DA51 Lab Session 2: The Geth client

Question 5:

```
PS C:\dev\lab-session-2> geth --datadir node1 account new
INFO [09-18|14:07:15.461] Maximum peer count                          ETH=50 total=50
Your new account is locked with a password. Please give a password. Do not forget this password.
Password:
Repeat password:

Your new key was generated

Public address of the key:   0x547a58C011f6121F913C378F7338B95A43526353
Path of the secret key file: node1\keystore\UTC--2024-09-18T12-07-19.616153200Z--547a58c011f6121f913c378f7338b95a4352635
3

- You can share your public address with anyone. Others need it to interact with you.
- You must NEVER share the secret key with anyone! The key controls access to your funds!
- You must BACKUP your key file! Without the key, it's impossible to access account funds!
- You must REMEMBER your password! Without the password, it's impossible to decrypt the key!
```

The command creates a keyfile that is stored in the keystore path

Question 10:

La commande initialise la base de données. Pour connecter les deux nodes plus tard, il faut faire cette initialisation dans les deux répertoires.

```
PS C:\dev\lab-session-2> geth init --datadir node1 genesis.json
INFO [09-18|16:15:57.383] Maximum peer count                  ETH=50 total=50
WARN [09-18|16:15:57.391] Lowering memory allowance on 32bit arch  available=8026 addressable=2048
WARN [09-18|16:15:57.391] Sanitizing cache to Go's GC limits       provided=1024 updated=682
INFO [09-18|16:15:57.393] Set global gas cap                       cap=50,000,000
INFO [09-18|16:15:57.393] Initializing the KZG library             backend=gokzg
INFO [09-18|16:15:57.750] Defaulting to pebble as the backing database
INFO [09-18|16:15:57.750] Allocated cache and file handles         database=C:\dev\lab-session-2\node1\geth\chaindata cache=16.00MiB handles=16
INFO [09-18|16:15:57.800] Opened ancient database                  database=C:\dev\lab-session-2\node1\geth\chaindata\ancient/chain readonly=false
INFO [09-18|16:15:57.801] State schema set to default              scheme=hash
INFO [09-18|16:15:57.802] Writing custom genesis block
INFO [09-18|16:15:57.806] Persisted trie from memory database      nodes=3 size=405.00B time=2.1806ms gcnodes=0 gcsize=0.00B gctime=0s livenodes=0 livesize=0.00B
INFO [09-18|16:15:57.826] Successfully wrote genesis state         database=chaindata hash=166a0e..3ccd7f
INFO [09-18|16:15:57.826] Defaulting to pebble as the backing database
INFO [09-18|16:15:57.826] Allocated cache and file handles         database=C:\dev\lab-session-2\node1\geth\lightchaindata cache=16.00MiB handles=16
INFO [09-18|16:15:57.889] Opened ancient database                  database=C:\dev\lab-session-2\node1\geth\lightchaindata\ancient/chain readonly=false
INFO [09-18|16:15:57.890] State schema set to default              scheme=hash
INFO [09-18|16:15:57.890] Writing custom genesis block
INFO [09-18|16:15:57.893] Persisted trie from memory database      nodes=3 size=405.00B time=2.6261ms gcnodes=0 gcsize=0.00B gctime=0s livenodes=0 livesize=0.00B
INFO [09-18|16:15:57.909] Successfully wrote genesis state         database=lightchaindata hash=166a0e..3ccd7f
```

Question 12:

```
PS C:\dev\lab-session-2> bootnode -nodekey boot.key -addr :30305
enode://ec572066a2059f2f330b7f2a9bc53e3cdc7b12614c90fd94c155103be7a2
da15247f96f62b42bae60029b862dd3c1c35159d878134d433b73b1483ede2b904c5
@127.0.0.1:0?discport=30305
Note: you're using cmd/bootnode, a developer tool.
We recommend using a regular node as bootstrap node for production d
eployments.
INFO [09-18|14:21:26.532] New local node record                    s
eq=1,726,662,086,529 id=10c5af03f5e031bf ip=<nil> udp=0 tcp=0
```

Question 13:

First command: geth --datadir node1 --port 30307 --bootnodes enode://7f851530fc477c9f183d02719e4066e4252b6bd2572d29d4f3d57e785701b6a19a87c12c499327d5cbcd5dac5afbd437ab57cc69c02c5619f65f327d9da40580@127.0.0.1:0?discport=30305 --networkid 1234567890 --unlock B6E9D58c3A76f9E5640e6920cA03dF9d30FcD331 --password node1/password.txt --authrpc.port 8551 --ipcpath node1 --miner.etherbase 0xB6E9D58c3A76f9E5640e6920cA03dF9d30FcD331

Second command: geth --datadir node2 --port 30308 --bootnodes enode://7f851530fc477c9f183d02719e4066e4252b6bd2572d29d4f3d57e785701b6a19a87c12c499327d5cbcd5dac5afbd437ab57cc69c02c5619f65f327d9da40580@127.0.0.1:0?discport=30305 --networkid 1234567890 --unlock c2024d10C9F18176A0Eb290F9e35DAd6F10BeeF4 --password node2/password.txt --authrpc.port 8552 --ipcpath node2

I needed to add –ipcpath because of a forbidden access of the start of the two commands at the same time. In the same way, I needed to add –miner.etherbase to sepecify the etherbase in order to mine, requirement for something later in the TP.

Question 15:

As I specified in the previous question the -ipcpath the command look like : geth attach \\.\pipe\node1 for the node 1 and geth attach \\.\pipe\node2 for the node 2.

```
PS C:\dev\lab-session-2> geth attach \\.\pipe\node1
Welcome to the Geth JavaScript console!

instance: Geth/v1.13.15-stable-c5ba367e/windows-386/go1.21.6
coinbase: 0xb6e9d58c3a76f9e5640e6920ca03df9d30fcd331
at block: 2 (Wed Sep 18 2024 16:26:05 GMT+0200 (CEST))
 datadir: C:\dev\lab-session-2\node1
 modules: admin:1.0 clique:1.0 debug:1.0 engine:1.0 eth:1.0 miner:1.0 net:1.0 rpc:1.0 txpool:1.0 web3:1.0

To exit, press ctrl-d or type exit
```

```
PS C:\Users\jules> geth attach \\.\pipe\node2
Welcome to the Geth JavaScript console!

instance: Geth/v1.13.15-stable-c5ba367e/windows-386/go1.21.6
at block: 0 (Thu Jan 01 1970 01:00:00 GMT+0100 (CET))
 datadir: C:\dev\lab-session-2\node2
 modules: admin:1.0 clique:1.0 debug:1.0 engine:1.0 eth:1.0 miner:1.0 net:1.0 rpc:1.0 txpool:1.0 web3:1.0

To exit, press ctrl-d or type exit
```

Question 16:

```
> net.peerCount
1
```

Question 17:

```
> admin.peers
[{
    caps: ["eth/68", "snap/1"],
    enode: "enode://baea567b4a411d5052fa5b83de8bc0ef1ba0020a4670bb0c21f884feab7b2449a3bb460ef552146f52d9dbdbf1b2b982b2dfa68a6655c4b31ff8c5c9bcb6b982@127.0.0.1:58004",
    id: "4b566c159451beea618364c4f8e7ac3d1408d4c505529101d7241f82ea69173f",
    name: "Geth/v1.13.15-stable-c5ba367e/windows-386/go1.21.6",
    network: {
      inbound: true,
      localAddress: "127.0.0.1:30307",
      remoteAddress: "127.0.0.1:58004",
      static: false,
      trusted: false
    },
    protocols: {
      eth: {
        version: 68
      },
      snap: {
        version: 1
      }
    }
}]
```

Question 18:

```
> eth.getBalance(eth.accounts[0])
9.9999999934101971356999e+22
```

Question 19:

eth.sendTransaction({to: 'c2024d10C9F18176A0Eb290F9e35DAd6F10BeeF4', from: eth.accounts[0], value: 25000});

```
> eth.sendTransaction({to: 'c2024d10C9F18176A0Eb290F9e35DAd6F10BeeF4', from: eth.accounts[0], value: 25000});
"0x7f459fe9b10a7ebb012be79e2b629bbdb964f550d81aaac81207780817d8f524"
```

Question 20:

In order to get the value, we need to start the miner by miner.start()

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

```
> eth.getBalance('c2024d10C9F18176A0Eb290F9e35DAd6F10BeeF4');
125000
```

Question 21:

```
PS C:\Users\jules> geth attach \\.\pipe\node2
Welcome to the Geth JavaScript console!

instance: Geth/v1.13.15-stable-c5ba367e/windows-386/go1.21.6
at block: 0 (Thu Jan 01 1970 01:00:00 GMT+0100 (CET))
 datadir: C:\dev\lab-session-2\node2
 modules: admin:1.0 clique:1.0 debug:1.0 engine:1.0 eth:1.0 miner:1.0 net:1.0 rpc:1.0 txpool:1.0 web3:1.0

To exit, press ctrl-d or type exit
```

Question 22:

```
> eth.getBalance(eth.accounts[0])
125000
```

Question 23:

Yes, it matches

Question 24:

Balance in Ethereum is represented in Wei by default.

Question 25:

1 ether is equal to 10^{18} Wei

Question 26:

List of command in this order:

- mkdir node3
- geth –datadir node3 account new

```
PS E:\Documents\UTBM\Cours\DA51\Lab session 2> geth --datadir node3 account new
INFO [10-08|16:48:08.822] Maximum peer count                    ETH=50 total=50
Your new account is locked with a password. Please give a password. Do not forget this password.
Password:
Repeat password:

Your new key was generated

Public address of the key:   0xe56E032e6430d1D3A0D0221e5869103fAA4d934F
Path of the secret key file: node3\keystore\UTC--2024-10-08T14-48-12.925717600Z--e56e032e6430d1d3a0d0221e5869103faa4d934f

- You can share your public address with anyone. Others need it to interact with you.
- You must NEVER share the secret key with anyone! The key controls access to your funds!
- You must BACKUP your key file! Without the key, it's impossible to access account funds!
- You must REMEMBER your password! Without the password, it's impossible to decrypt the key!
```

- geth init --datadir node3 genesis.json

```
PS E:\Documents\UTBM\Cours\DA51\Lab session 2> geth init --datadir node3 genesis.json
INFO [10-08|16:45:15.327] Maximum peer count                    ETH=50 total=50
WARN [10-08|16:45:15.331] Lowering memory allowance on 32bit arch  available=32581 addressable=2048
WARN [10-08|16:45:15.331] Sanitizing cache to Go's GC limits       provided=1024 updated=682
INFO [10-08|16:45:15.331] Set global gas cap                       cap=50,000,000
INFO [10-08|16:45:15.331] Initializing the KZG library             backend=gokzg
INFO [10-08|16:45:15.432] Defaulting to pebble as the backing database
INFO [10-08|16:45:15.432] Allocated cache and file handles         database="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\chaindata" cache=16.00MiB handles=16
INFO [10-08|16:45:15.457] Opened ancient database                  database="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\chaindata\ancient/chain" readonly=false
INFO [10-08|16:45:15.457] State schema set to default              scheme=hash
INFO [10-08|16:45:15.457] Writing custom genesis block
INFO [10-08|16:45:15.459] Persisted trie from memory database      nodes=3 size=405.00B time=1.5574ms gcnodes=0 gcsize=0.00B gctime=0s livenodes=0 livesize=0.00B
INFO [10-08|16:45:15.470] Successfully wrote genesis state         database=chaindata hash=fca880..c53498
INFO [10-08|16:45:15.470] Defaulting to pebble as the backing database
INFO [10-08|16:45:15.470] Allocated cache and file handles         database="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\lightchaindata" cache=16.00MiB handles=16
INFO [10-08|16:45:15.498] Opened ancient database                  database="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\lightchaindata\ancient/chain" readonly=false
INFO [10-08|16:45:15.498] State schema set to default              scheme=hash
INFO [10-08|16:45:15.498] Writing custom genesis block
INFO [10-08|16:45:15.500] Persisted trie from memory database      nodes=3 size=405.00B time=1.5357ms gcnodes=0 gcsize=0.00B gctime=0s livenodes=0 livesize=0.00B
INFO [10-08|16:45:15.511] Successfully wrote genesis state         database=lightchaindata hash=fca880..c53498
```

- geth --datadir node3 --port 30309 --bootnodes enode://13327bbcc754edccb30b6aaf6383238f49629259899cf5c84d8bba8df51b8a427190a3c80a7b068f4b24f0a651f8f94180d514141ea30589f24356e14ee70f98@127.0.0.1:0?discport=30305 --networkid 1234567890 --unlock e56E032e6430d1D3A0D0221e5869103fAA4d934F --password password.txt --authrpc.port 8553 --ipcpath node3

```
PS E:\Documents\UTBM\Cours\DA51\Lab session 2> geth --datadir node3 --port 30309 --bootnodes enode://13327bbcc754edccb30b6aaf6383238f49629259899cf5c84d8bba8df51b8a427190a3c80a7b068f4b24f0a651f8f94180d514141ea3
0589f24356e14ee70f98@127.0.0.1:0?discport=30305  --networkid 1234567890 --unlock e56E032e6430d1D3A0D0221e5869103fAA4d934F --password password.txt --authrpc.port 8553 --ipcpath node3
INFO [10-08|16:49:50.277] Maximum peer count                       ETH=50 total=50
WARN [10-08|16:49:50.279] Lowering memory allowance on 32bit arch  available=32581 addressable=2048
WARN [10-08|16:49:50.279] Sanitizing cache to Go's GC limits        provided=1024 updated=682
INFO [10-08|16:49:50.280] Set global gas cap                        cap=50,000,000
INFO [10-08|16:49:50.280] Initializing the KZG library              backend=gokzg
INFO [10-08|16:49:50.388] Allocated trie memory caches              clean=102.00MiB dirty=170.00MiB
INFO [10-08|16:49:50.388] Using pebble as the backing database
INFO [10-08|16:49:50.388] Allocated cache and file handles          database="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\chaindata" cache=341.00MiB handles=8192
INFO [10-08|16:49:50.407] Opened ancient database                   database="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\chaindata\ancient/chain" readonly=false
INFO [10-08|16:49:50.411] State scheme set to already existing       scheme=hash
INFO [10-08|16:49:50.412] Initialising Ethereum protocol            network=1,234,567,890 dbversion=<nil>
INFO [10-08|16:49:50.414]
INFO [10-08|16:49:50.414] ---------------------------------------------------------------------------------------------------------------------------------------------------------
INFO [10-08|16:49:50.414] Chain ID:  1234567890 (unknown)
INFO [10-08|16:49:50.414] Consensus: Clique (proof-of-authority)
INFO [10-08|16:49:50.414]
INFO [10-08|16:49:50.414] Pre-Merge hard forks (block based):
INFO [10-08|16:49:50.414]  - Homestead:                #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/homestead.md)
INFO [10-08|16:49:50.414]  - Tangerine Whistle (EIP 150): #0      (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/tangerine-whistle.md)
INFO [10-08|16:49:50.414]  - Spurious Dragon/1 (EIP 155): #0      (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [10-08|16:49:50.414]  - Spurious Dragon/2 (EIP 158): #0      (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [10-08|16:49:50.414]  - Byzantium:                #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/byzantium.md)
INFO [10-08|16:49:50.414]  - Constantinople:           #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/constantinople.md)
INFO [10-08|16:49:50.414]  - Petersburg:               #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/petersburg.md)
INFO [10-08|16:49:50.414]  - Istanbul:                 #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/istanbul.md)
INFO [10-08|16:49:50.414]  - Muir Glacier:             #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/muir-glacier.md)
INFO [10-08|16:49:50.414]  - Berlin:                   #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/berlin.md)
INFO [10-08|16:49:50.414]  - London:                   #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/london.md)
INFO [10-08|16:49:50.414]  - Arrow Glacier:            #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/arrow-glacier.md)
INFO [10-08|16:49:50.414]  - Gray Glacier:             #0        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/gray-glacier.md)
INFO [10-08|16:49:50.414]
INFO [10-08|16:49:50.414] The Merge is not yet available for this network!
INFO [10-08|16:49:50.414]  - Hard-fork specification: https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/paris.md
INFO [10-08|16:49:50.414]
INFO [10-08|16:49:50.414] Post-Merge hard forks (timestamp based):
INFO [10-08|16:49:50.414]
INFO [10-08|16:49:50.414] ---------------------------------------------------------------------------------------------------------------------------------------------------------
INFO [10-08|16:49:50.414]
INFO [10-08|16:49:50.414] Loaded most recent local block            number=0 hash=fca880..c53498 td=1 age=55y6mo3w
WARN [10-08|16:49:50.416] Failed to load snapshot                   err="missing or corrupted snapshot"
INFO [10-08|16:49:50.419] Rebuilding state snapshot
INFO [10-08|16:49:50.421] Initialized transaction indexer           range="last 2350000 blocks"
INFO [10-08|16:49:50.421] Resuming state snapshot generation        root=042841..01ba01 accounts=0 slots=0 storage=0.00B dangling=0 elapsed=2.515ms
INFO [10-08|16:49:50.424] Generated state snapshot                  accounts=2 slots=0 storage=88.00B dangling=0 elapsed=5.170ms
INFO [10-08|16:49:50.491] Enabled snap sync                         head=0 hash=fca880..c53498
INFO [10-08|16:49:50.491] Gasprice oracle is ignoring threshold set threshold=2
INFO [10-08|16:49:50.493] Stored checkpoint snapshot to disk        number=0 hash=fca880..c53498
WARN [10-08|16:49:50.495] Engine API enabled                        protocol=eth
WARN [10-08|16:49:50.495] Engine API started but chain not configured for merge yet
INFO [10-08|16:49:50.496] Starting peer-to-peer node                instance=Geth/v1.13.15-stable-c5ba367e/windows-386/go1.21.6
INFO [10-08|16:49:50.505] New local node record                     seq=1,728,398,990,504 id=c8caf62813c94e64 ip=127.0.0.1 udp=30309 tcp=30309
INFO [10-08|16:49:50.505] Started P2P networking                    self=enode://bf497c4bd8221686df87228a0b649edd52108847b850509b26dfbd89aa17ec4b99519efd40802d099b22b1f3a1e59419af5f6cb8b2d31f770c7e6ba937e6098f@
127.0.0.1:30309
INFO [10-08|16:49:50.506] IPC endpoint opened                       url=\\.\pipe\node3
INFO [10-08|16:49:50.506] Generated JWT secret                      path="E:\Documents\UTBM\Cours\DA51\Lab session 2\node3\geth\jwtsecret"
INFO [10-08|16:49:50.511] WebSocket enabled                         url=ws://127.0.0.1:8553
```

To send money to node3 from node1:

eth.sendTransaction({ to: "e56E032e6430d1D3A0D0221e5869103fAA4d934F", from: eth.accounts[0], value: 25000});

```
> eth.sendTransaction({ to: "e56E032e6430d1D3A0D0221e5869103fAA4d934F", from: eth.accounts[0], value: 25000});
"0xa647c24a5fcd7f2f5b5c2d396f72f5e068adefea3cea949e65d6700f111e0bfd"
```