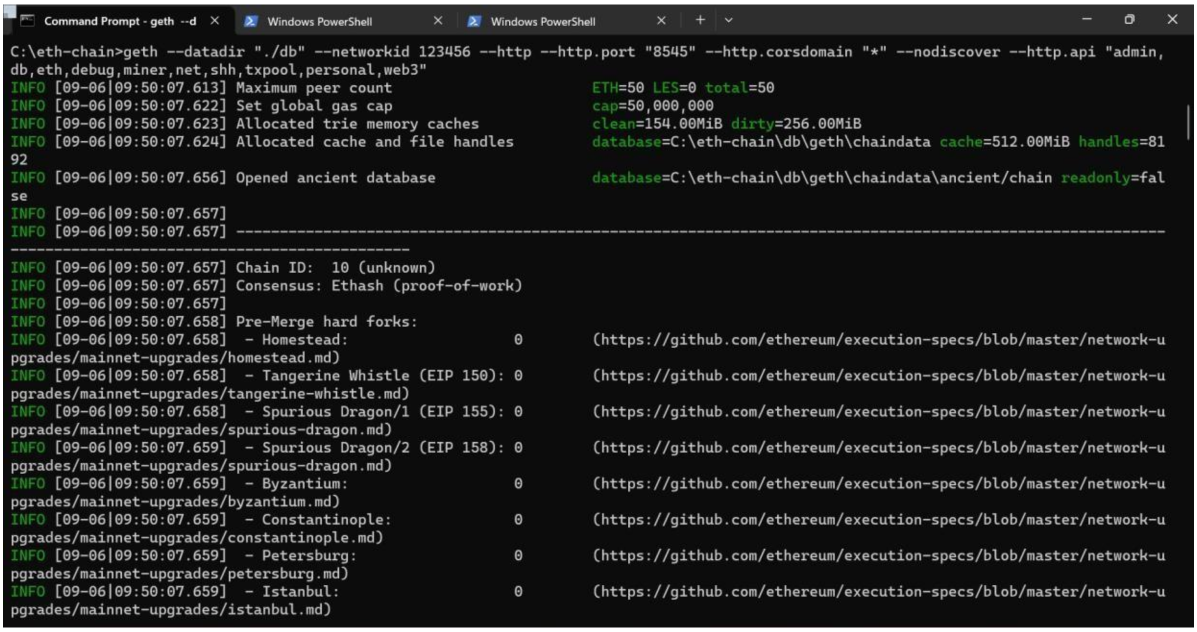
Everything geth persists gets written inside its data directory (except for the PoW Ethash DAG. The default data directory locations in Window platform is %APPDATA%\Ethereum.

Step:4

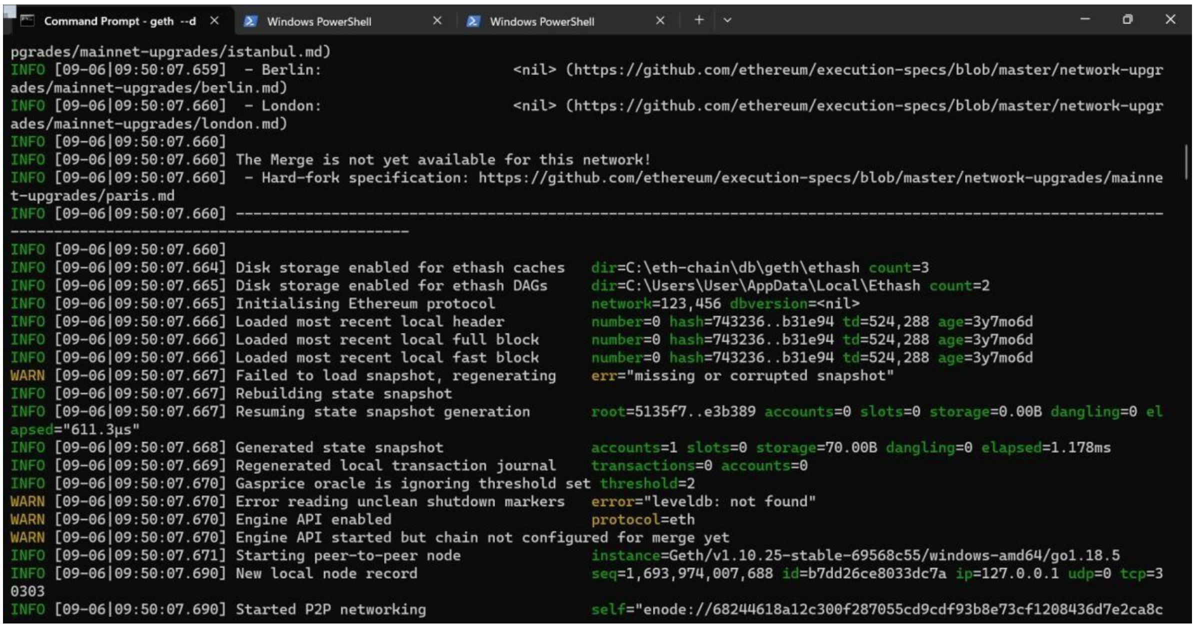
Start your Ethereum peer node

Networkid helps ensure the privacy of your network. You can use any number here (where we used " 123456"), but other peers joining your network must use the same one. Use following command.

geth --datadir "./db" --networkid 123456 --http –http.port "8545" –http.corsdomain "*" --nodiscover –http.api=”admin,db,eth,debug,miner,net,shh,txpool,personal,web3”



```
C:\eth-chain>geth --datadir "./db" --networkid 123456 --http --http.port "8545" --http.corsdomain "*" --nodiscover --http.api "admin,
db,eth,debug,miner,net,shh,txpool,personal,web3"
INFO [09-06|09:50:07.613] Maximum peer count                       ETH=50 LES=0 total=50
INFO [09-06|09:50:07.622] Set global gas cap                       cap=50,000,000
INFO [09-06|09:50:07.623] Allocated trie memory caches             clean=154.00MiB dirty=256.00MiB
INFO [09-06|09:50:07.624] Allocated cache and file handles         database=C:\eth-chain\db\geth\chaindata cache=512.00MiB handles=81
92
INFO [09-06|09:50:07.656] Opened ancient database                  database=C:\eth-chain\db\geth\chaindata\ancient/chain readonly=fal
se
INFO [09-06|09:50:07.657]
INFO [09-06|09:50:07.657] ----------------------------------------------------------------------------------------------------------
----------------------------------------
INFO [09-06|09:50:07.657] Chain ID:  10 (unknown)
INFO [09-06|09:50:07.657] Consensus: Ethash (proof-of-work)
INFO [09-06|09:50:07.657]
INFO [09-06|09:50:07.658] Pre-Merge hard forks:
INFO [09-06|09:50:07.658]  - Homestead:                   0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/homestead.md)
INFO [09-06|09:50:07.658]  - Tangerine Whistle (EIP 150): 0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/tangerine-whistle.md)
INFO [09-06|09:50:07.658]  - Spurious Dragon/1 (EIP 155): 0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/spurious-dragon.md)
INFO [09-06|09:50:07.659]  - Spurious Dragon/2 (EIP 158): 0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/spurious-dragon.md)
INFO [09-06|09:50:07.659]  - Byzantium:                   0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/byzantium.md)
INFO [09-06|09:50:07.659]  - Constantinople:              0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/constantinople.md)
INFO [09-06|09:50:07.659]  - Petersburg:                  0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/petersburg.md)
INFO [09-06|09:50:07.659]  - Istanbul:                    0        (https://github.com/ethereum/execution-specs/blob/master/network-u
pgrades/mainnet-upgrades/istanbul.md)
```

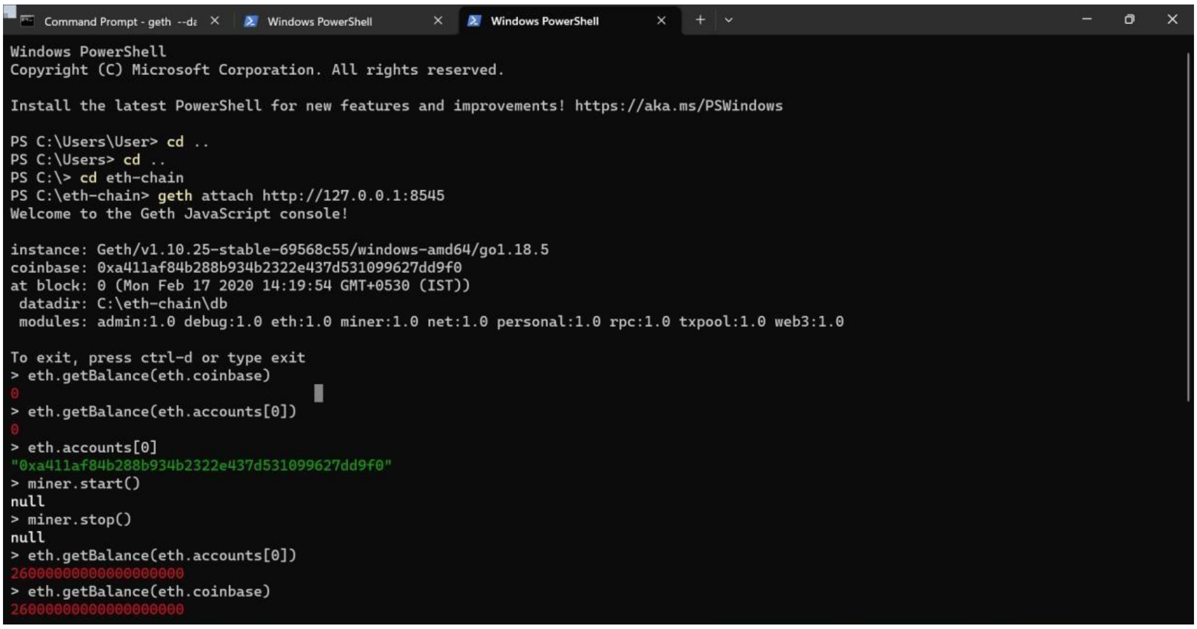


```
pgrades/mainnet-upgrades/istanbul.md)
INFO [09-06|09:50:07.659]  - Berlin:                      <nil> (https://github.com/ethereum/execution-specs/blob/master/network-upgr
ades/mainnet-upgrades/berlin.md)
INFO [09-06|09:50:07.660]  - London:                      <nil> (https://github.com/ethereum/execution-specs/blob/master/network-upgr
ades/mainnet-upgrades/london.md)
INFO [09-06|09:50:07.660]
INFO [09-06|09:50:07.660] The Merge is not yet available for this network!
INFO [09-06|09:50:07.660]  - Hard-fork specification: https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainne
t-upgrades/paris.md
INFO [09-06|09:50:07.660] ----------------------------------------------------------------------------------------------------------
----------------------------------------
INFO [09-06|09:50:07.660]
INFO [09-06|09:50:07.664] Disk storage enabled for ethash caches   dir=C:\eth-chain\db\geth\ethash count=3
INFO [09-06|09:50:07.665] Disk storage enabled for ethash DAGs     dir=C:\Users\User\AppData\Local\Ethash count=2
INFO [09-06|09:50:07.665] Initialising Ethereum protocol           network=123,456 dbversion=<nil>
INFO [09-06|09:50:07.666] Loaded most recent local header          number=0 hash=743236..b31e94 td=524,288 age=3y7mo6d
INFO [09-06|09:50:07.666] Loaded most recent local full block      number=0 hash=743236..b31e94 td=524,288 age=3y7mo6d
INFO [09-06|09:50:07.666] Loaded most recent local fast block      number=0 hash=743236..b31e94 td=524,288 age=3y7mo6d
WARN [09-06|09:50:07.667] Failed to load snapshot, regenerating    err="missing or corrupted snapshot"
INFO [09-06|09:50:07.667] Rebuilding state snapshot
INFO [09-06|09:50:07.667] Resuming state snapshot generation       root=5135f7..e3b389 accounts=0 slots=0 storage=0.00B dangling=0 el
apsed="611.3µs"
INFO [09-06|09:50:07.668] Generated state snapshot                 accounts=1 slots=0 storage=70.00B dangling=0 elapsed=1.178ms
INFO [09-06|09:50:07.669] Regenerated local transaction journal    transactions=0 accounts=0
INFO [09-06|09:50:07.670] Gasprice oracle is ignoring threshold set threshold=2
WARN [09-06|09:50:07.670] Error reading unclean shutdown markers   error="leveldb: not found"
WARN [09-06|09:50:07.670] Engine API enabled                       protocol=eth
WARN [09-06|09:50:07.670] Engine API started but chain not configured for merge yet
INFO [09-06|09:50:07.671] Starting peer-to-peer node               instance=Geth/v1.10.25-stable-69568c55/windows-amd64/go1.18.5
INFO [09-06|09:50:07.690] New local node record                    seq=1,693,974,007,688 id=b7dd26ce8033dc7a ip=127.0.0.1 udp=0 tcp=3
0303
INFO [09-06|09:50:07.690] Started P2P networking                   self="enode://68244618a12c300f287055cd9cdf93b8e73cf1208436d7e2ca8c
```

Step:5

Open a new command prompt. Use following command.

geth attach http://127.0.0.1:8545



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\User> cd ..
PS C:\Users> cd ..
PS C:\> cd eth-chain
PS C:\eth-chain> geth attach http://127.0.0.1:8545
Welcome to the Geth JavaScript console!

instance: Geth/v1.10.25-stable-69568c55/windows-amd64/go1.18.5
coinbase: 0xa411af84b288b934b2322e437d531099627dd9f0
at block: 0 (Mon Feb 17 2020 14:19:54 GMT+0530 (IST))
 datadir: C:\eth-chain\db
 modules: admin:1.0 debug: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(eth.coinbase)
0
> eth.getBalance(eth.accounts[0])
0
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.accounts[0])
260000000000000000000
> eth.getBalance(eth.coinbase)
260000000000000000000
```

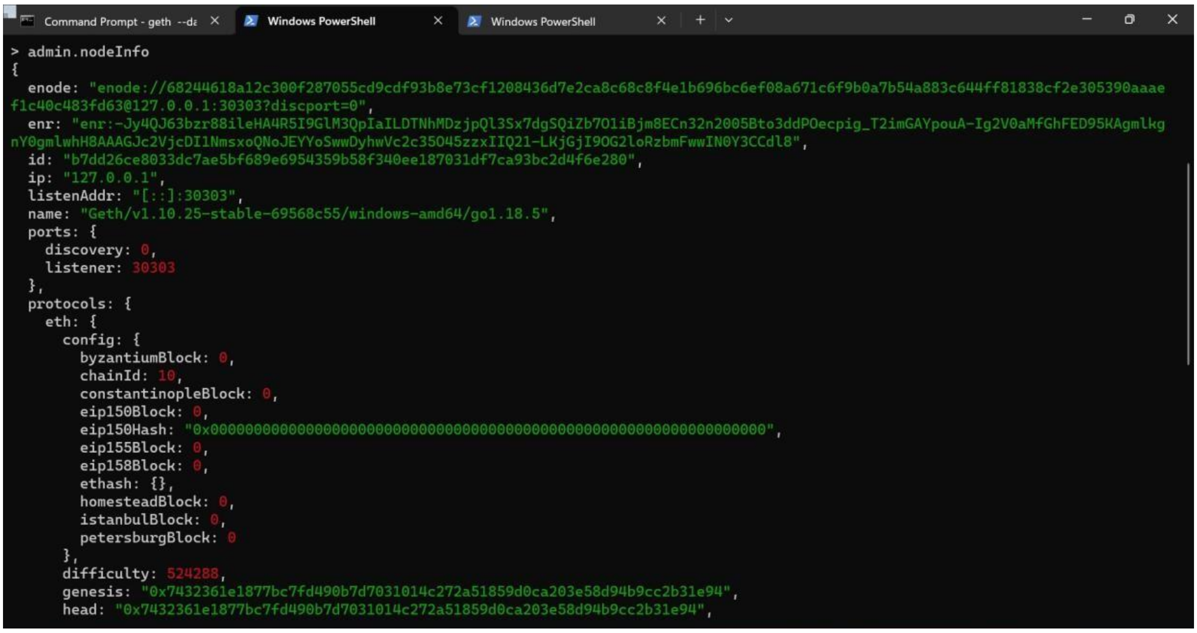
Step:6

Node Information

The nodeInfo administrative property can be queried for all the information known about the running Geth node at the networking granularity.

Type the below in the new terminal(command prompt)

```
>   admin.nodeInfo
```



```
> admin.nodeInfo
{
  enode: "enode://68244618a12c300f287055cd9cdf93b8e73cf1208436d7e2ca8c68c8f4e1b696bc6ef08a671c6f9b0a7b54a883c644ff81838cf2e305390aaae
f1c40c483fd63@127.0.0.1:30303?discport=0",
  enr: "enr:-Jy4QJ63bzr88ileHA4R5I9GlM3QpIaILDTNhMDzjpQl3Sx7dgSQiZb7O1iBjm8ECn32n2005Bto3ddPOecpig_T2imGAYpouA-Ig2V0aMfGhFED95KAgmlkg
nY0gmlwhH8AAAGJc2VjcDI1NmsxoQNoJEYYoSwwDyhwVc2c35O45zzxIIQ21-LKjGjI9OG2loRzbmFwwIN0Y3CCdl8",
  id: "b7dd26ce8033dc7ae5bf689e6954359b58f340ee187031df7ca93bc2d4f6e280",
  ip: "127.0.0.1",
  listenAddr: "[::]:30303",
  name: "Geth/v1.10.25-stable-69568c55/windows-amd64/go1.18.5",
  ports: {
    discovery: 0,
    listener: 30303
  },
  protocols: {
    eth: {
      config: {
        byzantiumBlock: 0,
        chainId: 10,
        constantinopleBlock: 0,
        eip150Block: 0,
        eip150Hash: "0x0000000000000000000000000000000000000000000000000000000000000000",
        eip155Block: 0,
        eip158Block: 0,
        ethash: {},
        homesteadBlock: 0,
        istanbulBlock: 0,
        petersburgBlock: 0
      },
      difficulty: 524288,
      genesis: "0x7432361e1877bc7fd490b7d7031014c272a51859d0ca203e58d94b9cc2b31e94",
      head: "0x7432361e1877bc7fd490b7d7031014c272a51859d0ca203e58d94b9cc2b31e94",
```

Step:7

Creating a new account

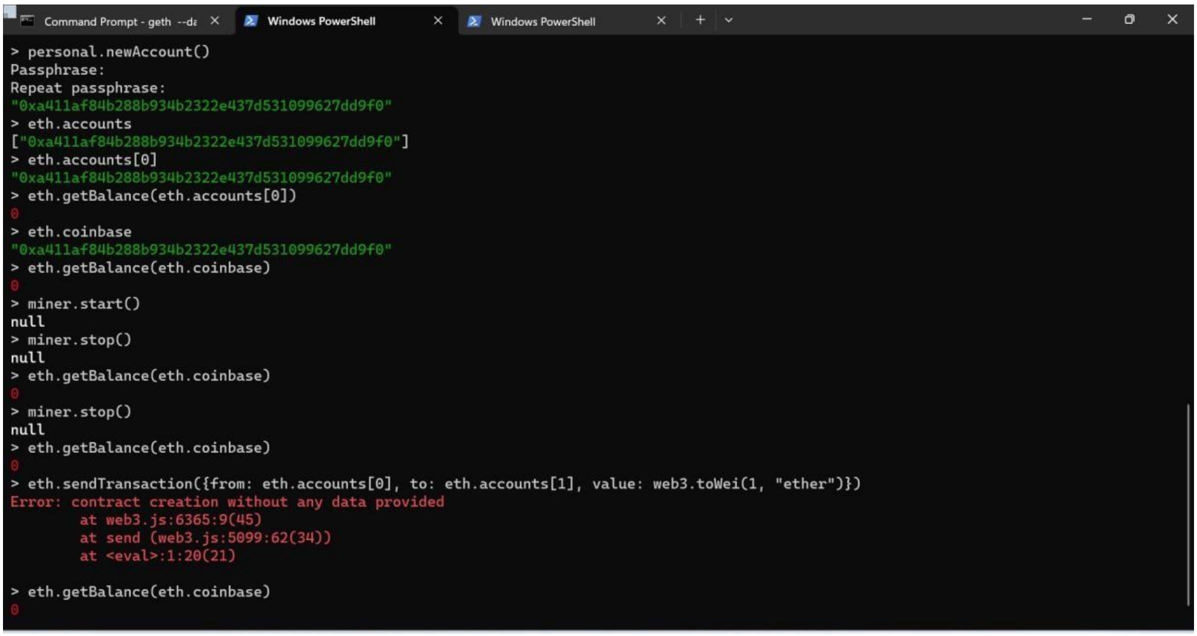
> personal.newAccount()

Creates a new account and prints the address. On the console, use:

Enter your password and then it will display account address. In my case, I set password to “123456”

Second way to create a new account

> personal.newAccount("123456")



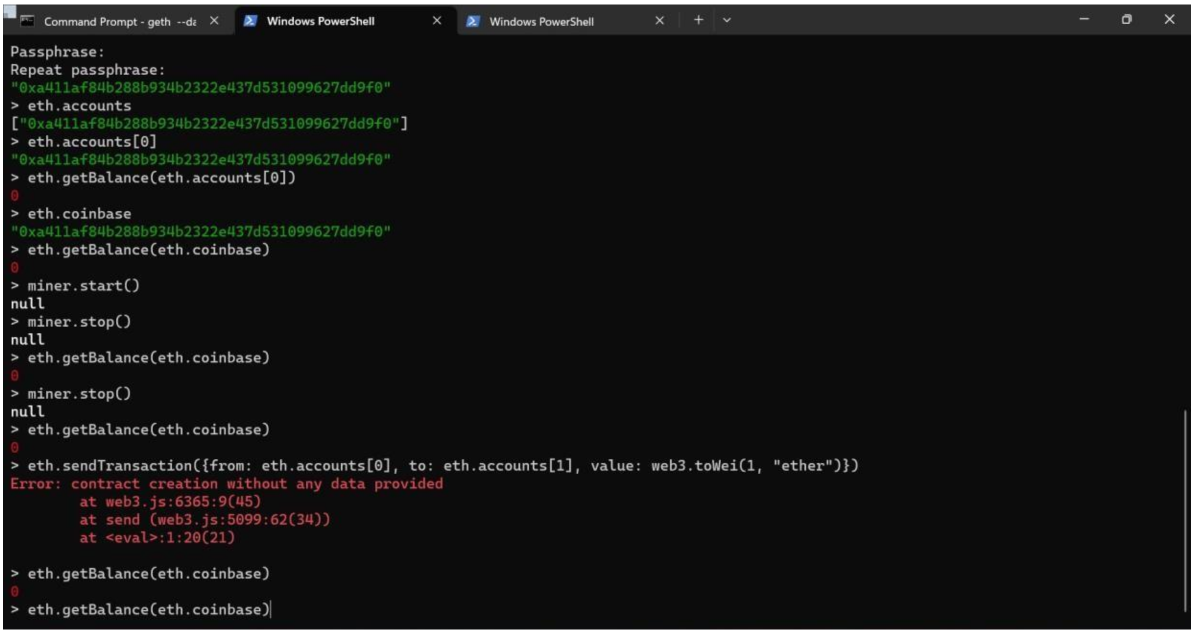
```
> personal.newAccount()
Passphrase:
Repeat passphrase:
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0"]
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.accounts[0])
0
> eth.coinbase
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.coinbase)
0
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.coinbase)
0
```

Step:8

Check Accounts

Use following command to check account

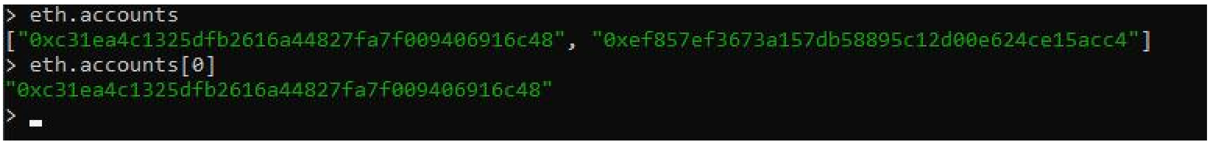
> eth.accounts



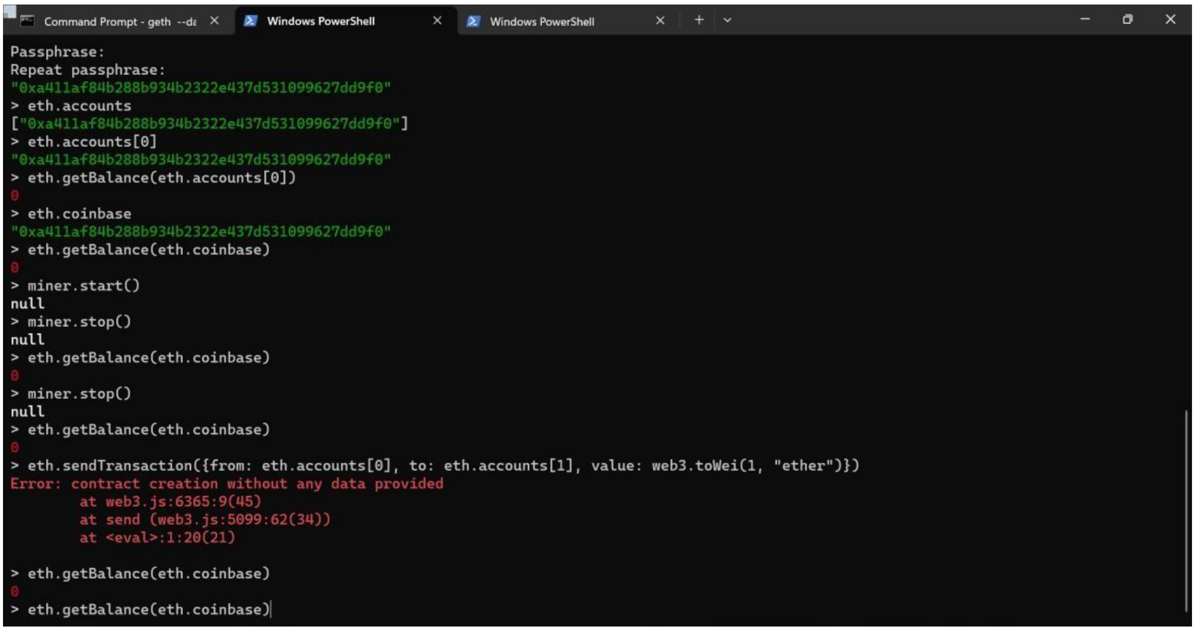
```
Passphrase:
Repeat passphrase:
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0"]
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.accounts[0])
0
> eth.coinbase
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.coinbase)
0
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.coinbase)
0
> eth.getBalance(eth.coinbase)
```

Accounts is an array so you can search account by index also.

> eth.accounts[0]



```
> eth.accounts
["0xc31ea4c1325dfb2616a44827fa7f009406916c48", "0xef857ef3673a157db58895c12d00e624ce15acc4"]
> eth.accounts[0]
"0xc31ea4c1325dfb2616a44827fa7f009406916c48"
> _
```

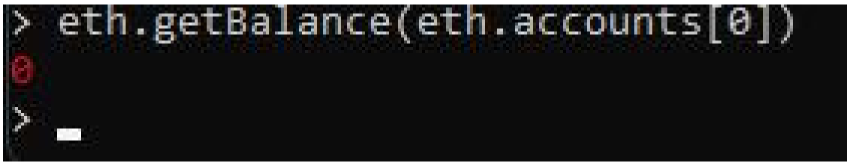


```
Passphrase:
Repeat passphrase:
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0"]
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.accounts[0])
0
> eth.coinbase
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.coinbase)
0
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.coinbase)
0
> eth.getBalance(eth.coinbase)
```

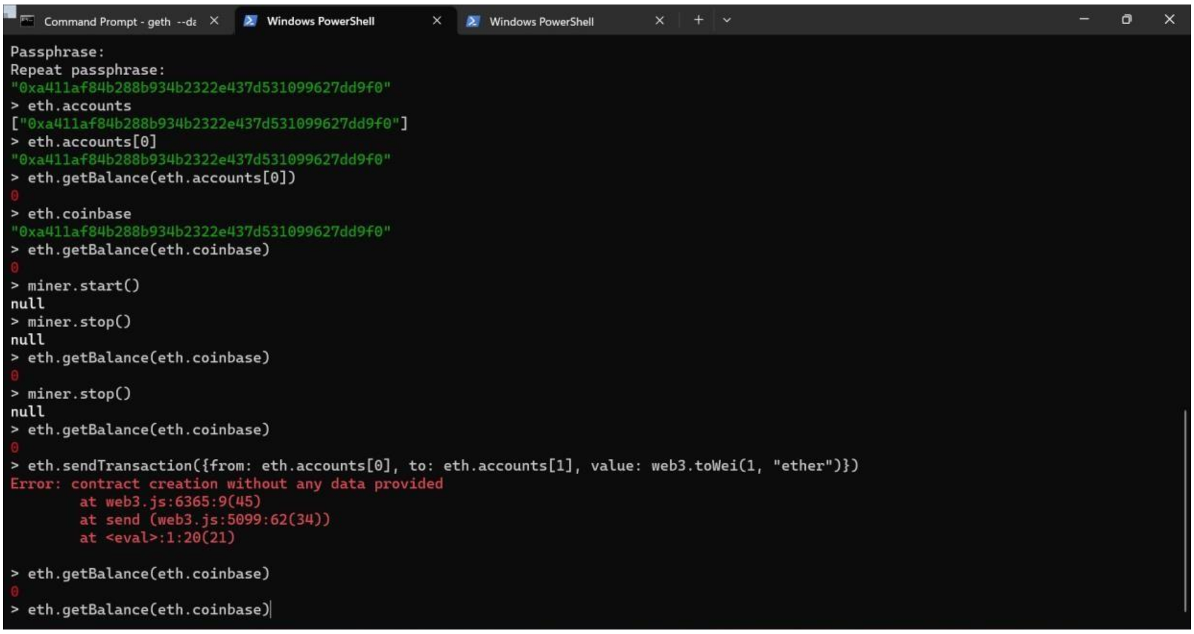
Step:9

Check balance of account

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



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



```
Passphrase:
Repeat passphrase:
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0"]
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.accounts[0])
0
> eth.coinbase
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.coinbase)
0
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.coinbase)
0
> eth.getBalance(eth.coinbase)
```

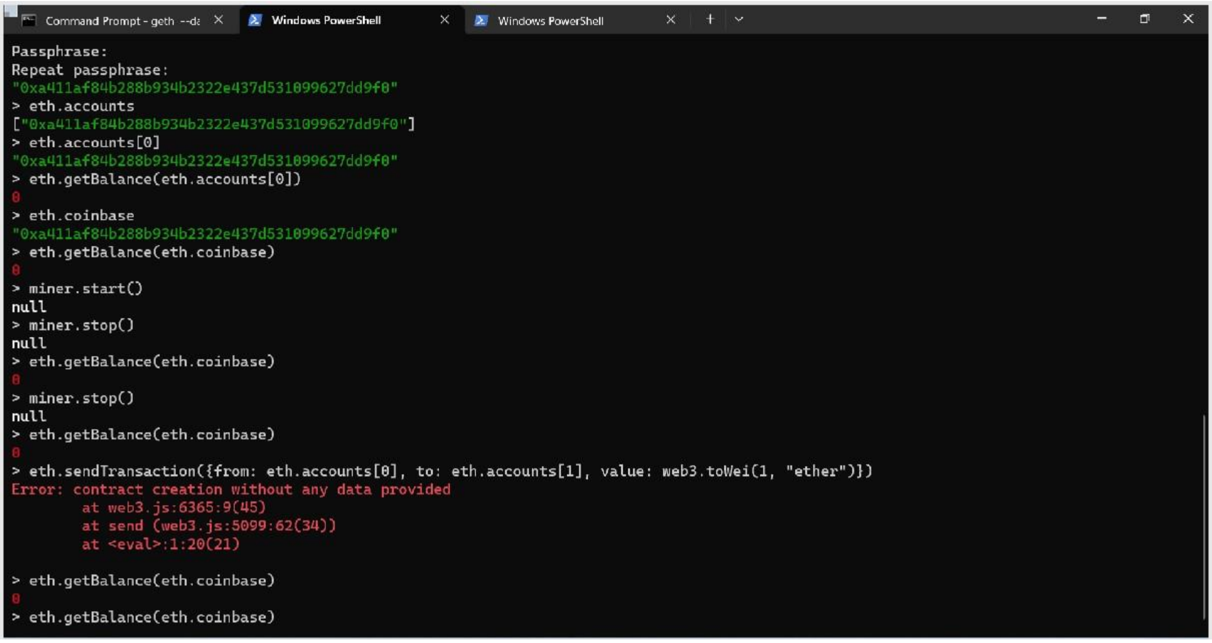
Step:10

Mining

Set Default Account

- Check your default account, type

  `>    eth.coinbase`

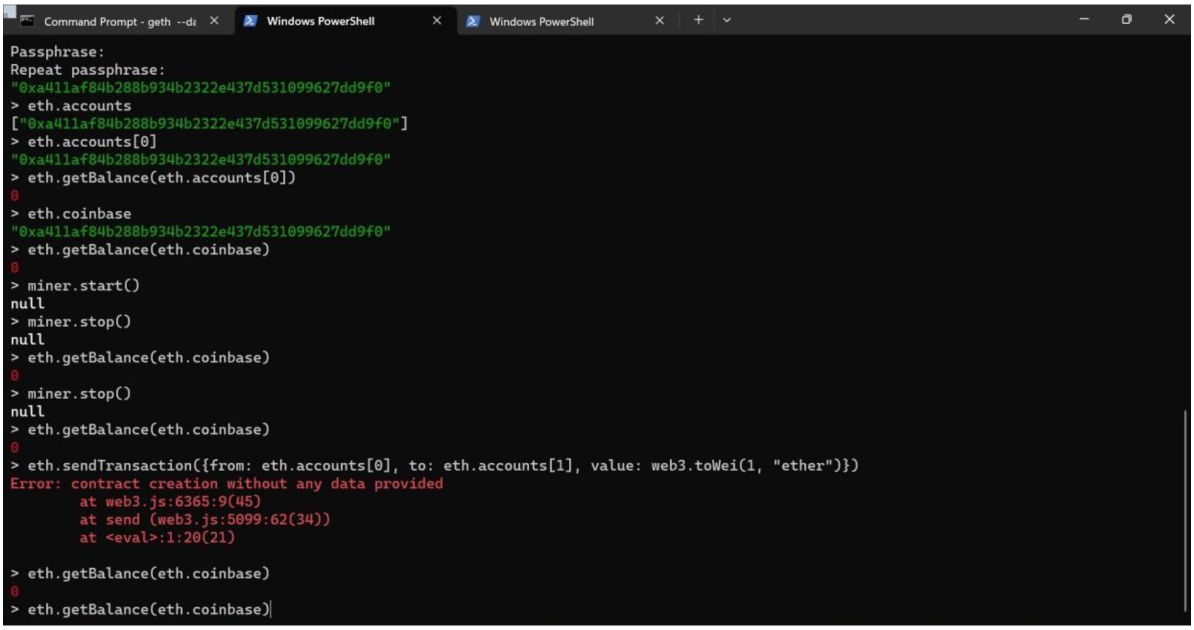


```
Passphrase:
Repeat passphrase:
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0"]
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.accounts[0])
0
> eth.coinbase
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.coinbase)
0
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.coinbase)
0
> eth.getBalance(eth.coinbase)
```

Start Mining

- Check your balance with

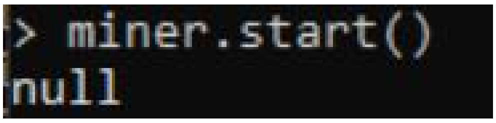
> eth.getBalance(eth.coinbase)



```
Passphrase:
Repeat passphrase:
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0"]
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.accounts[0])
0
> eth.coinbase
"0xa411af84b288b934b2322e437d531099627dd9f0"
> eth.getBalance(eth.coinbase)
0
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> miner.stop()
null
> eth.getBalance(eth.coinbase)
0
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.coinbase)
0
> eth.getBalance(eth.coinbase)
```

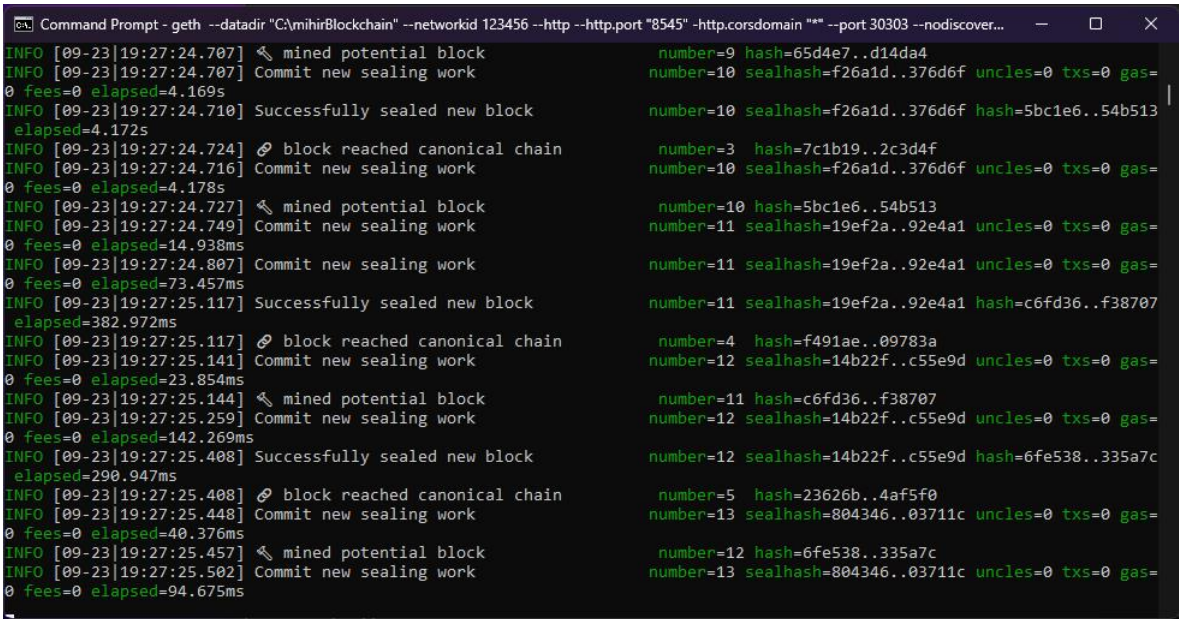
- Run

  > miner.start()



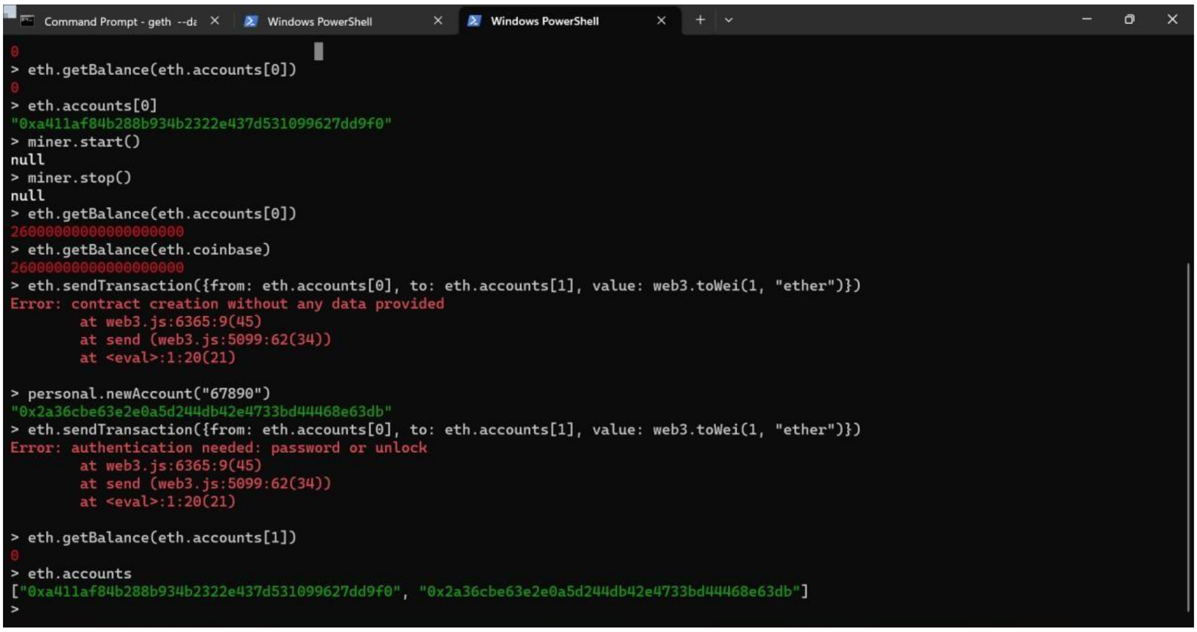
```
> miner.start()
null
```

- Now, Mining will get started on the Blockchain network i.e., on the first Command Prompt
- Look at your other terminal window, you should see some mining action in the logs.

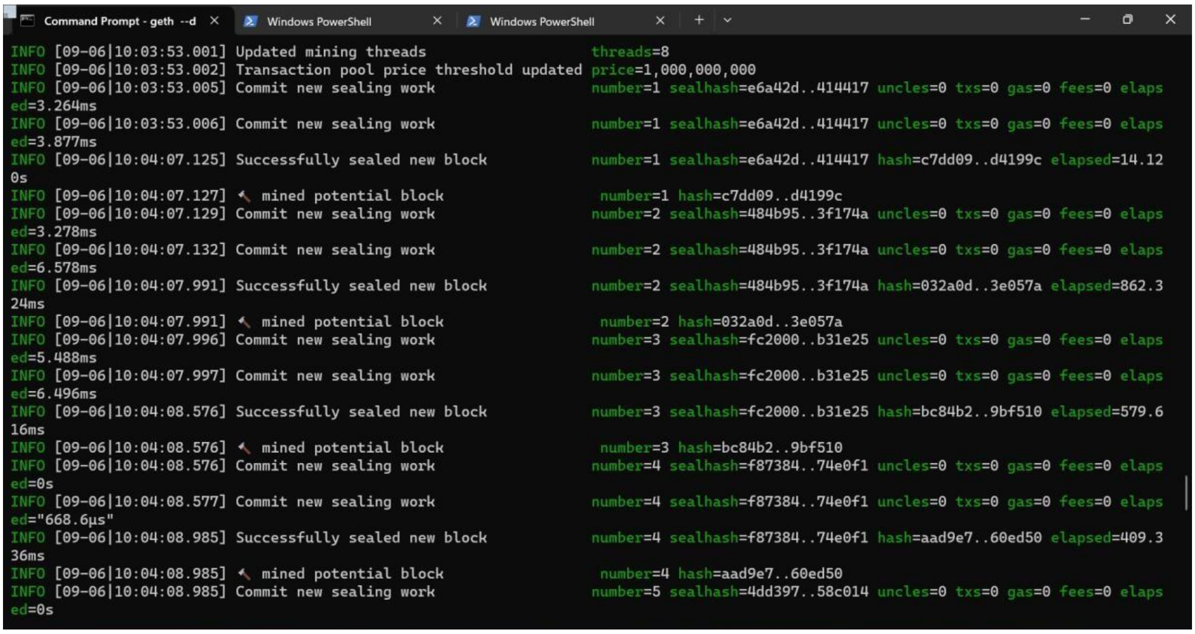


Command Prompt - geth --datadir "C:\mihirBlockchain" --networkid 123456 --http --http.port "8545" -http.corsdomain "*" --port 30303 --nodiscover...

```
INFO [09-23|19:27:24.707] 🔨 mined potential block                 number=9  hash=65d4e7..d14da4
INFO [09-23|19:27:24.707] Commit new sealing work                number=10 sealhash=f26a1d..376d6f uncles=0 txs=0 gas=
0 fees=0 elapsed=4.169s
INFO [09-23|19:27:24.710] Successfully sealed new block          number=10 sealhash=f26a1d..376d6f hash=5bc1e6..54b513
 elapsed=4.172s
INFO [09-23|19:27:24.724] 🔗 block reached canonical chain         number=3  hash=7c1b19..2c3d4f
INFO [09-23|19:27:24.716] Commit new sealing work                number=10 sealhash=f26a1d..376d6f uncles=0 txs=0 gas=
0 fees=0 elapsed=4.178s
INFO [09-23|19:27:24.727] 🔨 mined potential block                 number=10 hash=5bc1e6..54b513
INFO [09-23|19:27:24.749] Commit new sealing work                number=11 sealhash=19ef2a..92e4a1 uncles=0 txs=0 gas=
0 fees=0 elapsed=14.938ms
INFO [09-23|19:27:24.807] Commit new sealing work                number=11 sealhash=19ef2a..92e4a1 uncles=0 txs=0 gas=
0 fees=0 elapsed=73.457ms
INFO [09-23|19:27:25.117] Successfully sealed new block          number=11 sealhash=19ef2a..92e4a1 hash=c6fd36..f38707
 elapsed=382.972ms
INFO [09-23|19:27:25.117] 🔗 block reached canonical chain         number=4  hash=f491ae..09783a
INFO [09-23|19:27:25.141] Commit new sealing work                number=12 sealhash=14b22f..c55e9d uncles=0 txs=0 gas=
0 fees=0 elapsed=23.854ms
INFO [09-23|19:27:25.144] 🔨 mined potential block                 number=11 hash=c6fd36..f38707
INFO [09-23|19:27:25.259] Commit new sealing work                number=12 sealhash=14b22f..c55e9d uncles=0 txs=0 gas=
0 fees=0 elapsed=142.269ms
INFO [09-23|19:27:25.408] Successfully sealed new block          number=12 sealhash=14b22f..c55e9d hash=6fe538..335a7c
 elapsed=290.947ms
INFO [09-23|19:27:25.408] 🔗 block reached canonical chain         number=5  hash=23626b..4af5f0
INFO [09-23|19:27:25.448] Commit new sealing work                number=13 sealhash=804346..03711c uncles=0 txs=0 gas=
0 fees=0 elapsed=40.376ms
INFO [09-23|19:27:25.457] 🔨 mined potential block                 number=12 hash=6fe538..335a7c
INFO [09-23|19:27:25.502] Commit new sealing work                number=13 sealhash=804346..03711c uncles=0 txs=0 gas=
0 fees=0 elapsed=94.675ms
```



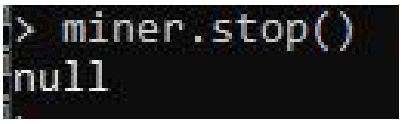
```
0
> eth.getBalance(eth.accounts[0])
0
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.accounts[0])
26000000000000000000
> eth.getBalance(eth.coinbase)
26000000000000000000
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> personal.newAccount("67890")
"0x2a36cbe63e2e0a5d244db42e4733bd44468e63db"
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: authentication needed: password or unlock
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.accounts[1])
0
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0", "0x2a36cbe63e2e0a5d244db42e4733bd44468e63db"]
>
```



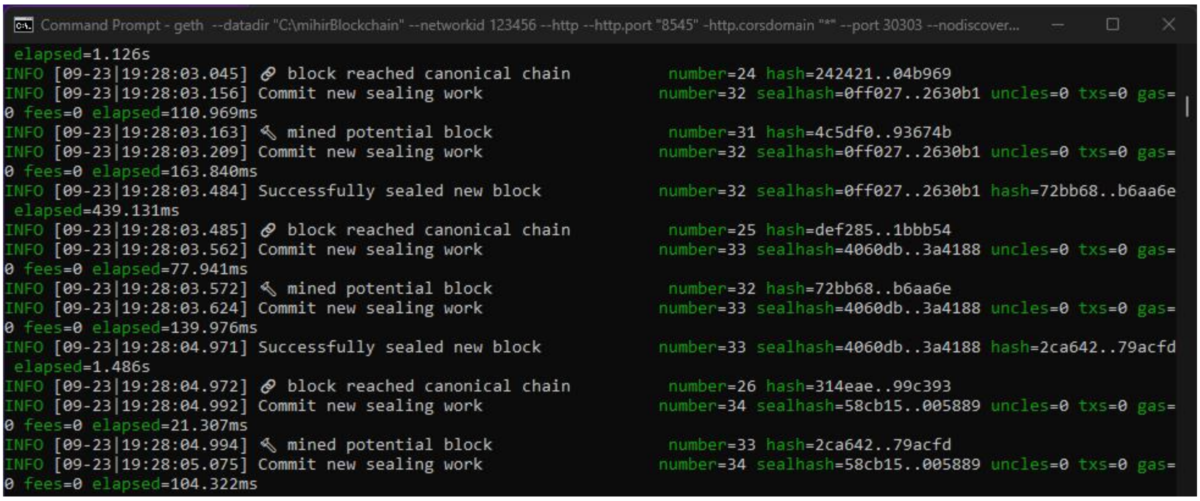
```
INFO [09-06|10:03:53.001] Updated mining threads                   threads=8
INFO [09-06|10:03:53.002] Transaction pool price threshold updated price=1,000,000,000
INFO [09-06|10:03:53.005] Commit new sealing work                  number=1 sealhash=e6a42d..414417 uncles=0 txs=0 gas=0 fees=0 elaps
ed=3.264ms
INFO [09-06|10:03:53.006] Commit new sealing work                  number=1 sealhash=e6a42d..414417 uncles=0 txs=0 gas=0 fees=0 elaps
ed=3.877ms
INFO [09-06|10:04:07.125] Successfully sealed new block            number=1 sealhash=e6a42d..414417 hash=c7dd09..d4199c elapsed=14.12
0s
INFO [09-06|10:04:07.127] 🔨 mined potential block                  number=1 hash=c7dd09..d4199c
INFO [09-06|10:04:07.129] Commit new sealing work                  number=2 sealhash=484b95..3f174a uncles=0 txs=0 gas=0 fees=0 elaps
ed=3.278ms
INFO [09-06|10:04:07.132] Commit new sealing work                  number=2 sealhash=484b95..3f174a uncles=0 txs=0 gas=0 fees=0 elaps
ed=6.578ms
INFO [09-06|10:04:07.991] Successfully sealed new block            number=2 sealhash=484b95..3f174a hash=032a0d..3e057a elapsed=862.3
24ms
INFO [09-06|10:04:07.991] 🔨 mined potential block                  number=2 hash=032a0d..3e057a
INFO [09-06|10:04:07.996] Commit new sealing work                  number=3 sealhash=fc2000..b31e25 uncles=0 txs=0 gas=0 fees=0 elaps
ed=5.488ms
INFO [09-06|10:04:07.997] Commit new sealing work                  number=3 sealhash=fc2000..b31e25 uncles=0 txs=0 gas=0 fees=0 elaps
ed=6.496ms
INFO [09-06|10:04:08.576] Successfully sealed new block            number=3 sealhash=fc2000..b31e25 hash=bc84b2..9bf510 elapsed=579.6
16ms
INFO [09-06|10:04:08.576] 🔨 mined potential block                  number=3 hash=bc84b2..9bf510
INFO [09-06|10:04:08.576] Commit new sealing work                  number=4 sealhash=f87384..74e0f1 uncles=0 txs=0 gas=0 fees=0 elaps
ed=0s
INFO [09-06|10:04:08.577] Commit new sealing work                  number=4 sealhash=f87384..74e0f1 uncles=0 txs=0 gas=0 fees=0 elaps
ed="668.6µs"
INFO [09-06|10:04:08.985] Successfully sealed new block            number=4 sealhash=f87384..74e0f1 hash=aad9e7..60ed50 elapsed=409.3
36ms
INFO [09-06|10:04:08.985] 🔨 mined potential block                  number=4 hash=aad9e7..60ed50
INFO [09-06|10:04:08.985] Commit new sealing work                  number=5 sealhash=4dd397..58c014 uncles=0 txs=0 gas=0 fees=0 elaps
ed=0s
```

- To end mining, type

  > miner.stop()

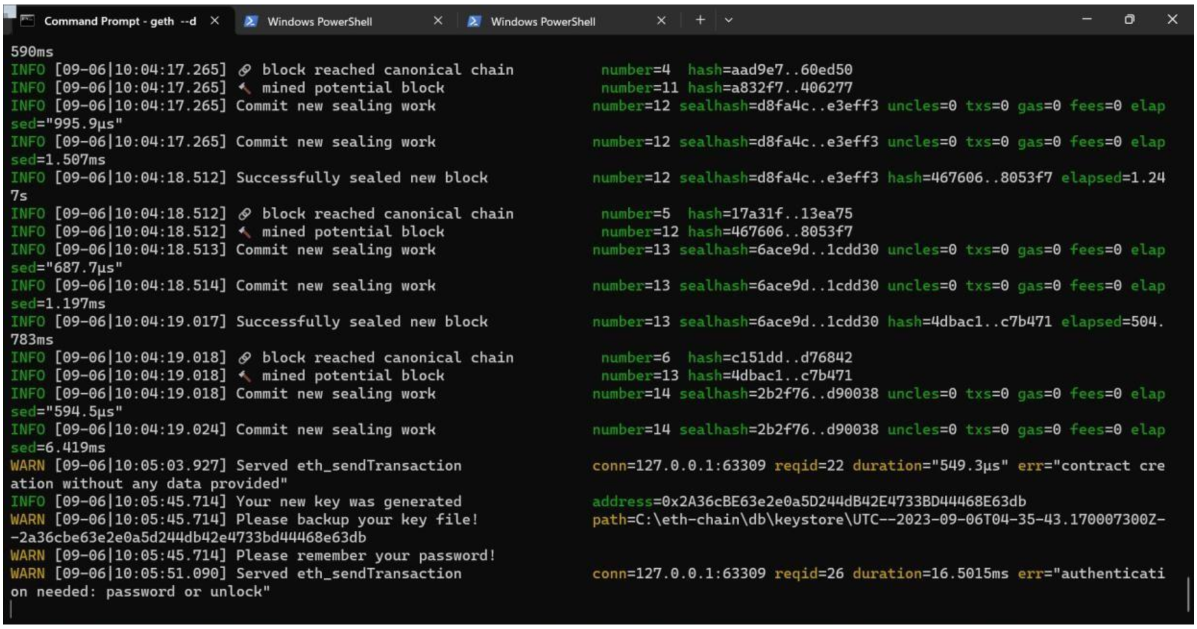


```
> miner.stop()
null
```



Command Prompt - geth --datadir "C:\mihirBlockchain" --networkid 123456 --http --http.port "8545" -http.corsdomain "*" --port 30303 --nodiscover...

```
 elapsed=1.126s
INFO [09-23|19:28:03.045] 🔗 block reached canonical chain          number=24 hash=242421..04b969
INFO [09-23|19:28:03.156] Commit new sealing work                  number=32 sealhash=0ff027..2630b1 uncles=0 txs=0 gas=
0 fees=0 elapsed=110.969ms
INFO [09-23|19:28:03.163] 🔨 mined potential block                  number=31 hash=4c5df0..93674b
INFO [09-23|19:28:03.209] Commit new sealing work                  number=32 sealhash=0ff027..2630b1 uncles=0 txs=0 gas=
0 fees=0 elapsed=163.840ms
INFO [09-23|19:28:03.484] Successfully sealed new block            number=32 sealhash=0ff027..2630b1 hash=72bb68..b6aa6e
 elapsed=439.131ms
INFO [09-23|19:28:03.485] 🔗 block reached canonical chain          number=25 hash=def285..1bbb54
INFO [09-23|19:28:03.562] Commit new sealing work                  number=33 sealhash=4060db..3a4188 uncles=0 txs=0 gas=
0 fees=0 elapsed=77.941ms
INFO [09-23|19:28:03.572] 🔨 mined potential block                  number=32 hash=72bb68..b6aa6e
INFO [09-23|19:28:03.624] Commit new sealing work                  number=33 sealhash=4060db..3a4188 uncles=0 txs=0 gas=
0 fees=0 elapsed=139.976ms
INFO [09-23|19:28:04.971] Successfully sealed new block            number=33 sealhash=4060db..3a4188 hash=2ca642..79acfd
 elapsed=1.486s
INFO [09-23|19:28:04.972] 🔗 block reached canonical chain          number=26 hash=314eae..99c393
INFO [09-23|19:28:04.992] Commit new sealing work                  number=34 sealhash=58cb15..005889 uncles=0 txs=0 gas=
0 fees=0 elapsed=21.307ms
INFO [09-23|19:28:04.994] 🔨 mined potential block                  number=33 hash=2ca642..79acfd
INFO [09-23|19:28:05.075] Commit new sealing work                  number=34 sealhash=58cb15..005889 uncles=0 txs=0 gas=
0 fees=0 elapsed=104.322ms
```



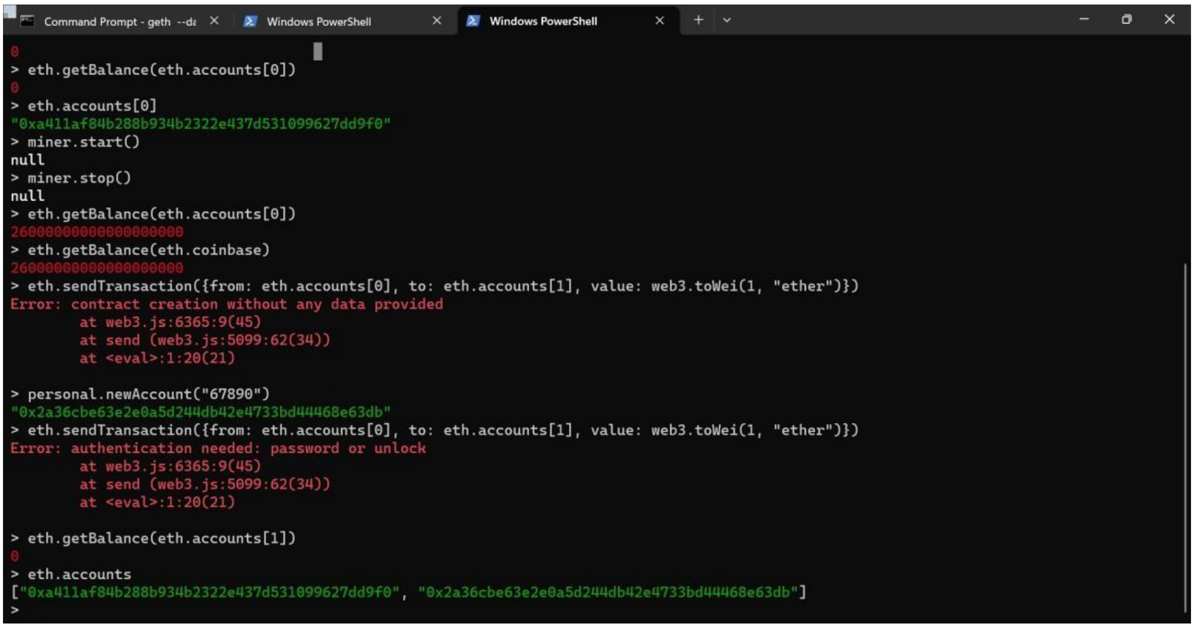
```
590ms
INFO [09-06|10:04:17.265] 🔗 block reached canonical chain          number=4  hash=aad9e7..60ed50
INFO [09-06|10:04:17.265] 🔨 mined potential block                  number=11 hash=a832f7..406277
INFO [09-06|10:04:17.265] Commit new sealing work                  number=12 sealhash=d8fa4c..e3eff3 uncles=0 txs=0 gas=0 fees=0 elap
sed="995.9µs"
INFO [09-06|10:04:17.265] Commit new sealing work                  number=12 sealhash=d8fa4c..e3eff3 uncles=0 txs=0 gas=0 fees=0 elap
sed=1.507ms
INFO [09-06|10:04:18.512] Successfully sealed new block            number=12 sealhash=d8fa4c..e3eff3 hash=467606..8053f7 elapsed=1.24
7s
INFO [09-06|10:04:18.512] 🔗 block reached canonical chain          number=5  hash=17a31f..13ea75
INFO [09-06|10:04:18.512] 🔨 mined potential block                  number=12 hash=467606..8053f7
INFO [09-06|10:04:18.513] Commit new sealing work                  number=13 sealhash=6ace9d..1cdd30 uncles=0 txs=0 gas=0 fees=0 elap
sed="687.7µs"
INFO [09-06|10:04:18.514] Commit new sealing work                  number=13 sealhash=6ace9d..1cdd30 uncles=0 txs=0 gas=0 fees=0 elap
sed=1.197ms
INFO [09-06|10:04:19.017] Successfully sealed new block            number=13 sealhash=6ace9d..1cdd30 hash=4dbac1..c7b471 elapsed=504.
783ms
INFO [09-06|10:04:19.018] 🔗 block reached canonical chain          number=6  hash=c151dd..d76842
INFO [09-06|10:04:19.018] 🔨 mined potential block                  number=13 hash=4dbac1..c7b471
INFO [09-06|10:04:19.018] Commit new sealing work                  number=14 sealhash=2b2f76..d90038 uncles=0 txs=0 gas=0 fees=0 elap
sed="594.5µs"
INFO [09-06|10:04:19.024] Commit new sealing work                  number=14 sealhash=2b2f76..d90038 uncles=0 txs=0 gas=0 fees=0 elap
sed=6.419ms
WARN [09-06|10:05:03.927] Served eth_sendTransaction               conn=127.0.0.1:63309 reqid=22 duration="549.3µs" err="contract cre
ation without any data provided"
INFO [09-06|10:05:45.714] Your new key was generated               address=0x2A36cBE63e2e0a5D244dB42E4733BD44468E63db
WARN [09-06|10:05:45.714] Please backup your key file!             path=C:\eth-chain\db\keystore\UTC--2023-09-06T04-35-43.170007300Z-
-2a36cbe63e2e0a5d244db42e4733bd44468e63db
WARN [09-06|10:05:45.714] Please remember your password!
WARN [09-06|10:05:51.090] Served eth_sendTransaction               conn=127.0.0.1:63309 reqid=26 duration=16.5015ms err="authenticati
on needed: password or unlock"
```

Step 11:

Transfer

1. Check your balance

> eth.getBalance(eth.coinbase)



```
0
> eth.getBalance(eth.accounts[0])
0
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.accounts[0])
26000000000000000000
> eth.getBalance(eth.coinbase)
26000000000000000000
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> personal.newAccount("67890")
"0x2a36cbe63e2e0a5d244db42e4733bd44468e63db"
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: authentication needed: password or unlock
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.accounts[1])
0
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0", "0x2a36cbe63e2e0a5d244db42e4733bd44468e63db"]
>
```

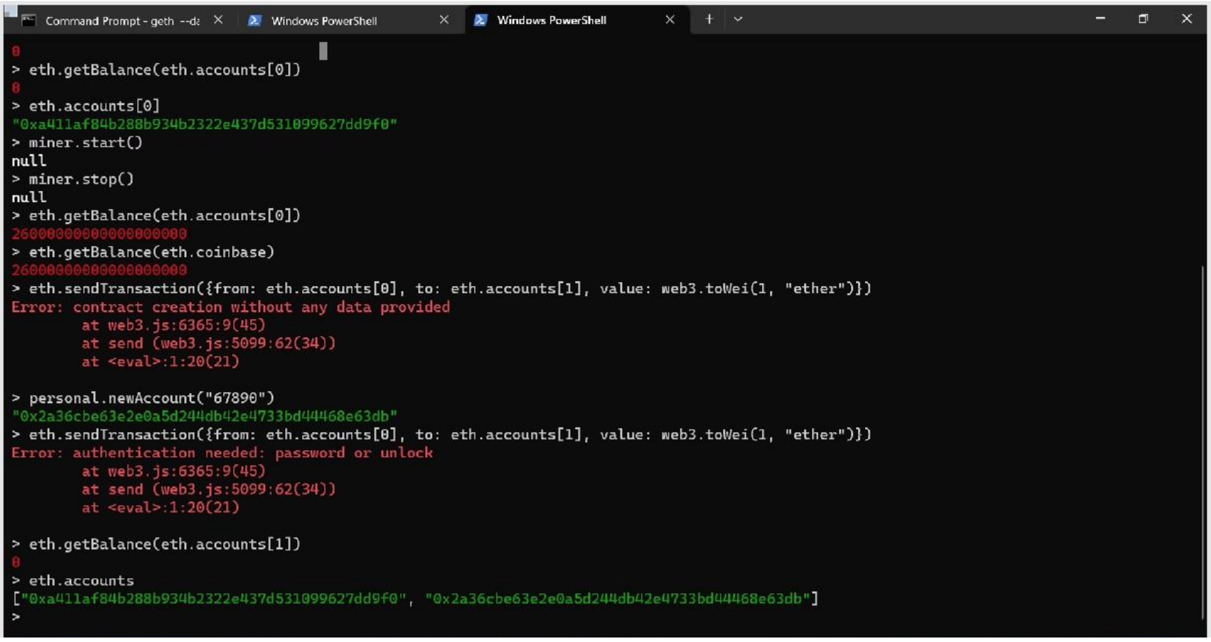
2. Transfer Ether, type:

> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})

OR

> eth.sendTransaction({from: 'your_first_account_address', to: 'your_second_account_address', value: web3.toWei(1, "ether")})

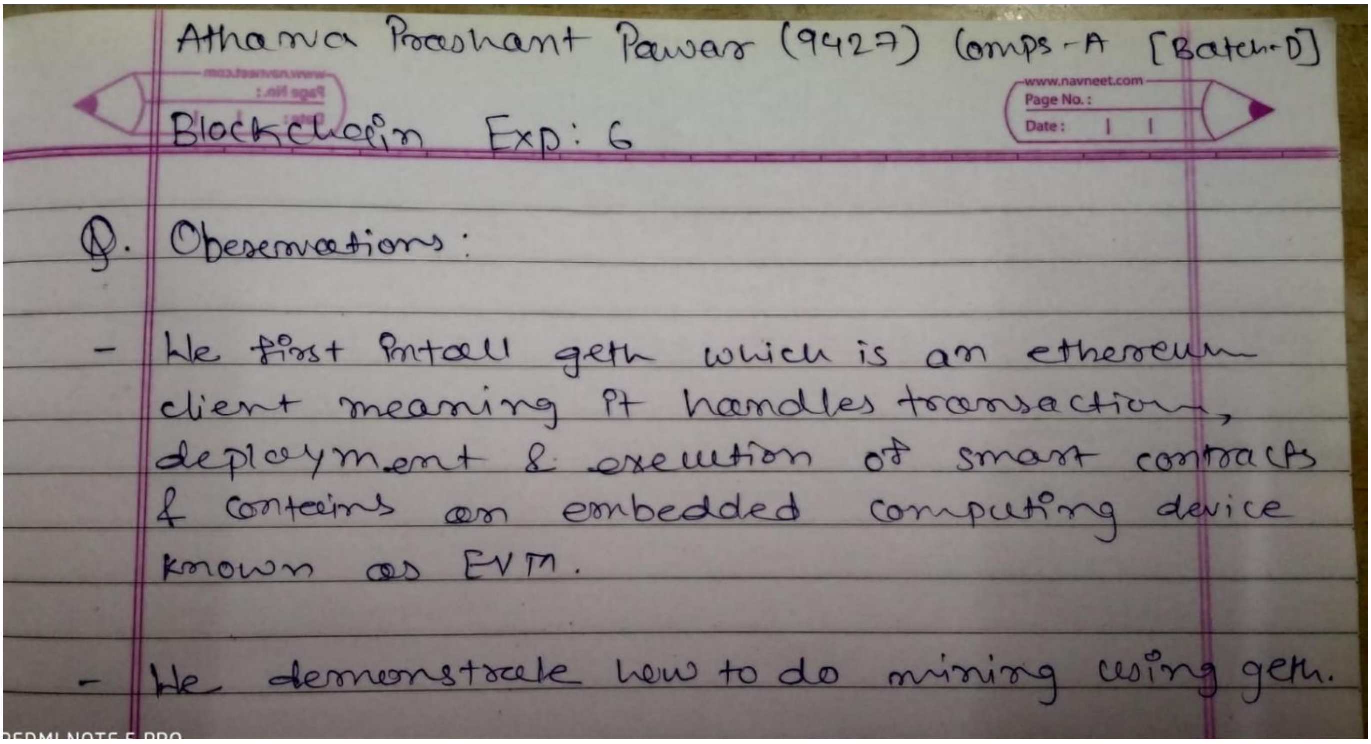
But you should get error like this.



```
0
> eth.getBalance(eth.accounts[0])
0
> eth.accounts[0]
"0xa411af84b288b934b2322e437d531099627dd9f0"
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.accounts[0])
26000000000000000000
> eth.getBalance(eth.coinbase)
26000000000000000000
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: contract creation without any data provided
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> personal.newAccount("67890")
"0x2a36cbe63e2e0a5d244db42e4733bd44468e63db"
> eth.sendTransaction({from: eth.accounts[0], to: eth.accounts[1], value: web3.toWei(1, "ether")})
Error: authentication needed: password or unlock
        at web3.js:6365:9(45)
        at send (web3.js:5099:62(34))
        at <eval>:1:20(21)

> eth.getBalance(eth.accounts[1])
0
> eth.accounts
["0xa411af84b288b934b2322e437d531099627dd9f0", "0x2a36cbe63e2e0a5d244db42e4733bd44468e63db"]
>
```

Actually, User have to unlock account first before transfer.

Conclusion: We have succesfully installed Geth and performed all the commands for various operations.



Atharva Prashant Pawar (9427) Comps-A [Batch-D]

Blockchain Exp: 6

Q. Obeservations:

- We first intall geth which is an ethereum client meaning it handles transaction, deployment & execution of smart contracts & contains an embedded computing device known as EVM.

- We demonstrate how to do mining using geth.