

区块链原理与实践

实验二 比特币客户端与回归测试网络

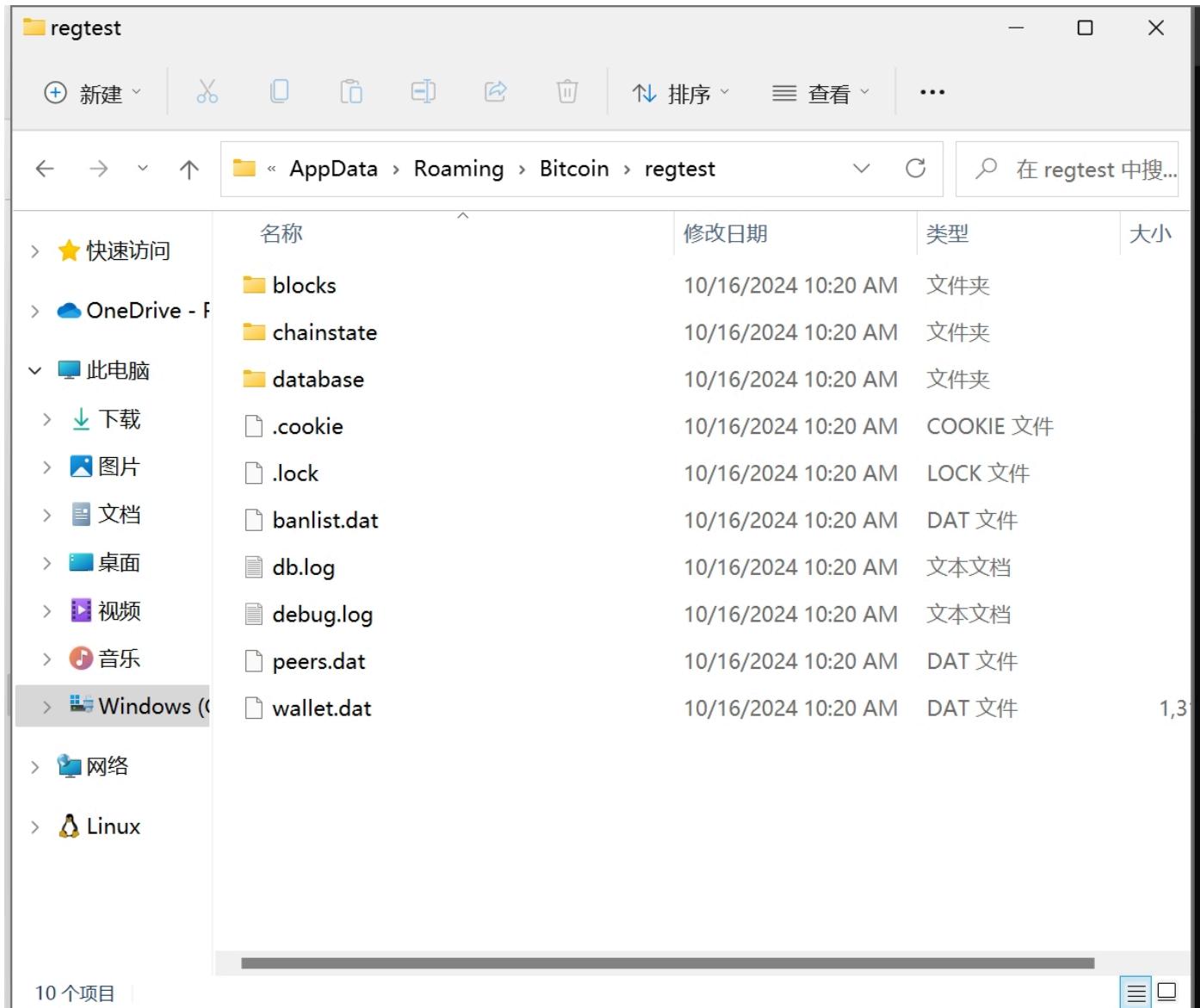
实验内容

- A. 掌握 Bitcoin Core 的基础知识、安装与配置方法
- B. 利用 Bitcoin Core 搭建多节点回归测试网络，实现挖矿与交易
- C. 了解 RPC 的作用，通过控制台与测试链进行更加丰富的交互
- D. 拓展实验：利用回归测试网络模拟并测试复杂的区块链状态与功能（分叉、挖矿难度、多签交易、局域网联机测试等）

实验步骤

熟悉 Bitcoin Core 的基本配置方法

配置 `bitcoin.conf`，进行回归测试 `regtest=1`，查看所生成文件如下：



回答思考题

思考题：解读当前日志信息，回答以下问题：

- 1) 测试中为存储链上交易状态初始化的数据空间是多少？
- 2) 初始化过程中，节点钱包密钥池最终保存了多少对密钥？
- 3) 简述回归测试模式下，程序添加 P2P 节点的步骤？

- 初始开辟了一个块，块大小是16384kb

blk00000.dat

10/16/2024 11:04 AM DAT 文件

16,384 KB

- 初始过程保存了1000对密钥

```

Windows PowerShell
版权所有 (C) Microsoft Corporation。保留所有权利。

安装最新的 PowerShell, 了解新功能和改进 ! https://aka.ms/PSWindows

PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest getwalletinfo
{
  "walletname": "wallet.dat",
  "walletversion": 139900,
  "balance": 0.00000000,
  "unconfirmed_balance": 0.00000000,
  "immature_balance": 0.00000000,
  "txcount": 0,
  "keypoololdest": 1729045235,
  "keypoolsize": 1000,
  "keypoolsize_hd_internal": 1000,
  "paytxfee": 0.00000000,
  "hdmasterkeyid": "a23f35590b085c5c0f8bb4a1145036316863004c"
}
PS C:\Software\Bitcoin\daemon>

```

- P2P节点的步骤 启动服务后先登录第二个节点 `bitcoind -regtest -server -rpcport=18443 -datadir=/path/to/another/data/directory`, 并获取地址 `bitcoin-cli -regtest getnewaddress` 随后在原终端内创造节点 `bitcoin-cli -regtest addnode "<ip_address>:18444" "add"`, 并检查状态 `bitcoin-cli -regtest getpeerinfo`

建立三个节点alice, bob, network并相互通信:

过程中出现了许多错误，无法访问被block的数据无法建立http链接等等。经过不断调试，发现去除路径中 `%APPDATA%` 的缩写可以解决问题。

```

Windows PowerShell
PS C:\Users\w1098\AppData\Roaming\Bitcoin\alice> C:\Software\Bitcoin\daemon\bitcoind -conf="C:\Users\w1098\AppData\Roaming\Bitcoin\alice\bitcoin.conf" -datadir="C:\Users\w1098\AppData\Roaming\Bitcoin\alice"

Windows PowerShell
PS C:\Users\w1098\AppData\Roaming\Bitcoin\bob> C:\Software\Bitcoin\daemon\bitcoind -conf="C:\Users\w1098\AppData\Roaming\Bitcoin\bob\bitcoin.conf" -datadir="C:\Users\w1098\AppData\Roaming\Bitcoin\bob"

Windows PowerShell
PS C:\Software\Bitcoin\daemon> .\bitcoind -regtest
Windows PowerShell
版权所有 (C) Microsoft Corporation。保留所有权利。

安装最新的 PowerShell, 了解新功能和改进 ! https://aka.ms/PSWindows

PS C:\Users\w1098\AppData\Roaming\Bitcoin\network> C:\Software\Bitcoin\daemon\bitcoind -conf="C:\Users\w1098\AppData\Roaming\Bitcoin\ne twork\bitcoin.conf" -datadir="C:\Users\w1098\ApplData\Roaming\Bitcoin\network"

```

虽然也出现了连接成功的标志：

```
2024-10-16 13:32:29 keypool added 2000 keys (1000 internal, size=2000 (1000 internal))
2024-10-16 13:32:29 keypool acquired 4 keys (0 internal, size=2000 (1000 internal))
2024-10-16 13:32:29 keypool.size() = 2000
2024-10-16 13:32:29 mapWallet.size() = 0
2024-10-16 13:32:29 mapAddressBook.size() = 1
2024-10-16 13:32:29 UpdateTip: new best=0f9188f13cb7b2c71f2a335e3a4fc328bf5beb436012afca590b1a11466e2206 height=0 version=0x00000001 log2_work=1 tx=1 date=2011-02-02 23:16:42 progress=1.000000 cache=0.0MiB(0txo)
2024-10-16 13:32:29 mapBlockIndex.size() = 1
2024-10-16 13:32:29 Failed to open mempool file from disk. Continuing anyway.
2024-10-16 13:32:29 nBestHeight = 0
2024-10-16 13:32:29 torcontrol thread start
2024-10-16 13:32:29 AddLocal([2409:8a00:d9c:4500:9c52:751b:86b6:30e4]:18446,1)
2024-10-16 13:32:29 Discover: LAPTOP-V1V54U7L - 2409:8a00:d9c:4500:9c52:751b:86b6:30e4
2024-10-16 13:32:29 AddLocal([2409:8a00:d9c:4500:d56a:590c:b3b6:fedc]:18446,1)
2024-10-16 13:32:29 Discover: LAPTOP-V1V54U7L - 2409:8a00:d9c:4500:d56a:590c:b3b6:fedc
2024-10-16 13:32:29 Bound to [::]:18446
2024-10-16 13:32:29 Bound to 0.0.0.0:18446
2024-10-16 13:32:29 init message: Loading P2P addresses...
2024-10-16 13:32:29 ERROR: DeserializeFileDB: Failed to open file C:\Users\w1098\AppData\Roaming\Bitcoin\network\regtest\peers.dat
2024-10-16 13:32:29 Invalid or missing peers.dat; recreating
2024-10-16 13:32:29 init message: Loading banlist...
2024-10-16 13:32:29 ERROR: DeserializeFileDB: Failed to open file C:\Users\w1098\AppData\Roaming\Bitcoin\network\regtest\banlist.dat
2024-10-16 13:32:29 Invalid or missing banlist.dat; recreating
2024-10-16 13:32:29 init message: Starting network threads...
2024-10-16 13:32:29 net thread start
2024-10-16 13:32:29 dnsseed thread start
2024-10-16 13:32:29 Loading addresses from DNS seeds (could take a while)
2024-10-16 13:32:29 0 addresses found from DNS seeds
2024-10-16 13:32:29 dnsseed thread exit
2024-10-16 13:32:29 addcon thread start
2024-10-16 13:32:29 opencon thread start
2024-10-16 13:32:29 init message: Done loading
2024-10-16 13:32:29 msghand thread start
2024-10-16 13:32:29 receive version message: /Satoshi:0.15.2/: version 70015, blocks=0, us=[::]:0, peer=0
2024-10-16 13:32:29 receive version message: /Satoshi:0.15.2/: version 70015, blocks=0, us=[::]:0, peer=1
2024-10-16 13:32:29 receive version message: /Satoshi:0.15.2/: version 70015, blocks=0, us=[::]:0, peer=2
2024-10-16 13:32:30 receive version message: /Satoshi:0.15.2/: version 70015, blocks=0, us=[::]:0, peer=3
2024-10-16 13:33:30 Adding fixed seed nodes as DNS doesn't seem to be available.
```

但是在检测链接的同时发现密码验证错误，未发现原因，正和助教学姐探讨...

命令：`.\bitcoin-cli -regtest -rpcuser=alice -rpcpassword=alicepass getpeerinfo alice`配置

```
regtest=1
server=1
rpcuser=alice
rpcpassword=alicepass
rpcport=18443
port=18444
datadir=%APPDATA%\Bitcoin\alice
listen=1
addnode=127.0.0.1:18446 # 连接到 network 节点
addnode=127.0.0.1:18448 # 连接到 bob 节点
```

掌握常用 RPC 指令，利用回归测试网络实现挖矿与交易

验证节点链接

```
C:\Windows\system32\cmd.exe
C:\Software\Bitcoin\daemon>echo on
C:\Software\Bitcoin\daemon>.\bitcoin-cli -datadir=C:\Users\w1098\AppData\Roaming\bitcoin\alice\ getpeerinfo
[ {
  "id": 0,
  "addr": "127.0.0.1:18446",
  "addrbind": "127.0.0.1:49397",
  "services": "000000000000000d",
  "relaytxes": true,
  "lastsend": 1729123307,
  "lastrecv": 1729123307,
  "bytessent": 453,
  "bytesrecv": 336,
  "comtime": 1729123307,
  "timeoffset": 0,
  "pingtime": 0.00098,
  "minping": 0.00098,
  "version": 70015,
  "subver": "Satoshi:0.15.2/",
  "inbound": false,
  "addnode": true,
  "startingheight": 0,
  "banscore": 0,
  "synced_headers": -1,
  "synced_blocks": -1,
  "inflight": [
  ],
  "whitelisted": false,
  "bytessent_per_msg": {
    "feefilter": 32,
    "getaddr": 24,
    "getheaders": 93,
    "ping": 32,
    "pong": 32,
    "sendcmpt": 66,
    "sendheaders": 24,
    "verack": 24,
    "version": 126
  }
}
```

任务：1) 为 alice 生成至少 150 BTC 的可用余额；

```
Windows PowerShell
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice getbalance
8800.00000000
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob getnewaddress
mwzYrM6Tz5TTd1si7akeZ2aUTdohhuY9Qn
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\network getnewaddress
mmvCTVjRfJdvkGJ7KjAdZhvMmUeW4xjzaN
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice sendtoaddress mwzYrM6Tz5TTd1si7akeZ2aUTdohhuY9Qn 2.5
bc4eb23ebcb8e53092b77f6bed4a7dbb9587c231002a393456b39fee95f8e34c
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice sendtoaddress mmvCTVjRfJdvkGJ7KjAdZhvMmUeW4xjzaN 1.5
3935bd14281acfc24ef8e067488129501a2c9709af8f157d33e23d3c662b4be8
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice generate 10
[
  "2cfdd03ade7cbc0d0976b92e93cef7ff43de1dd543f6b63c0194c8516adb38eb4",
  "1b6dabaf66ce992072449d36eed59ed97e092c2216fd3517b5413a57792652",
  "1b73729f547ef4d05a5a105d73b53a4f8ee40981736ff257d545e3962ff9db46",
  "6c5dc3e973f2269f6403cb675f23358c18f5b54b2fc979ae6305d7d990dad9",
  "0c5984723efb9009ae284cbc8b365dce937c5018fb0fb13c844d75fa7e13412",
  "09d2c05f510a1d2a872a2617f07a890482153ff01e35ea817327ef5dc872e109",
  "0bc117a4375e19137c8d1a86acefac15aed7488737f98676c35b91455961cc9",
  "06f9e6c5ab31784611354edab47248097a10d6cb5832646cf1d66c97f435f4b8",
  "2dc861a1eecf78654402665725cde1b2b6f63ac57865f72417c924f9955c23af",
  "487728cfffc1b8f4786c105c6f737283af40850cb034d2b393652bc6021fef56"
]
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob getbalance
0.00000000
PS C:\Software\Bitcoin\daemon>
```

2) 生成交易，由 alice 分别支付给 bob 2.5BTC， network 1.5BTC，并使交易入块获得确认；

```
Windows PowerShell x + - <input type="checkbox" checked="">
56f9e6c5ab31784611354edab47248097a10d6cb5832646cf1d66c97f435f4b8",
"2dc861a1eecf7865402665725cd1b2b6f63ac57865f72417c924f9955c23af",
"487728cfffc1b8f4786c105c6f737283af40850cb034d2b393652cb6021fe56"
]
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob getbalance
0.00000000
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice generate 10
[
  "0a3fd7f40f298a1d4ee9a827c330fbeafedca4105a86a11919dda9fa8957a65c",
  "086ec6aecf990e8c51e2d1fec9cb2780614c307ee3bd78d44f845d0208eb4fd8",
  "7e9e0b6d1610ce6850bd37c093ac96ef632e0ffdd6d5986d41345d9c120eff475",
  "1b7d7826a0a2a50d045e15066b01789533444641182c8bc2d128321b96b8287",
  "5777537cb1e2c6b328dcf125c8c0f5f144e7f8fd4989c26ebddaa10516d511ba",
  "117917e559873817f9d4739a92d302bdcf95a4e952352eb60ccb92f6fbcb9dc2",
  "35dfad2e29a5c04588f78ed5d44c6e8d65589e6c363205509ea68fa1e08f1759",
  "0e86d5c42392931f8cb95404d71d931e3f498b9e2477bc8f71535265ef737d74",
  "52978b138509a00c4862d9c6e7a93d41ef2da915b68d2f1ab9418cff4f253ef2",
  "2128f7dd76f6bf9311edb526d87d82ebfc6712657959df382adb694cdd098f"
]
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob getbalance
0.00000000
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice getblock bc4eb23ebcb8e53092b77f6bed4a7dbb9587c231002a393456b39fee95f8e34c
error code: -5
error message:
Block not found
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice getblock 3935bd14281acfcc24ef8e067488129501a2c9709af8f157d33e23d3c662b4be8
error code: -5
error message:
Block not found
PS C:\Software\Bitcoin\daemon>
```

3) 展示时请分别用指令获取 bob 和 network 的余额，并展示承载上述关键交易的区块原始数据。

```
Windows PowerShell x + - X

113edb526d87d8d2ebfc6712657959df382adb694cdd098f
{
    "hash": "2128f7dd76f6bf93113edb526d87d8d2ebfc6712657959df382adb694cdd098f",
    "confirmations": 1,
    "strippedsize": 228,
    "size": 228,
    "weight": 912,
    "height": 323,
    "version": 805306371,
    "versionHex": "30000003",
    "merkleroot": "5e65086fbe27a131bdd5796107d1bf1bae80f1646f827815bc90e346ea8d0c92",
    "tx": [
        "5e65086fbe27a131bdd5796107d1bf1bae80f1646f827815bc90e346ea8d0c92"
    ],
    "time": 1729124372,
    "mediantime": 1729124371,
    "nonce": 0,
    "bits": "207fffff",
    "difficulty": 4.656542373906925e-010,
    "chainwork": "000000000000000000000000000000000000000000000000000000000000288",
    "previousblockhash": "52978b138509a00c4862d9c6e7a93d41ef2da915b68d2f1ab9418cff4f253ef2"
}
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice gettransaction bc4eb23ebcb8e53092b77f6bed4a7dbb9587c231002a393456b39fee95f8e34c
{
    "amount": -2.50000000,
    "fee": -0.00003840,
    "confirmations": 20,
    "blockhash": "2cfdd03ade7cbcd0976b92e93cef7ff43de1dd543f6b63c0194c8516adb38eb4",
    "blockindex": 2,
    "blocktime": 1729124267,
    "txid": "bc4eb23ebcb8e53092b77f6bed4a7dbb9587c231002a393456b39fee95f8e34c",
    "txindex": 0
}
```

值得注意的是，即使我使用指令向bob地址、network地址发送了比特币，并且使用高达20个块进行确认，bob和network仍然没有收到比特币，查询交易数据时也可以看到交易已被确认。具体问题原因正在探讨与思考，**详见报告末尾**

通过控制台与测试链进行更加丰富的交互

任务： 1) 利用 rpc 指令将如下交易源数据解析为 JSON 格式

010000000156211389e5410a9fd1fc684ea3a852b8cee07fd15398689d99441b98b

fa76e2900000000000fffffff0280969800000000001976a914fdc7990956642433ea7
5cabdcc0a9447c5d2b4ee88acd0e89600000000001976a914d6c492056f3f99692b
56967a42b8ad44ce76b67a88ac0000000并回答： a.该交易的输入输出情况; b.该交
易的数据量大小；

```
Windows PowerShell + ×
d99441b98bfa76e290000000000fffffff0280969800000000001976a914fdc7990956642433ea75cabdcc0a9447c5d2b4ee88acd0e89600000000001976a914d6c4
92056f3f99692b56967a42b8ad44ce76b67a88ac0000000"
{
    "txid": "54f773a3fdf7cb3292fc76b46c97e536348b3a0715886dbfd2f60e115fb3a8f0",
    "hash": "54f773a3fdf7cb3292fc76b46c97e536348b3a0715886dbfd2f60e115fb3a8f0",
    "version": 1,
    "size": 119,
    "vsize": 119,
    "locktime": 0,
    "vin": [
        {
            "txid": "296ea7bf981b44999d689853d17fe0ceb852a8a34e68fc19f0a41e589132156",
            "vout": 0,
            "scriptSig": {
                "asm": "",
                "hex": ""
            },
            "sequence": 4294967295
        }
    ],
    "vout": [
        {
            "value": 0.10000000,
            "n": 0,
            "scriptPubKey": {
                "asm": "OP_DUP OP_HASH160 fdc7990956642433ea75cabdcc0a9447c5d2b4ee OP_EQUALVERIFY OP_CHECKSIG",
                "hex": "76a914fdc7990956642433ea75cabdcc0a9447c5d2b4ee88ac",
                "reqSigs": 1,
                "type": "pubkeyhash",
                "addresses": [
                    "n4epMtJQQE2WkvjgspLnyoTww6z9qbvdWF"
                ]
            }
        }
    ]
}
```

情况如下：

```
{
    "txid": "54f773a3fdf7cb3292fc76b46c97e536348b3a0715886dbfd2f60e115fb3a8f0",
    "hash": "54f773a3fdf7cb3292fc76b46c97e536348b3a0715886dbfd2f60e115fb3a8f0",
    "version": 1,
    "size": 119,
    "vsize": 119,
    "locktime": 0,
    "vin": [
        {
            "txid": "296ea7bf981b44999d689853d17fe0ceb852a8a34e68fc19f0a41e589132156",
            "vout": 0,
            "scriptSig": {
                "asm": "",
                "hex": ""
            },
            "sequence": 4294967295
        }
    ],
    "vout": [
        {
            "value": 0.10000000,
            "n": 0,
            "scriptPubKey": {
                "asm": "OP_DUP OP_HASH160 fdc7990956642433ea75cabdcc0a9447c5d2b4ee OP_EQUALVERIFY OP_CHECKSIG",
                "hex": "76a914fdc7990956642433ea75cabdcc0a9447c5d2b4ee88ac",
                "reqSigs": 1,
                "type": "pubkeyhash",
                "addresses": [
                    "n4epMtJQQE2WkvjgspLnyoTww6z9qbvdWF"
                ]
            }
        }
    ]
}
```

```

    "reqSigs": 1,
    "type": "pubkeyhash",
    "addresses": [
        "n4epMtJQQE2WkvjgspLnyoTw6z9qbvdWF"
    ]
}
},
{
    "value": 0.09890000,
    "n": 1,
    "scriptPubKey": {
        "asm": "OP_DUP OP_HASH160 d6c492056f3f99692b56967a42b8ad44ce76b67a
OP_EQUALVERIFY OP_CHECKSIG",
        "hex": "76a914d6c492056f3f99692b56967a42b8ad44ce76b67a88ac",
        "reqSigs": 1,
        "type": "pubkeyhash",
        "addresses": [
            "n16YP4DTiYAbYbdd7f3G7UjwCoCkwwhEiN"
        ]
    }
}
]
}

```

大小为119字节

2) 由 bob 节点创建一个多输入多输出交易，同时支付给 alice 的地址 23BTC, network 21BTC，并使该交易被确认，并于生成的区块中定位该交易，利用 rpc 命令解析。-（提示：可以通过前端或者 rpc 指令完成，rpc 指令完成可算作加分项的一部分- 使用这种方法的同学注意在设置输出时向自己的地址支付多余的输入额度）。

挖矿获得比特币

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob generate 101
```

获取 Alice 的地址

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice getnewaddress
```

获取 Network 的地址

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\network getnewaddress
```

使用 createrawtransaction 命令创建一个多输入多输出的交易

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob listunspent
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob createrawtransaction \'[{"txid":"<UTXO_TXID>", "vout":<UTXO_VOUT>}, {"txid":"<UTXO_TXID>", "vout":<UTXO_VOUT>}...]' \'{<Alice_Address>:23, "<Network_Address>":21, "<Bob_Change_Address>":<Change_Amount>}'
```

签名

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob  
signrawtransactionwithwallet "<raw_transaction_hex>"
```

广播

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob  
sendrawtransaction "<signed_transaction_hex>"
```

使用新块确认

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob generate 1
```

查询余额确认

查询 Alice 的余额

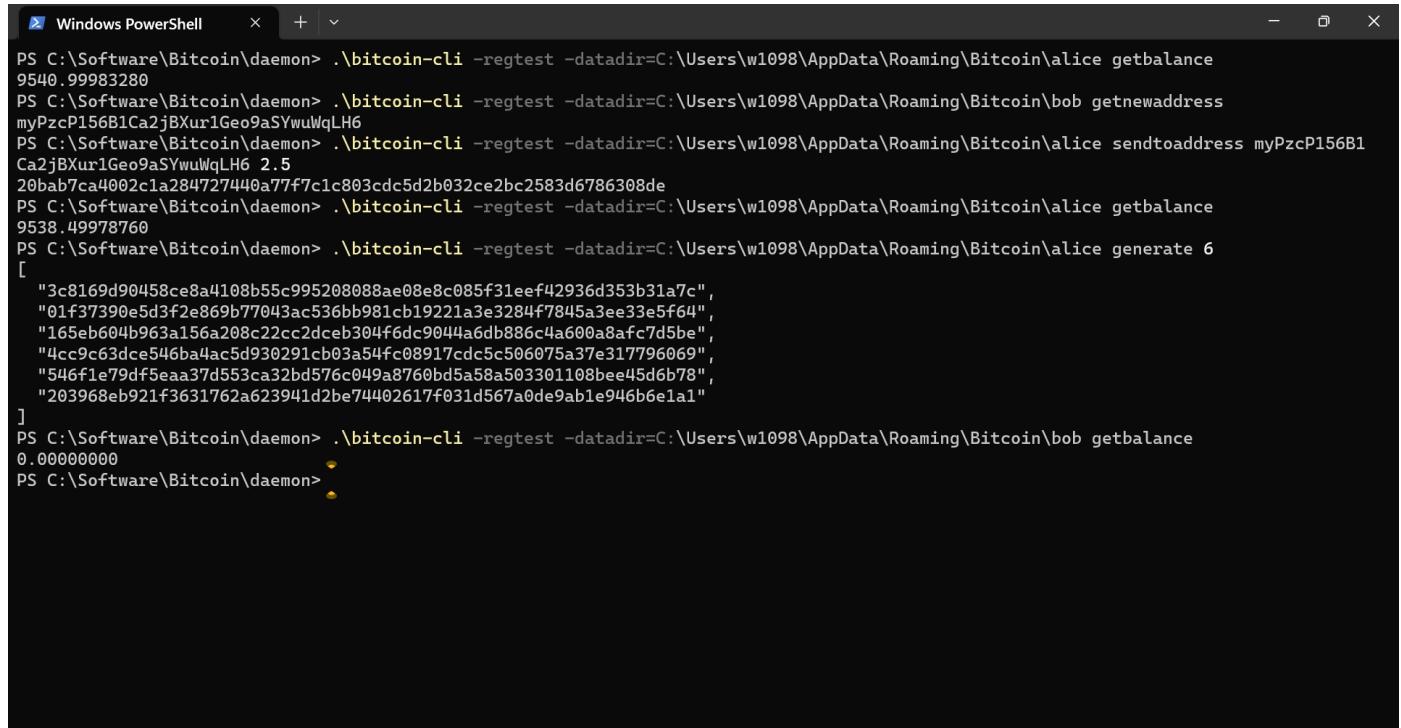
```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice  
getbalance
```

查询 Network 的余额

```
bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\network  
getbalance
```

问题

*涉及交易的步骤存在问题如下，即接收方无法收到比特币，*与助教学姐商讨多时，未果，正不断debug，先行将问题记录于此，相关涉及比特币交易的问题只能暂时“纸上谈兵”了：



```
Windows PowerShell      +  ▾
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice getbalance
9540.99983280
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob getnewaddress
myPzcP156B1Ca2jBXurlGeo9aSYwuWqLH6
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice sendtoaddress myPzcP156B1
Ca2jBXurlGeo9aSYwuWqLH6 2.5
20bab7ca4002c1a28472740a77f7c1c803cdc5d2b032ce2bc2583d6786308de
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice getbalance
9538.49978760
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\alice generate 6
[
  "3c8169d90458ce8a4108b55c995208088ae08e8c085f31eeff42936d353b31a7c",
  "01f37390e5d3f2e869b77043ac536bb981cb19221a3e3284f7845a3ee33e5f64",
  "165eb604b963a156a208c22cc2dceb304f6dc9044a6db886c4a600a8afc7d5be",
  "4cc9c63dce546ba4ac5d930291cb03a54fc08917cdc5c506075a37e317796069",
  "546f1e79df5eaa37d553ca32bd576c09a8760bd5a58a503301108bee45d6b78",
  "203968eb921f3631762a623941d2be74402617f031d567a0de9ab1e946b6e1a1"
]
PS C:\Software\Bitcoin\daemon> .\bitcoin-cli -regtest -datadir=C:\Users\w1098\AppData\Roaming\Bitcoin\bob getbalance
0.00000000
PS C:\Software\Bitcoin\daemon>
```