

lab 4

Design and Execution of Land registry Smart Contract

creating and running geth

```
prashanth@prashanth-VirtualBox: ~
geth --datadir .\datadir_new --networkid 2018 --port 30306 --nodiscover --rpc --rpcapi "db,personal,eth,net,web3,debug" --rpcorsdomain="*" --rpcaddr="localhost"

pcport 8545 console --allow-insecure-unlock
INFO [11-19|14:41:24.520] Maximum peer count
WARN [11-19|14:41:24.521] The flag --rpc is deprecated and will be removed in the future, please use --http
WARN [11-19|14:41:24.522] The flag --rpcaddr is deprecated and will be removed in the future, please use --http.addr
WARN [11-19|14:41:24.522] The flag --rpcport is deprecated and will be removed in the future, please use --http.port
WARN [11-19|14:41:24.522] The flag --rpcorsdomain is deprecated and will be removed in the future, please use --http.corsdomain
WARN [11-19|14:41:24.522] The flag --rpcapi is deprecated and will be removed in the future, please use --http.api
INFO [11-19|14:41:24.522] Smartcard socket not found, disabling
ERROR [11-19|14:41:24.523] Failed to enumerate USB devices
ERROR [11-19|14:41:24.523] Failed to enumerate USB devices
ERROR [11-19|14:41:24.523] Failed to enumerate USB devices
ERROR [11-19|14:41:24.523] Failed to enumerate USB devices
ERROR [11-19|14:41:24.524] Failed to enumerate USB devices
ERROR [11-19|14:41:24.524] Failed to enumerate USB devices
INFO [11-19|14:41:24.524] Set global gas cap
INFO [11-19|14:41:24.524] Allocated trie memory caches
INFO [11-19|14:41:24.525] Allocated cache and file handles
INFO [11-19|14:41:24.556] Opened ancient database
INFO [11-19|14:41:24.556] Writing default main-net genesis block
INFO [11-19|14:41:24.761] Persisted trie from memory database
INFO [11-19|14:41:24.762] Initialised chain configuration
IP158: 2675000 Byzantium: 4370000 Constantinople: 7280000 Petersburg: 7280000 Istanbul: 9869000 Muir Glacier: 9200000, YOLO v1: <nil>, Engine: ethash]
INFO [11-19|14:41:24.762] Disk storage enabled for ethash caches
INFO [11-19|14:41:24.762] Disk storage enabled for ethash DAGs
INFO [11-19|14:41:24.762] Initialising Ethereum protocol
WARN [11-19|14:41:24.762] Upgrade blockchain database version
INFO [11-19|14:41:24.763] Loaded most recent local header
INFO [11-19|14:41:24.763] Loaded most recent local full block
INFO [11-19|14:41:24.763] Loaded most recent local fast block
INFO [11-19|14:41:24.764] Regenerated local transaction journal
INFO [11-19|14:41:24.773] Allocated fast sync bloom
INFO [11-19|14:41:24.786] Starting peer-to-peer node
INFO [11-19|14:41:24.831] New local node record
INFO [11-19|14:41:24.832] Started P2P networking
aecd4dc0b7176f9e13e0ed8d800bf8cbf69237620127.0.0.1:30306/discport=0
ETH=50 LFS=0 total=50
clean=256.00MiB dirty=256.00MiB
database=/datadir_new/geth/chaindata cache=512.00MiB handles=524288
database=/datadir_new/geth/chaindata/ancient
nodes=12356 size=1.78MiB time=44.599552ms gcnodes=0 gcsize=0.008 gctime=0s livenodes=1 liveness=0.008
config={ChainID: 1 Homestead: 1150000 DAO: 1920000 DAOsupport: true EIP150: 2463000 EIP155: 2675000 E
dir=/datadir_new/geth/ethash count=3
dir=/root/.ethash count=2
versions=[65 64 63] network=2018 dbversion=<nil>
from=<nil> to=8
number=0 hash="d4e567...cb8fa3" td=17179869184 age=51y7mo2w
number=0 hash="d4e567...cb8fa3" td=17179869184 age=51y7mo2w
number=0 hash="d4e567...cb8fa3" td=17179869184 age=51y7mo2w
transactions=0 accounts=0
size=512.00MiB
instance=Geth/v1.9.22-stable-c71a7e26/linux-amd64/go1.15.2
seq=1 ld=d6487eee4dacbb0c lp=127.0.0.1 udp=0 tcp=30306
self="enode://f52c27e9425e998752f98223e8e2552ef6bca136bf9c807277c584ff55bcc80e6d97fbc317e33ae99ab3dda
prashanth-VirtualBox 20:11 19-Nov-20
```

remix in browser
contract.sol source code

```
Remix - Ethereum IDE - Mozilla Firefox
Microsoft Word - Lab 1 - UI... X  Ethereum: Land Market... X  Remix - Ethereum IDE X  go ethereum - geth acc... X  ethereum - REMIX | Not... X  +
remix.ethereum.org/#optimize=false&runs=200&evmVersion=null&version=soljson-v0.7.4+commit.3f05b770.js
FILE EXPLORERS
  browser
    1.Storage.sol
    2.Owner.sol
    3.Ballot.sol
  tests
    Contract.sol
Contract.sol X
1 pragma solidity ^0.4.11;
2
3 contract LandContract {
4     address owner;
5     mapping (address => uint) public balances;
6
7     struct Plot {
8         address owner;
9         bool forSale;
10        uint price;
11    }
12
13    Plot[12] public plots;
14
15    event PlotOwnerChanged(
16        uint index
17    );
18
19    event PlotPriceChanged(
20        uint index,
21        uint price
22    );
23
24    event PlotAvailabilityChanged(
25        uint index,
26        uint price,
27        bool forSale
28    );
29
30    constructor() public {
31
32    }
33 }
```

connect remix with local blockchain
unlock account in blockchain

```
prashanth@prashanth-VirtualBox:~$
Instance: Geth/v1.9.24-stable-cc05b050/linux-amd64/go1.15.5
at block: 0 (Thu Jan 01 1970 05:30:00 GMT+0530 (IST))
datadir: /home/prashanth/datadir_new
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
> INFO [11-19|21:00:35.839] Initialized fast sync bloom          items=12356 errorrate=0.000 elapsed=86.602ms
> personal.unlockAccount(eth.accounts[0])
GOERROR: first argument must be the account to unlock
    at native
    at <eval>:1:24(6)

> eth.accounts()
TypeError: Not a function:
    at <eval>:1:13(3)

> eth.accounts
[]
> personal.newAccount()
Passphrase:
Repeat passphrase:
GOERROR: passwords don't match!
    at native
    at <eval>:1:1(2)

> eth.accounts
[]
> personal.newAccount()
Passphrase:
Repeat passphrase:
INFO [11-19|21:07:04.949] Your new key was generated          address=0x525f540328ee0a7f88df54fb813afccc6620d373
WARN [11-19|21:07:04.949] Please backup your key file!          path=/home/prashanth/datadir_new/keystore/UTC--2020-11-19T15-37-02.253081822Z--525f540328ee0a7f88df54f
WARN [11-19|21:07:04.949] Please remember your password!
0x525f540328ee0a7f88df54fb813afccc6620d373
> personal.unlockAccount(eth.accounts[0])
Unlock account 0x525f540328ee0a7f88df54fb813afccc6620d373
Passphrase:
true
>
>
Geth
```

compile contract

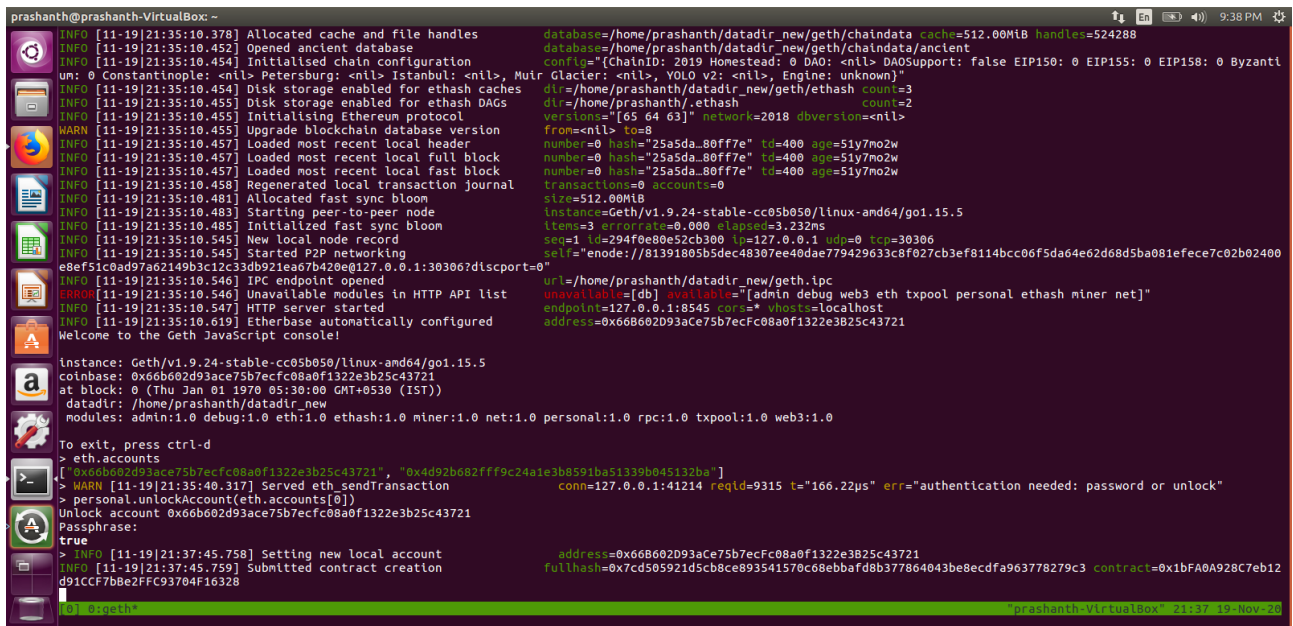
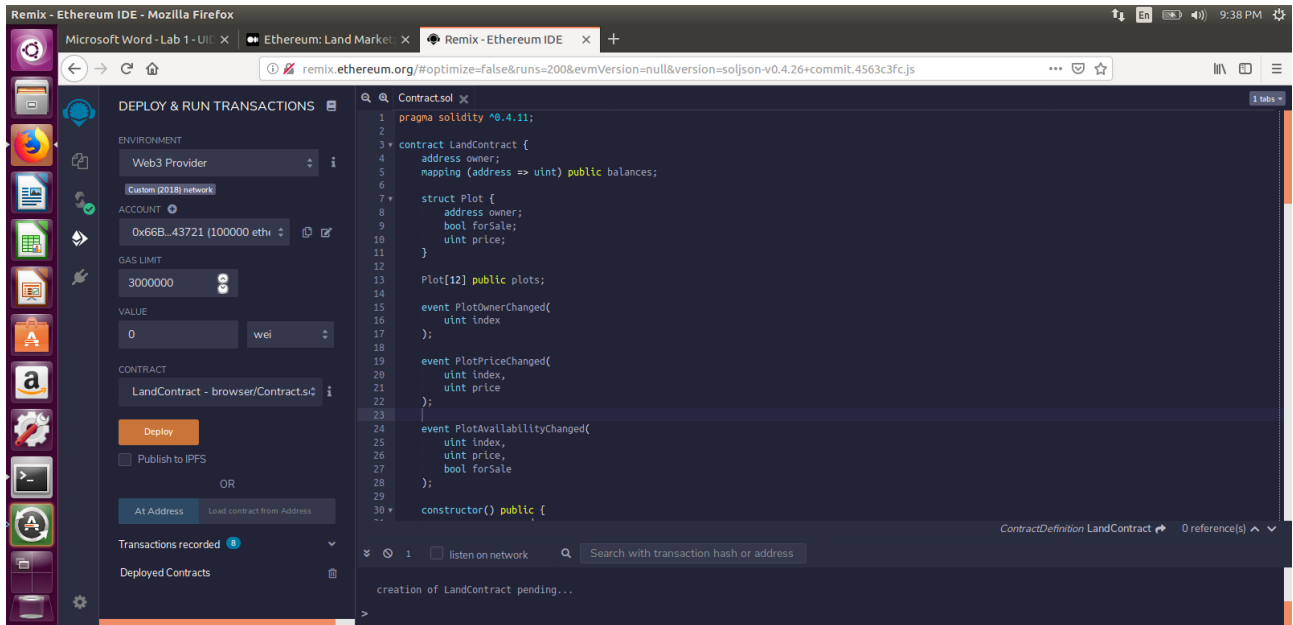
```
Remix - Ethereum IDE - Mozilla Firefox
Microsoft Word - Lab 1 - UII X  Ethereum: Land Market X  Remix - Ethereum IDE X  go ethereum - geth acc X  ethereum - REMIX | Not X  +

remix.ethereum.org/#optimize=false&runs=200&evmVersion=null&version=soljson-v0.4.26+commit.4563c3fc.js

SOLIDITY COMPILER
COMPILER 0.4.26+commit.4563c3fc
Include nightly builds
LANGUAGE Solidity
EVM VERSION compiler default
COMPILER CONFIGURATION
[checked] Auto compile
[unchecked] Enable optimization 200
[unchecked] Hide warnings
Compile Contract.sol
CONTRACT LandContract (Contract.sol)
Publish on Swarm
Publish on Ipfs

Contract.sol
1 pragma solidity ^0.4.11;
2
3 contract LandContract {
4     address owner;
5     mapping (address => uint) public balances;
6
7     struct Plot {
8         address owner;
9         bool forSale;
10        uint price;
11    }
12
13    Plot[12] public plots;
14
15    event PlotOwnerChanged(
16        uint index
17    );
18
19    event PlotPriceChanged(
20        uint index,
21        uint price
22    );
23
24    event PlotAvailabilityChanged(
25        uint index,
26        uint price,
27        bool forSale
28    );
29
30    constructor() public {
31        owner = msg.sender;
32        plots[0].price = 4000;
33        plots[0].forSale = true;
34        plots[1].price = 4000;
35        plots[1].forSale = true;
36    }
37}
```

deploy contract



start miner

```
prashanth@prashanth-VirtualBox: ~
INFO [11-19|21:35:10.547] HTTP server started
INFO [11-19|21:35:10.619] Etherbase automatically configured
Welcome to the Geth JavaScript console!

Instance: Geth/v1.9.24-stable-cc05b050/linux-amd64/go1.15.5
coinbase: 0x66b0d293ace75b7ecfc08a0f1322e3b25c43721
at block: 0 (Thu Jan 01 1970 05:30:00 GMT+0530 (IST))
datadir: /home/prashanth/.datadir_new
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
> eth.accounts
["0x66b0d293ace75b7ecfc08a0f1322e3b25c43721", "0x4d92b682ff9c24a1e3b8591ba51339b045132ba"]
> WARN [11-19|21:35:40.317] Served eth_sendTransaction
> personal.unlockAccount(eth.accounts[0])
conn=127.0.0.1:41214 reqId=9315 t="166.22µs" err="authentication needed: password or unlock"
Unlock account 0x66b0d293ace75b7ecfc08a0f1322e3b25c43721
Passphrase:
true
> INFO [11-19|21:37:45.758] Setting new local account
INFO [11-19|21:37:45.759] Submitted contract creation
d91ccf7bbe2ff93704f16328
fullhash=0x7cd505921d5cb8ce893541570c68ebbaf8b377864043beecd9a63778279c3 contract=0x1bfA0A928C7eb12
> miner.start()
INFO [11-19|21:39:19.825] Updated mining threads
INFO [11-19|21:39:19.825] Transaction pool price threshold updated
threads=8
price=1000000000
null
> INFO [11-19|21:39:19.826] Commit new mining work
number=1 sealhash="5fdef6..27be30" uncles=0 txs=0 gas=0 fees=0 elapsed="513.63µs"
INFO [11-19|21:39:19.830] Commit new mining work
number=1 sealhash="7045b1..5bd100" uncles=0 txs=1 gas=1376438 fees=0.001376438 elapsed=4.395ms
INFO [11-19|21:39:23.328] Generating ethash verification cache
epoch=1 percentage=68 elapsed=3.124s
INFO [11-19|21:39:24.477] Generated ethash verification cache
epoch=1 elapsed=4.273s
INFO [11-19|21:39:27.631] Generating DAG in progress
epoch=1 percentage=0 elapsed=3.154s
INFO [11-19|21:39:30.613] Generating DAG in progress
epoch=1 percentage=1 elapsed=6.135s
INFO [11-19|21:39:32.884] Generating DAG in progress
epoch=1 percentage=2 elapsed=8.406s
INFO [11-19|21:39:34.181] Successfully sealed new block
number=1 sealhash="7045b1..5bd100" hash="dabc77..3c6c29" elapsed=14.351s
INFO [11-19|21:39:34.181] Mined potential block
number=1 hash="dabc77..3c6c29"
INFO [11-19|21:39:34.181] Commit new mining work
number=2 sealhash="caae27..bc6071" uncles=0 txs=0 gas=0 fees=0 elapsed="158.37µs"
INFO [11-19|21:39:34.182] Commit new mining work
number=2 sealhash="caae27..bc6071" uncles=0 txs=0 gas=0 fees=0 elapsed="425.867µs"
INFO [11-19|21:39:35.876] Generating DAG in progress
epoch=1 percentage=3 elapsed=11.398s
INFO [11-19|21:39:40.828] Generating DAG in progress
epoch=1 percentage=4 elapsed=16.350s
INFO [11-19|21:39:42.256] Successfully sealed new block
number=2 sealhash="caae27..bc6071" hash="526189..b7b9d8" elapsed=8.075s
INFO [11-19|21:39:42.256] Mined potential block
number=2 hash="526189..b7b9d8"
INFO [11-19|21:39:42.257] Commit new mining work
number=3 sealhash="df1b00..199015" uncles=0 txs=0 gas=0 fees=0 elapsed="168.285µs"

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```

```
prashanth@prashanth-VirtualBox: ~
INFO [11-19|21:40:04.483] Mined potential block
number=9 hash="a2509c..c69bb4"
INFO [11-19|21:40:04.483] Commit new mining work
number=10 sealhash="2fe902..bcbfa5" uncles=0 txs=0 gas=0 fees=0 elapsed="108.394µs"
INFO [11-19|21:40:05.743] Successfully sealed new block
number=10 sealhash="2fe902..bcbfa5" hash="affe61..d9126c" elapsed=1.260s
INFO [11-19|21:40:05.743] Block reached canonical chain
number=3 hash="ca155e..8a47bf"
INFO [11-19|21:40:05.743] Mined potential block
number=10 hash="affe61..d9126c"
INFO [11-19|21:40:05.743] Commit new mining work
number=11 sealhash="59e10c..2da026" uncles=0 txs=0 gas=0 fees=0 elapsed="72.905µs"
INFO [11-19|21:40:06.338] Successfully sealed new block
number=11 sealhash="59e10c..2da026" hash="7c60f1..8ddb0e" elapsed=594.667ms
INFO [11-19|21:40:06.338] Block reached canonical chain
number=4 hash="927289..65c4f4"
INFO [11-19|21:40:06.338] Mined potential block
number=11 hash="7c60f1..8ddb0e"
INFO [11-19|21:40:06.339] Commit new mining work
number=12 sealhash="582c37..ee5897" uncles=0 txs=0 gas=0 fees=0 elapsed="526.958µs"
INFO [11-19|21:40:06.911] Generating DAG in progress
epoch=1 percentage=12 elapsed=42.434s
INFO [11-19|21:40:08.190] Successfully sealed new block
number=12 sealhash="582c37..ee5897" hash="ea4d69..1a1d47" elapsed=1.791s
INFO [11-19|21:40:08.203] Block reached canonical chain
number=5 hash="f3a5ef..2f439d"
INFO [11-19|21:40:08.203] Mined potential block
number=12 hash="ea4d69..1a1d47"
INFO [11-19|21:40:08.251] Commit new mining work
number=13 sealhash="09f1f8..bd8391" uncles=0 txs=0 gas=0 fees=0 elapsed="145.884µs"
INFO [11-19|21:40:08.757] Successfully sealed new block
number=13 sealhash="09f1f8..bd8391" hash="46a581..59c8ef" elapsed=505.667ms
INFO [11-19|21:40:08.757] Block reached canonical chain
number=6 hash="e8b183..851310"
INFO [11-19|21:40:08.757] Mined potential block
number=13 hash="46a581..59c8ef"
INFO [11-19|21:40:08.757] Commit new mining work
number=14 sealhash="7750a3..146c9f" uncles=0 txs=0 gas=0 fees=0 elapsed="75.411µs"
INFO [11-19|21:40:09.838] Generating DAG in progress
epoch=1 percentage=13 elapsed=45.360s
INFO [11-19|21:40:11.284] Successfully sealed new block
number=14 sealhash="7750a3..146c9f" hash="9204d8..eed5ac" elapsed=2.526s
INFO [11-19|21:40:11.284] Block reached canonical chain
number=7 hash="828e0b..e91e77"
INFO [11-19|21:40:11.284] Mined potential block
number=14 hash="9204d8..eed5ac"
INFO [11-19|21:40:11.284] Commit new mining work
number=15 sealhash="c52334..9755c8" uncles=0 txs=0 gas=0 fees=0 elapsed="100.642µs"
INFO [11-19|21:40:13.087] Generating DAG in progress
epoch=1 percentage=14 elapsed=48.610s
INFO [11-19|21:40:14.161] Successfully sealed new block
number=15 sealhash="c52334..9755c8" hash="263976..43aa57" elapsed=2.876s
INFO [11-19|21:40:14.161] Block reached canonical chain
number=8 hash="1eb978..96b2cd"
INFO [11-19|21:40:14.161] Mined potential block
number=15 hash="263976..43aa57"
INFO [11-19|21:40:14.236] Commit new mining work
number=16 sealhash="479bb0..beb5d7" uncles=0 txs=0 gas=0 fees=0 elapsed="185.847µs"
INFO [11-19|21:40:15.419] Successfully sealed new block
number=16 sealhash="479bb0..beb5d7" hash="908245..f0c64c" elapsed=1.183s
INFO [11-19|21:40:15.419] Block reached canonical chain
number=9 hash="a2509c..c69bb4"
INFO [11-19|21:40:15.487] Commit new mining work
number=16 hash="908245..f0c64c"
INFO [11-19|21:40:16.490] Generating DAG in progress
number=17 sealhash="6d5f69..565cbb" uncles=0 txs=0 gas=0 fees=0 elapsed="189.585µs"
INFO [11-19|21:40:19.647] Generating DAG in progress
epoch=1 percentage=15 elapsed=52.012s
INFO [11-19|21:40:22.104] Generating DAG in progress
epoch=1 percentage=16 elapsed=55.169s
INFO [11-19|21:40:24.891] Generating DAG in progress
epoch=1 percentage=17 elapsed=57.627s
INFO [11-19|21:40:25.492] Successfully sealed new block
epoch=1 percentage=18 elapsed=1m0.413s
INFO [11-19|21:40:25.492] Block reached canonical chain
number=17 sealhash="6d5f69..565cbb" hash="203768..471c49" elapsed=10.004s
INFO [11-19|21:40:25.492] Mined potential block
number=10 hash="affe61..d9126c"
INFO [11-19|21:40:25.493] Commit new mining work
number=17 hash="203768..471c49"
number=18 sealhash="4915bc..59a713" uncles=0 txs=0 gas=0 fees=0 elapsed="133.416µs"

prashanth@prashanth-VirtualBox: ~ 21:40 19-Nov-20
```

check plot 0 price

The screenshot displays the Remix IDE interface. On the left, the 'DEPLOY & RUN TRANSACTIONS' sidebar is visible, featuring buttons for 'destroy', 'gasPricingForS...', 'takeOffMarket', 'withdrawFunds', 'balances', 'getPlots', and 'plots'. The main workspace shows the Solidity code for a contract named 'LandContract'. The code includes a constructor and several public functions: 'plot', 'plotOwnerChanged', 'plotPriceChanged', and 'plotAvailabilityChanged'. The bottom panel shows the 'CALLDATA' section with a 'Transact' button and the transaction details for 'LANDCONTRACT AT 0xFEE...28F89 [BLOCKCHAIN]'.