

Saurav Chaudhary

20184165

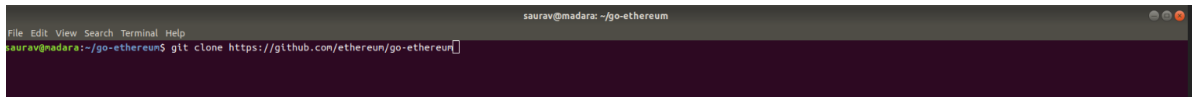
We will implement a digital bank using Ethereum Blockchain. Ethereum is an open-source, public, blockchain-based distributed computing platform. The systems will allow us to:

1. Make a cryptocurrency with a fixed market supply and tokens to represent real world asset values.
2. Create an autonomous private Blockchain with rules on spending money.
3. Mine for a new Ether by validating transactions.

Step 1 : Cloning Geth Code:

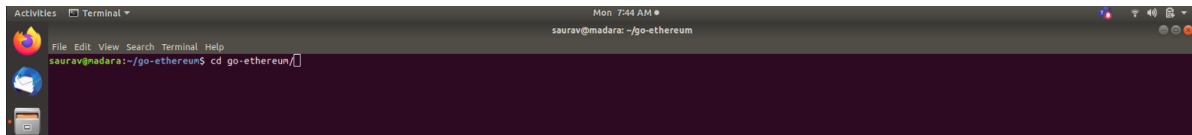
geth is the command line interface for running a full ethereum node implemented in Go.

```
Cloning the geth repository from github.  
$ git clone https://github.com/ethereum/go-ethereum
```



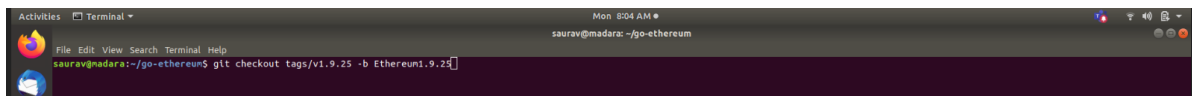
Step 2: Move to go-ethereum directory

```
$ cd go-ethereum
```



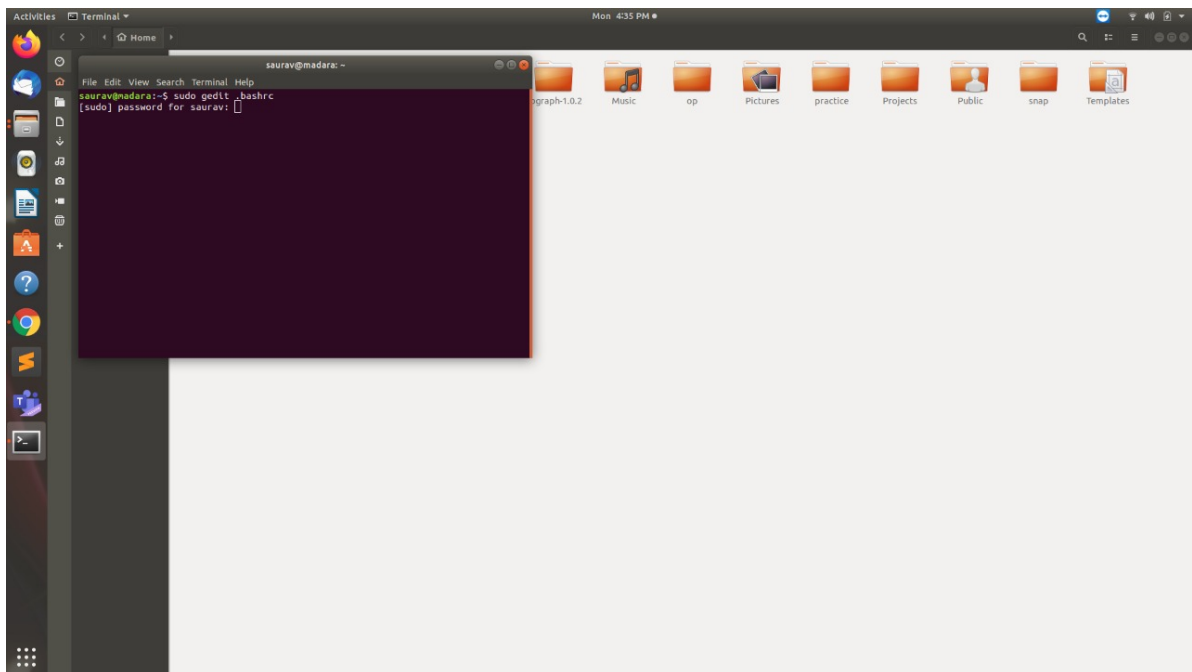
Step 3: Branch the latest version of geth.

```
$ git checkout tags/v1.9.25 -b EdurekaEthereumV1.9.25
```



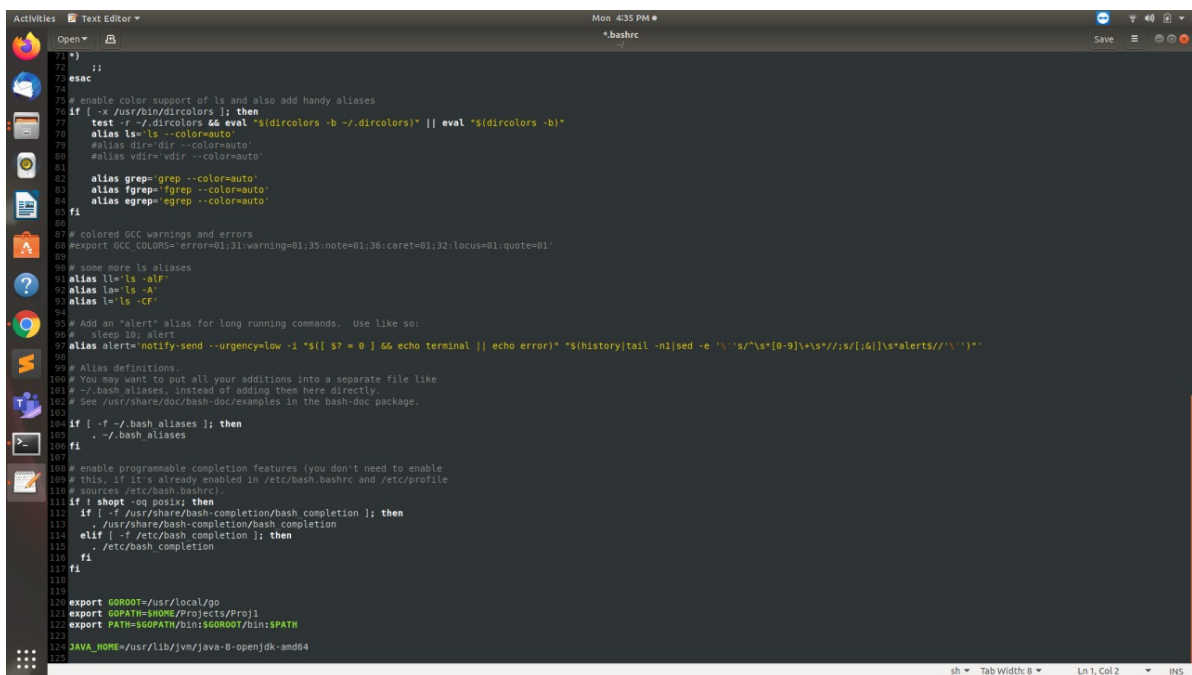
Step 4: Install go Language on system. Download it from internet. Extract the zip folder

```
sudo tar -xvf go1.15.8.linux-amd64.tar.gz
```



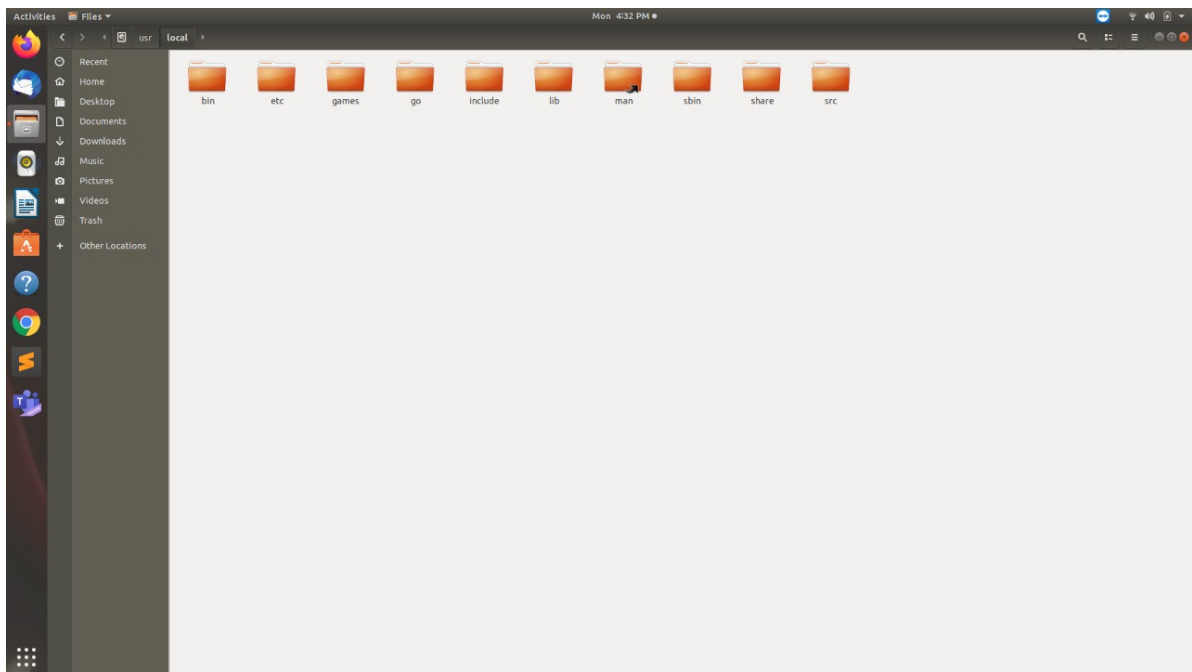
Step 5: Move the go folder to usr/local/

```
mv go usr/local
```



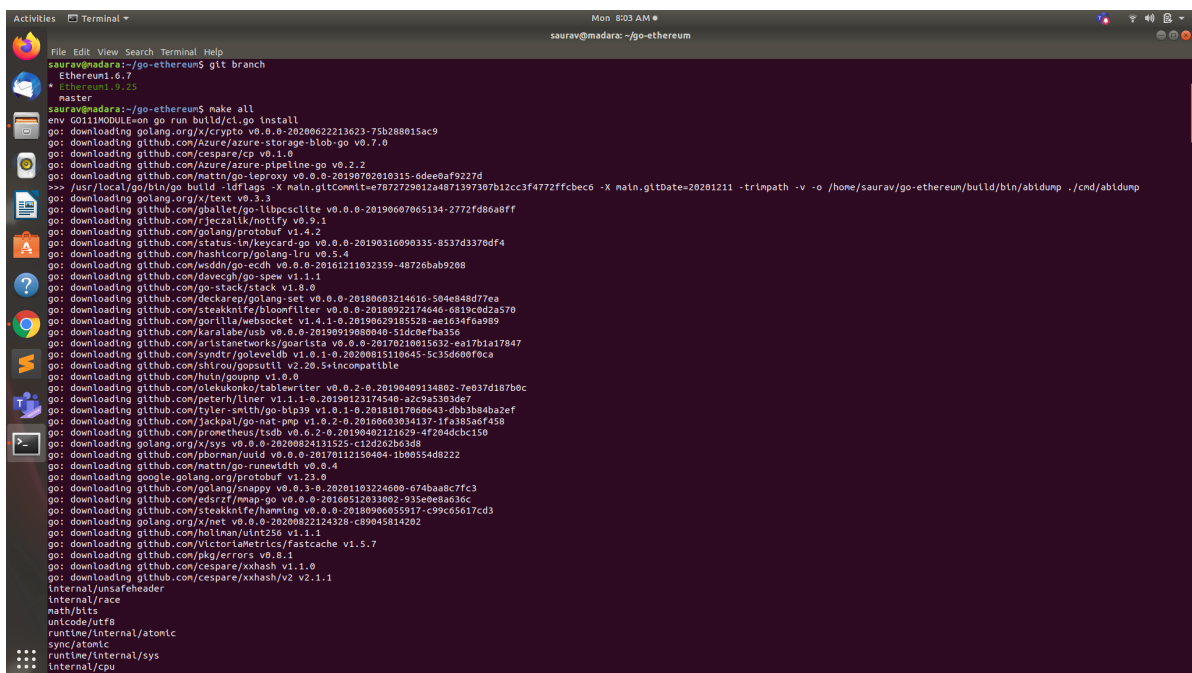
Step 6: Adjust the path in .bashrc

```
sudo gedit .bashrc
```



Step 7: Run this command

```
$ make all
```



Step 8: Creating Genesis Block

A genesis block is the first block of a block chain.

To create the genesis file, execute the following commands:

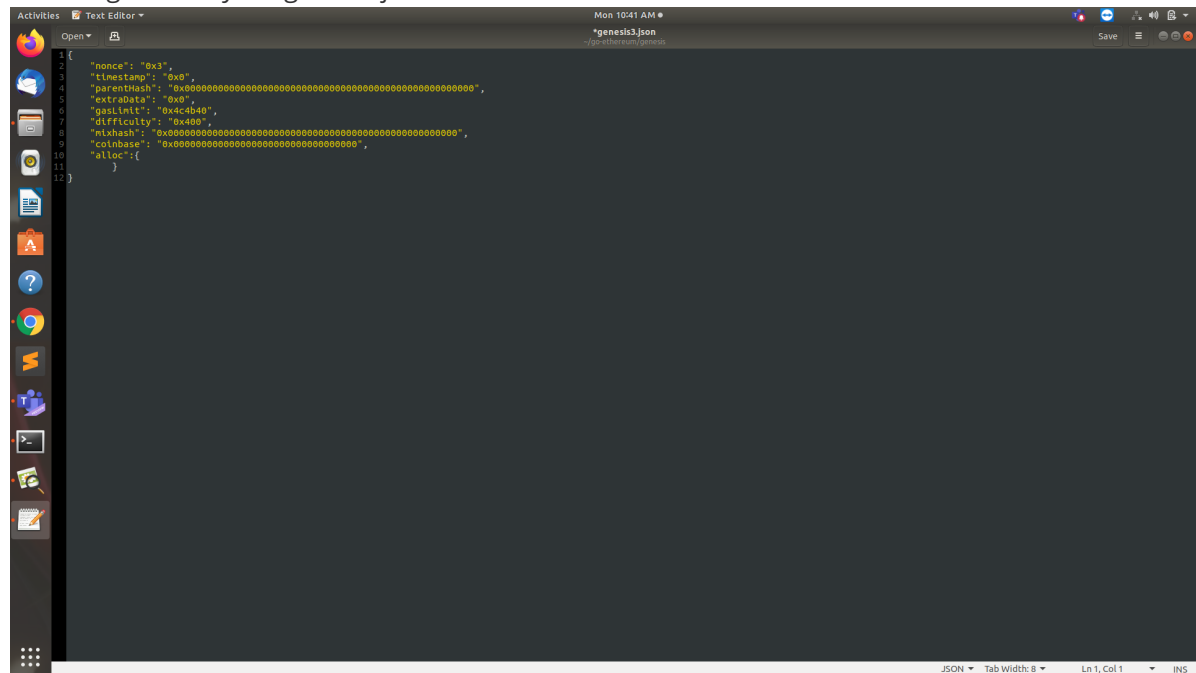
```
$ cd go-ethereum
$ mkdir genesis
$ cd genesis
```

Step 9: Step 5. Creating genesis.json in genesis folder

```
$ gedit genesis.json
```

This is like making Rules for our Blockchain

The rules for our Blockchain will be included in the genesis.json file we have created. Add the following code in your genesis.json file:

A screenshot of a text editor window titled "genesis3.json" showing the following JSON content:

```
1 {
2   "nonce": "0x0",
3   "timestamp": "0x0",
4   "parentHash": "0x0000000000000000000000000000000000000000000000000000000000000000",
5   "extraData": "0x0",
6   "gasLimit": "0x4c4b49",
7   "difficulty": "0x400",
8   "mixhash": "0x0000000000000000000000000000000000000000000000000000000000000000",
9   "coinbase": "0x00000000000000000000000000000000",
10  "alloc": {
11  }
12 }
```

Step 10: Now we need to initialize the blockchain.

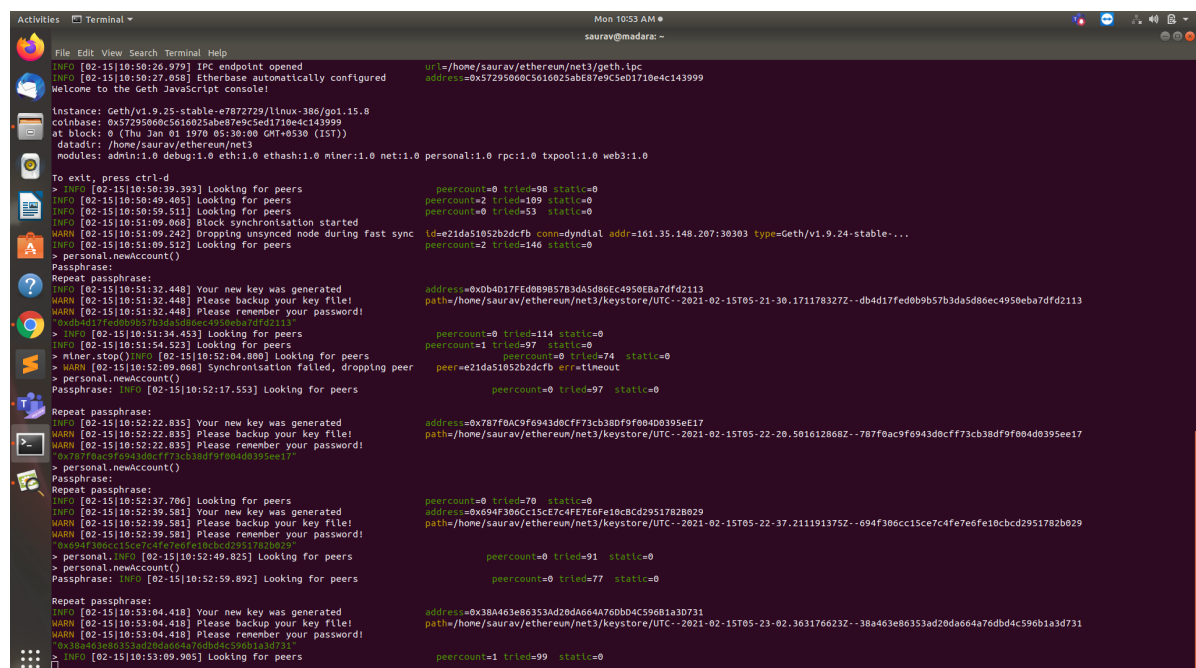
```
$ /home/saurav/go-ethereum/build/bin/geth --datadir ~/ethereum/net3 init
genesis/genesis3.json
```

Step 11: Run the geth console.

```
$ /home/saurav/go-ethereum/build/bin/geth --datadir ~/ethereum/net3/ --networkid
3 console
```

Step 12: Creating Accounts

personal.newAccount() : it creates a new account as part of your blockchain which has a specific wallet attached to it.

A screenshot of a terminal window showing the Geth console output. The output includes the following information:

```
INFO [02-15|10:50:26.979] IPC endpoint opened
INFO [02-15|10:50:27.059] Etherbase automatically configured
Welcome to the Geth JavaScript console!

Instance: Geth/v1.9.25-stable-47872729/linux-386/go1.15.8
coinbase: 0x57295060c5610025ab8e79c5ed1710e4c143999
at block: 0 (Thu Jan 01 1970 05:30:00 GMT+0530 (IST))
datadir: /home/saurav/ethereum/net3
modules: admin:1.0 debug:1.0 ethash: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
> info [02-15|10:50:39.393] Looking for peers peercount=0 tried=90 static=0
INFO [02-15|10:50:49.405] Looking for peers peercount=2 tried=109 static=0
INFO [02-15|10:50:59.511] Looking for peers peercount=0 tried=53 static=0
INFO [02-15|10:51:09.608] Block synchronisation started
WARN [02-15|10:51:09.242] Dropping unsynced node during fast sync id=e21da51052b2dcfb conn=dyndial addr=101.35.148.207:30303 type=Geth/v1.9.24-stable-...
INFO [02-15|10:51:09.512] Looking for peers peercount=2 tried=146 static=0
> personal.newAccount()
Passphrase:
Repeat passphrase:
INFO [02-15|10:51:32.448] Your new key was generated address=0xb040177fed0b9b57b3da5d86ec4950eba7dfd2113
WARN [02-15|10:51:32.448] Please backup your key file! path=/home/saurav/ethereum/net3/keystore/UTC--2021-02-15T05-21-30.1711783272--db4d17fed0b9b57b3da5d86ec4950eba7dfd2113
WARN [02-15|10:51:32.448] Please remember your password!
> info [02-15|10:51:34.453] Looking for peers peercount=0 tried=114 static=0
INFO [02-15|10:51:54.523] Looking for peers peercount=1 tried=97 static=0
> miner.stop() INFO [02-15|10:52:04.800] Looking for peers peercount=0 tried=74 static=0
> WARN [02-15|10:52:09.466] Synchronisation failed, dropping peer peer=e21da51052b2dcfb err=timeout
> personal.newAccount()
Passphrase: INFO [02-15|10:52:17.553] Looking for peers peercount=0 tried=97 static=0
Repeat passphrase:
INFO [02-15|10:52:22.835] Your new key was generated address=0x787f0ac9f6943dcff73cb38df9f084d0395ee17
WARN [02-15|10:52:22.835] Please backup your key file! path=/home/saurav/ethereum/net3/keystore/UTC--2021-02-15T05-22-26.501612808Z--787f0ac9f6943dcff73cb38df9f084d0395ee17
WARN [02-15|10:52:22.835] Please remember your password: "0x787f0ac9f6943dcff73cb38df9f084d0395ee17"
> personal.newAccount()
Passphrase:
Repeat passphrase:
INFO [02-15|10:52:37.706] Looking for peers peercount=0 tried=70 static=0
INFO [02-15|10:52:39.581] Your new key was generated address=0xb4643e86353ad2bd4664476dbd4c596b1a3d731
WARN [02-15|10:52:39.581] Please backup your key file! path=/home/saurav/ethereum/net3/keystore/UTC--2021-02-15T05-22-37.211191375Z--b4643e86353ad2bd4664476dbd4c596b1a3d731
WARN [02-15|10:52:39.581] Please remember your password: "0xb4643e86353ad2bd4664476dbd4c596b1a3d731"
> personal.newAccount()
Passphrase: INFO [02-15|10:52:49.825] Looking for peers peercount=0 tried=91 static=0
Repeat passphrase:
INFO [02-15|10:52:49.892] Looking for peers peercount=0 tried=77 static=0
INFO [02-15|10:52:53.041] Your new key was generated address=0x38a463e86353ad2bd4664476dbd4c596b1a3d731
WARN [02-15|10:53:04.418] Please backup your key file! path=/home/saurav/ethereum/net3/keystore/UTC--2021-02-15T05-23-02.363176623Z--38a463e86353ad2bd4664476dbd4c596b1a3d731
WARN [02-15|10:53:04.418] Please remember your password: "0x38a463e86353ad2bd4664476dbd4c596b1a3d731"
INFO [02-15|10:53:09.905] Looking for peers peercount=1 tried=99 static=0
```

eth.accounts: It helps you check the various accounts which are part of your blockchain.

Step 14:

```
Activities Terminal Mon 10:54 AM saurav@madara: ~  
File Edit View Search Terminal Help  
> personal.newAccount()  
Passphrase:  
Repeat passphrase:  
INFO [02-15:10:53:37.706] Looking for peers peercount=0 tried=70 static=0  
INFO [02-15:10:53:39.581] Your new key was generated address=0x94f306cc15ce7c4fe7f6e10c8d2951782b29  
WARN [02-15:10:53:39.581] Please backup your key file! path=/home/saurav/etheruymn3/keystore/UTC--2021-02-15T05-22-37.211191375Z--694f306cc15ce7c4fe7f6e10c8d2951782b29  
WARN [02-15:10:53:39.581] Please remember your password!  
WARN [02-15:10:53:39.581] Please remember your password!  
> personal.newAccount()  
INFO [02-15:10:52:49.825] Looking for peers peercount=0 tried=91 static=0  
> personal.newAccount()  
INFO [02-15:10:52:49.892] Looking for peers peercount=0 tried=77 static=0  
Passphrase:  
Repeat passphrase:  
INFO [02-15:10:53:04.418] Your new key was generated address=0x30A66308633ad2da66476dbd4c596b1a3d731  
WARN [02-15:10:53:04.418] Please backup your key file! path=/home/saurav/etheruymn3/keystore/UTC--2021-02-15T05-23-02.363176623Z--38A66308633ad2da66476dbd4c596b1a3d731  
WARN [02-15:10:53:04.418] Please remember your password!  
WARN [02-15:10:53:04.418] Please remember your password!  
> INFO [02-15:10:53:09.985] Looking for peers peercount=1 tried=99 static=0  
INFO [02-15:10:53:19.976] Looking for peers peercount=1 tried=90 static=0  
INFO [02-15:10:53:30.971] Looking for peers peercount=0 tried=90 static=0  
INFO [02-15:10:53:40.975] Looking for peers peercount=0 tried=99 static=0  
INFO [02-15:10:53:51.344] Looking for peers peercount=0 tried=102 static=0  
INFO [02-15:10:54:02.356] Looking for peers peercount=0 tried=68 static=0  
> eth.accounts  
undefined  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> INFO [02-15:10:54:12.369] Looking for peers peercount=0 tried=102 static=0  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}]  
> eth.accounts  
[{"x": "0x25b06c16025ab07e9c5ed1710e41c13999", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac9f6943d0cfff73cb38df9f084d0395ee17", "v": "0xe94f306cc15ce7c4fe7f6e10c8d2951782b29"}, {"x": "0x38a46308633ad2da66476dbd4c596b1a3d731", "y": "0x8d8c4decacae2547014b2491b7eb35f2086", "z": "0xbd417fed0b957b3da5d80ec4950eba70fd2113", "w": "0x787f0ac
```

Step 15: `miner.start()`: this function is used to start the mining process.

```
Activities Terminal Mon 12:04 PM saurav@madara: ~/go-ethereum
File Edit View Search Terminal Help
> eth.accounts
[0x57290906510025ab079c5ed170ec143999", "0x8dbcc46eccacae2454704b2491b7eb35f2080", "0xb04d177fed0b0b57b3da5d8ec4950eba7df2113", "0x707f0ac9f0943dcff73cb38df9f04d0395ee17", "0x094f30ccc15ce7c4
7ef7efeb3bdc2951702b029", "0x38a4638855ad20da64a7dbd4c596b1a3d731", "0x4bc7120747a7781356bcbcb3f832f69657c339d", "0xa9030f52c3faece334ee7658960be0340fadab9"]
> miner.start() INFO [02-15|11:55:27.632] Looking for peers peercount=0 tried=83 static=0
INFO [02-15|11:55:27.697] Updated mining threads threads=8
INFO [02-15|11:55:27.697] Transaction pool price threshold updated price=1000000000
null
> INFO [02-15|11:55:27.698] Commit new mining work number=1 sealhash="9fb1a1_3381ca" uncles=0 txs=0 gas=0 fees=0 elapsed="828.543us"
> INFO [02-15|11:55:38.727] Looking for peers peercount=2 tried=26 static=0
INFO [02-15|11:55:48.981] Looking for peers peercount=1 tried=17 static=0
INFO [02-15|11:55:59.263] Looking for peers peercount=0 tried=41 static=0
INFO [02-15|11:56:09.386] Looking for peers peercount=0 tried=1 static=0
INFO [02-15|11:56:19.387] Looking for peers peercount=2 tried=14 static=0
INFO [02-15|11:56:29.545] Looking for peers peercount=0 tried=66 static=0
INFO [02-15|11:56:41.143] Looking for peers peercount=0 tried=5 static=0
INFO [02-15|11:56:51.407] Looking for peers peercount=1 tried=82 static=0
INFO [02-15|11:57:01.534] Looking for peers peercount=0 tried=14 static=0
INFO [02-15|11:57:11.623] Looking for peers peercount=0 tried=112 static=0
INFO [02-15|11:57:19.611] Block synchronisation started
INFO [02-15|11:57:19.612] Mining aborted due to sync
WARN [02-15|11:57:20.184] Dropping unsynced node during fast sync id=e21da51052b2dcfb conn=dyndial addr=161.35.148.207:30303 type=Geth/v1.9.24-stable-...
INFO [02-15|11:57:32.492] Looking for peers peercount=0 tried=13 static=0
INFO [02-15|11:57:44.582] Looking for peers peercount=0 tried=94 static=0
> eth.hashrate
WARN [02-15|11:57:55.484] Looking for peers peercount=0 tried=102 static=0
INFO [02-15|11:58:07.789] Looking for peers peercount=0 tried=96 static=0
WARN [02-15|11:58:19.630] Synchronisation failed, dropping peer peer=e21da51052b2dcfb err=timeout
INFO [02-15|11:58:19.630] Commit new mining work number=1 sealhash="134fae_0e5d5d" uncles=0 txs=0 gas=0 fees=0 elapsed="308.527us"
INFO [02-15|11:58:30.406] Looking for peers peercount=0 tried=100 static=0
WARN [02-15|11:58:35.005] Dropping unsynced node during fast sync id=400115fd6d277021 conn=dyndial addr=206.81.16.181:30303 type=Geth/v1.9.25-stable-...
INFO [02-15|11:59:11.606] Looking for peers peercount=0 tried=75 static=0
INFO [02-15|11:59:21.615] Looking for peers peercount=2 tried=91 static=0
INFO [02-15|11:59:31.624] Looking for peers peercount=1 tried=79 static=0
INFO [02-15|11:59:42.617] Looking for peers peercount=0 tried=118 static=0
INFO [02-15|11:59:52.666] Looking for peers peercount=0 tried=106 static=0
INFO [02-15|12:00:03.624] Looking for peers peercount=0 tried=65 static=0
INFO [02-15|12:00:13.640] Looking for peers peercount=0 tried=57 static=0
INFO [02-15|12:00:23.681] Looking for peers peercount=0 tried=53 static=0
INFO [02-15|12:00:33.794] Looking for peers peercount=0 tried=102 static=0
INFO [02-15|12:00:46.640] Looking for peers peercount=0 tried=106 static=0
INFO [02-15|12:00:56.690] Looking for peers peercount=0 tried=70 static=0
INFO [02-15|12:01:06.710] Looking for peers peercount=0 tried=90 static=0
INFO [02-15|12:01:16.713] Looking for peers peercount=0 tried=99 static=0
INFO [02-15|12:01:26.733] Looking for peers peercount=0 tried=57 static=0
INFO [02-15|12:01:36.828] Looking for peers peercount=0 tried=84 static=0
INFO [02-15|12:01:46.878] Looking for peers peercount=0 tried=97 static=0
INFO [02-15|12:01:56.910] Looking for peers peercount=0 tried=94 static=0
INFO [02-15|12:02:06.923] Looking for peers peercount=2 tried=89 static=0
```

Step 16: `miner.stop()` Stop the mining operation.

```
edureka@localhost: ~/go-ethereum/genesis
I0728 11:03:28.551215 miner/unconfirmed.go:105] ⚡ mined block #3359 [fdd7727a...] reached canonical chain
I0728 11:03:28.551322 miner/unconfirmed.go:83] ⚡ mined potential block #3364 [79f552ca...], waiting for 5 blocks to confirm
I0728 11:03:28.551571 miner/worker.go:517] commit new work on block 3365 with 0 txs & 0 uncles. To ok 191.371µs
I0728 11:03:55.142466 miner/unconfirmed.go:105] ⚡ mined block #3360 [ee6f23d4...] reached canonical chain
I0728 11:03:55.142551 miner/unconfirmed.go:83] ⚡ mined potential block #3365 [f4c263fd...], waiting for 5 blocks to confirm
I0728 11:03:55.142726 miner/worker.go:517] commit new work on block 3366 with 0 txs & 0 uncles. To ok 106.484µs
I0728 11:04:22.432084 miner/unconfirmed.go:105] ⚡ mined block #3361 [2faf6e87...] reached canonical chain
I0728 11:04:22.432205 miner/unconfirmed.go:83] ⚡ mined potential block #3366 [0a714da8...], waiting for 5 blocks to confirm
I0728 11:04:22.432371 miner/worker.go:517] commit new work on block 3367 with 0 txs & 0 uncles. To ok 113.425µs
I0728 11:05:01.763483 miner/unconfirmed.go:105] ⚡ mined block #3362 [d0b19f7c...] reached canonical chain
I0728 11:05:01.771803 miner/unconfirmed.go:83] ⚡ mined potential block #3367 [4acaaafb5...], waiting for 5 blocks to confirm
I0728 11:05:01.763703 miner/worker.go:517] commit new work on block 3368 with 0 txs & 0 uncles. To ok 117.194µs
> miner.stop()
true
```

eth.blockNumber(): executing this command after the mining process tells you at which block number you are at after performing the mining operation

eth.getBalance: ("account number"): this command is used to check the ether balance in the specified account