Lab 11 - Blockchain

Lab 11 Template

1) Part 1:
   a. **Screenshot of the genesis block**
      (5 points)

      ```
      cpre331@cpre331:~/labs/lab11$ cat genesis.json
      {
        "config": {
              "chainId": 331,
              "homesteadBlock": 0,
              "eip150Block": 0,
              "eip155Block": 0,
              "eip158Block": 0,
              "byzantiumBlock": 0,
              "constantinopleBlock": 0,
              "petersburgBlock": 0,
              "istanbulBlock": 0,
              "berlinBlock": 0,
              "ethash": {}
      },
        "alloc"       : {},
        "coinbase"    : "0x0000000000000000000000000000000000000000",
        "difficulty"  : "0x2000",
        "extraData"   : "",
        "gasLimit"    : "0x2fefdf",
        "nonce"       : "0x0000000000000331",
        "mixhash"     : "0x0000000000000000000000000000000000000000000000000000000000000000",
        "parentHash"  : "0x0000000000000000000000000000000000000000000000000000000000000000",
        "timestamp"   : "0x00"
      }
      cpre331@cpre331:~/labs/lab11$
      ```
      -

2) Part 2:
   a. **Screenshot of bootnode identifier**
      (5 points)
      -
      ```
      cpre331@cpre331:~/labs/lab11$ cat bootnode
      enode://64ba603fb8decd7bf6cf499b2c01d8268a3c0a317303160946a6ff0d152b5dd1fd0a66be4fd27c26200c27bef28455b9
      744254802ef451a580bad68e928818e5@34.18.12.150:30301
      ```

      ```
      cpre331@cpre331:~/labs/lab11$ geth --datadir data --networkid 331 --bootnodes "`cat bootnode`" console 2>cons
      ole.log
      Welcome to the Geth JavaScript console!

      instance: Geth/v1.10.10-stable-bb74230f/linux-amd64/go1.17.2
      at block: 0 (Wed Dec 31 1969 18:00:00 GMT-0600 (CST))
       datadir: /home/cpre331/labs/lab11/data
       modules: admin:1.0 debug:1.0 eth: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 or type exit
      >
      ```
      -

   b. **Individual node's identifier with Ubuntu desktop's IP address**
      (15 points)
      - INFO [11-11|15:43:25.925] Started P2P networking
        self=enode://4e8ea6b07ebabf73e109e29c7efc2a68b3895ab3f9d3ec63d3
        f283750c5ce3482028389c3e5fd989e686f7b3fe3eb54692012cec23f6ceb
        2e34d42e09a5994e4@177.110.34.1:30303

c. Screenshot of peer node list
(10 points)

```
> admin.peers
[{
    caps: ["eth/66", "snap/1"],
    enode: "enode://72d606d9b82e6a7aa1064bc4e1760b9c8cbdd647b9fdecddb3d5d2549fb3dc868b45e4cd0e463a1bc7d53f8fe
2f8b8415f53444bcd78e96af5bbd1511f7e5d5b@34.18.12.150:30304",
    id: "7d97f8dbacb5d3d7216cc6ae7ee0d2df0b5ec2bc485b2e9102c1976613cb540c",
    name: "Geth/v1.10.10-stable-bb74230f/linux-amd64/go1.17.2",
    network: {
      inbound: false,
      localAddress: "77.110.34.1:53666",
      remoteAddress: "34.18.12.150:30304",
      static: true,
      trusted: false
    },
    protocols: {
      eth: {
        difficulty: 66191008193,
        head: "0xb0108ac274011d949e7ae60725d769d98e76fd953a215ee9534c5283ea1b5aee",
        version: 66
      },
      snap: {
        version: 1
      }
    }
}]
```

3) Part 3:

a. Screenshot of balance
(5 points)

```
> eth.getBalance(eth.accounts[0])
3562500000000000000
```

b. Screenshot of balance two minutes later
(5 points)

```
> eth.getBalance(eth.accounts[0])
16062478999999900000
```

4) Part 4:

a. Screenshot of transaction
(10 points)

```
> eth.getTransaction("0xd3307d99a4bedf75eab2e1e50143ff147d721b7bef084d4bca3bad95f3a697a4")
{
  blockHash: "0x78842c94ad1c55f8f05a1eb29e2f7c27861538e5bbb0fb626dfd8c90aa34624c",
  blockNumber: 42482,
  from: "0xc5164f4c714b69966613cfaf5ed740a706da1deb",
  gas: 21000,
  gasPrice: 1000000000,
  hash: "0xd3307d99a4bedf75eab2e1e50143ff147d721b7bef084d4bca3bad95f3a697a4",
  input: "0x",
  nonce: 1,
  r: "0xff4327d57e49e4ce17e1c83d30761195fcb4086441e8f91c6d5d96901f8fa68c",
  s: "0xb025607716f9ae21fee2e99e88837d204091d96f2273d0712c2dac170806114",
  to: "0xb9714a1070c92f88b6187d1b2ae9496e2883cb41",
  transactionIndex: 0,
  type: "0x0",
  v: "0x2ba",
  value: 300000
}
```

b. **Screenshot of transaction block**
(5 points)

```
> eth.getBlock(42482)
{
  difficulty: 2163421,
  extraData: "0xd883010a0a846765746888676f312e31372e32856c696e7578",
  gasLimit: 8000000,
  gasUsed: 21000,
  hash: "0x78842c94ad1c55f8f05a1eb29e2f7c27861538e5bbb0fb626dfd8c90aa34624c",
  logsBloom: "0x000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000",
  miner: "0xc5164f4c714b69966613cfaf5ed740a706da1deb",
  mixHash: "0x31973f3a5f8ba53934290b3c883f6a9afebe74292f3216b29019b11b1fc308c3",
  nonce: "0x6a28a0ad9dd36e83",
  number: 42482,
  parentHash: "0xdb7909ed9df8e1bc4a233decb4d1c8f648371931ae840aae7f49b8f70d9a2b3a",
  receiptsRoot: "0x056b23fbba480696b65fe5a59b8f2148a1299103c4f57df839233af2cf4ca2d2",
  sha3Uncles: "0x1dcc4de8dec75d7aab85b567b6ccd41ad312451b948a7413f0a142fd40d49347",
  size: 647,
  stateRoot: "0x7de44b44ffba7594ff2f35c04871444a408fbd001f30faea9fd1568d1d14e4c0",
  timestamp: 1699820076,
  totalDifficulty: 78305302381,
  transactions: ["0xd3307d99a4bedf75eab2e1e50143ff147d721b7bef084d4bca3bad95f3a697a4"],
  transactionsRoot: "0x78acbc54806b836939439693f213258953cfb0a2457d644f37e9d0632533db7d",
  uncles: []
}
```

```
> eth.getBlock('latest', true)
{
  difficulty: 2145513,
  extraData: "0xd883010a0a846765746888676f312e31372e32856c696e7578",
  gasLimit: 8000000,
  gasUsed: 0,
  hash: "0x426e1bb6930fc3c798035681269f07677d679793b18a8e4534776b32e52f8e30",
  logsBloom: "0x0000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000",
  miner: "0xc5164f4c714b69966613cfaf5ed740a706da1deb",
  mixHash: "0xa04e4dcf02b108df176c2746de96a56d8a84c12d73e3de1c7e0acea7949c0552",
  nonce: "0x4491fe0931565d0f",
  number: 42487,
  parentHash: "0xee5723b37fa75482c5d160f108696f13cd2a8101226a8c05ba0c14bebbd10802",
  receiptsRoot: "0x56e81f171bcc55a6ff8345e692c0f86e5b48e01b996cadc001622fb5e363b421",
  sha3Uncles: "0x1dcc4de8dec75d7aab85b567b6ccd41ad312451b948a7413f0a142fd40d49347",
  size: 538,
  stateRoot: "0xd496b6d076bd7e1aec2d07c3f5babd450f88d9f64fd57a0daf75628c60d837b1",
  timestamp: 1699820289,
  totalDifficulty: 78316052010,
  transactions: [],
  transactionsRoot: "0x56e81f171bcc55a6ff8345e692c0f86e5b48e01b996cadc001622fb5e363b421",
  uncles: []
}
```

-

c. **Screenshot of "final" balance after transactions**
   (10 points)

```
> eth.getBalance(eth.accounts[0])
32062478999999600000
```

-

d. **How many US dollars would this translate to?**
   (10 points)
   - 1 eth = 1.69 usd
   - 54522761252801220000 usd

5) Part 5:

   a. **Screenshot of latest block number**
      (10 points)

```
> eth.blockNumber
42487
```

   -

   b. **Screenshot of minedBlocks output**
      (10 points)

```
> minedBlocks(1000, eth.coinbase);
[42489, 42488, 42487, 42486, 42485, 42484, 42483, 42482, 42481, 42480, 42479, 42478, 42477
, 42476, 42475, 42474, 42473, 42452, 42451, 42450]
```

   -