Deploying a Smart Contract for Mac or PC

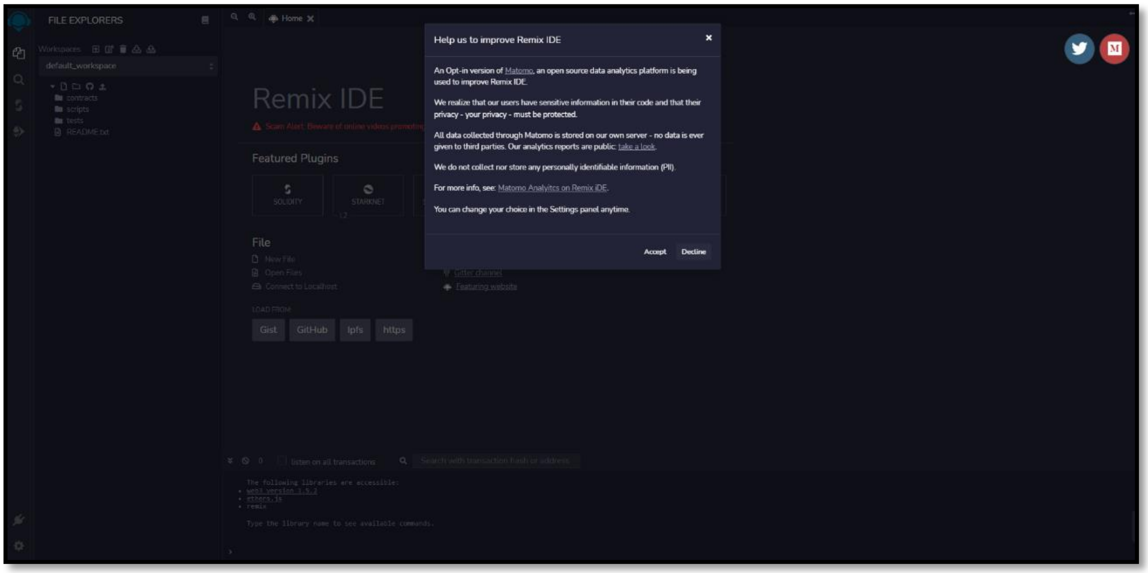
**We recommend using Google Chrome for this exercise

INITIAL NOTE

The digital environment is a very dynamic and agile environment where updates and changes occur on a constant basis. In this program, we will use web resources and external software in order to carry out the practical activities and provide a real vision of the tools available in the market. This means that, although we strive to keep the guides updated, sometimes some of the environments we will be showing you in the activities may suffer some small differences from the images reflected in these guides. Normally it is possible to follow the development of the activity by easily interpreting the differences between the guide and the real environment, if any. In case this is not possible, please let your facilitator know by sending a message through the program´s platform inbox.

- *Writing the contract*

Go to remix.ethereum.org in your browser. If this is your first time visiting the editor, close all the pop-ups by pressing the “X” button (do not press “Accept” or “Decline”).



Help us to improve Remix IDE

An Opt-in version of Matomo, an open source data analytics platform is being used to improve Remix IDE.

We realize that our users have sensitive information in their code and that their privacy - your privacy - must be protected.

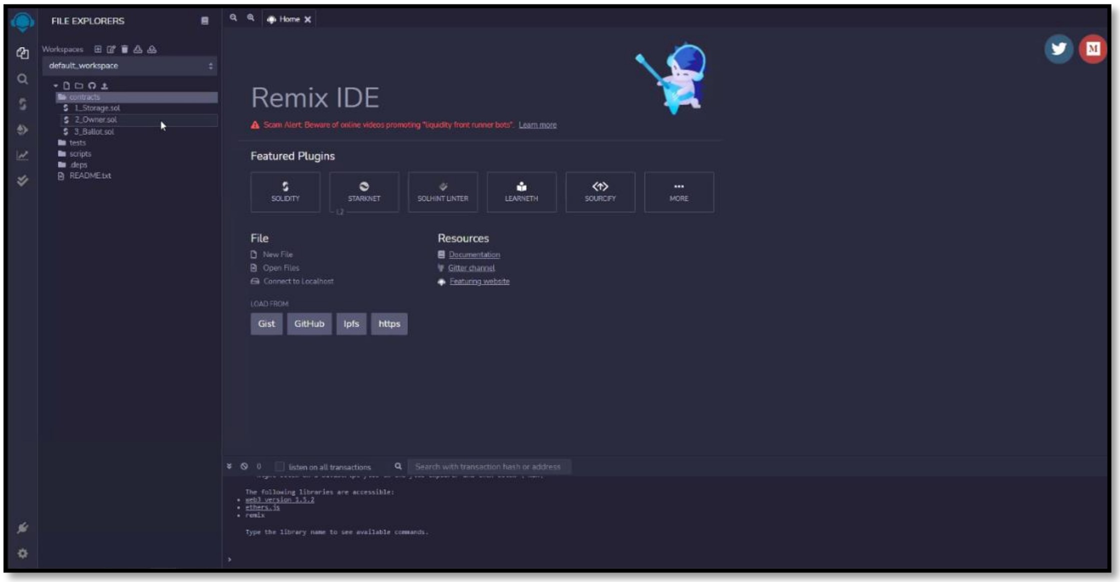
All data collected through Matomo is stored on our own server - no data is ever given to third parties. Our analytics reports are public: take a look.

We do not collect nor store any personally identifiable information (PII).

For more info, see: Matomo Analyitcs on Remix iDE.

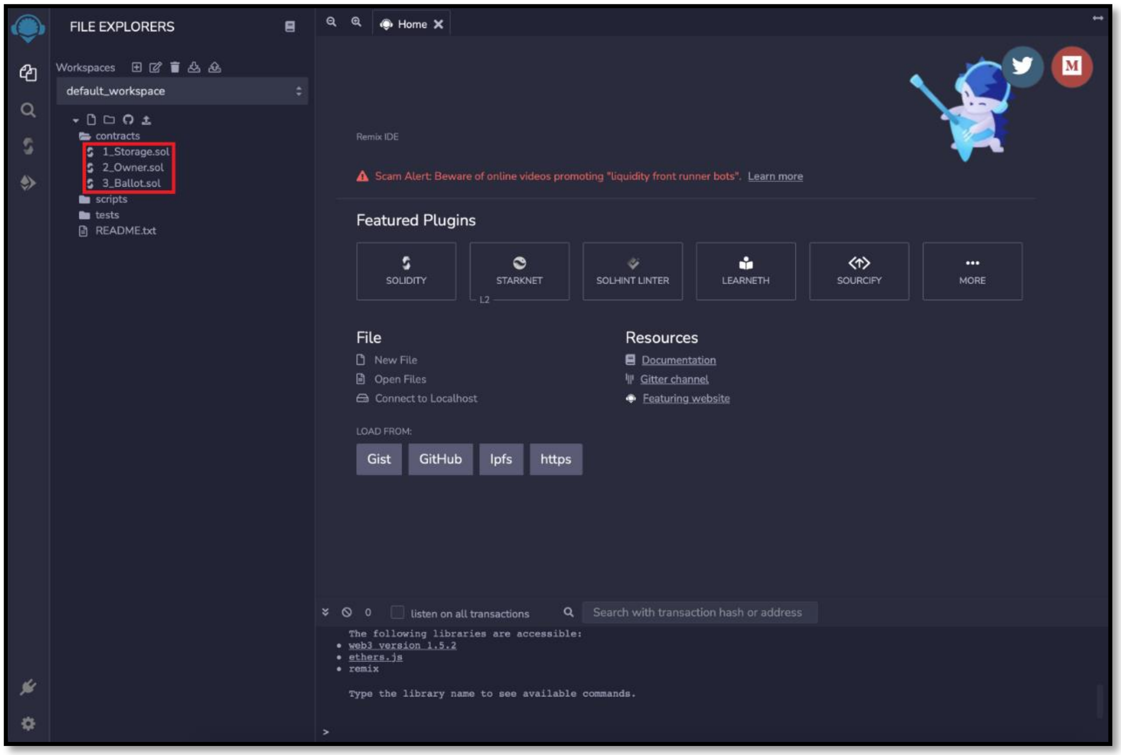
You can change your choice in the Settings panel anytime.

You should now see the following screen:



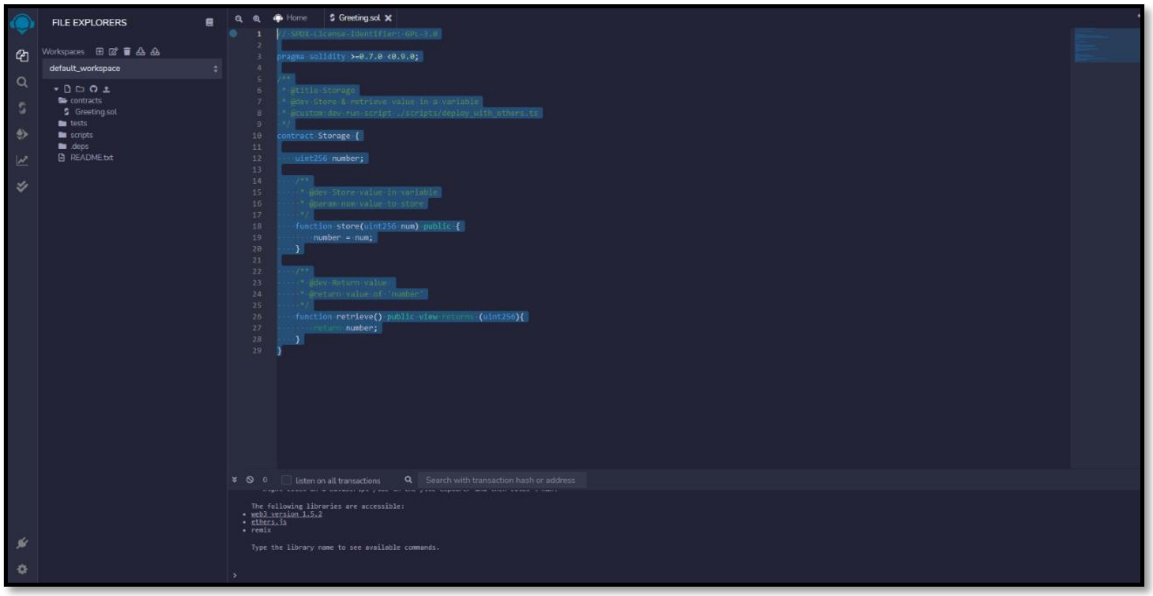
```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.
```

Click “contracts” and delete the folders “1_Storage.sol” and “2_Owner.sol”. Rename “3_Ballot.sol” as “Greeting.sol”.



```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.
```

Delete the code from the main field.



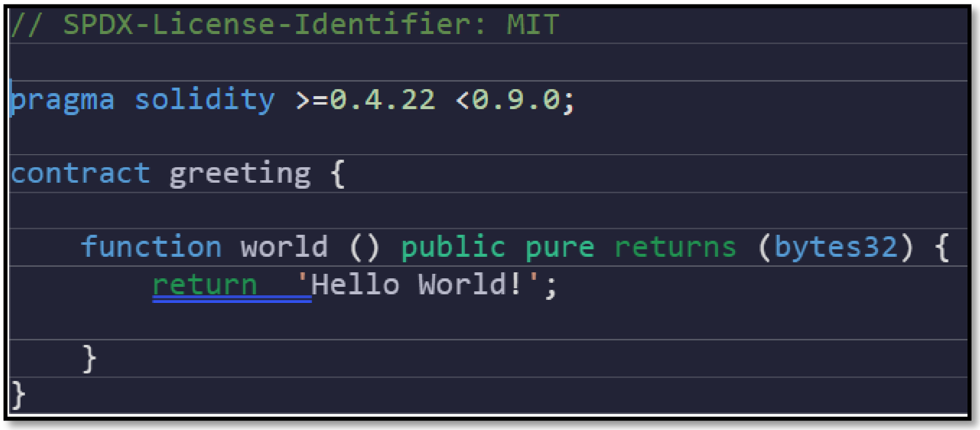
```
// SPDX-License-Identifier: GPL-3.0

pragma solidity >=0.7.0 <0.9.0;

/**
 * @title Storage
 * @dev Store & retrieve value in a variable
 * @custom:dev-run-script ./scripts/deploy_with_ethers.ts
 */
contract Storage {

    uint256 number;

    /**
     * @dev Store value in variable
     * @param num value to store
     */
    function store(uint256 num) public {
        number = num;
    }

    /**
     * @dev Return value
     * @return value of 'number'
     */
    function retrieve() public view returns (uint256){
        return number;
    }
}
```

```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.

>
```

Copy the ‘hello world smart contract’ below and paste it into the main field:

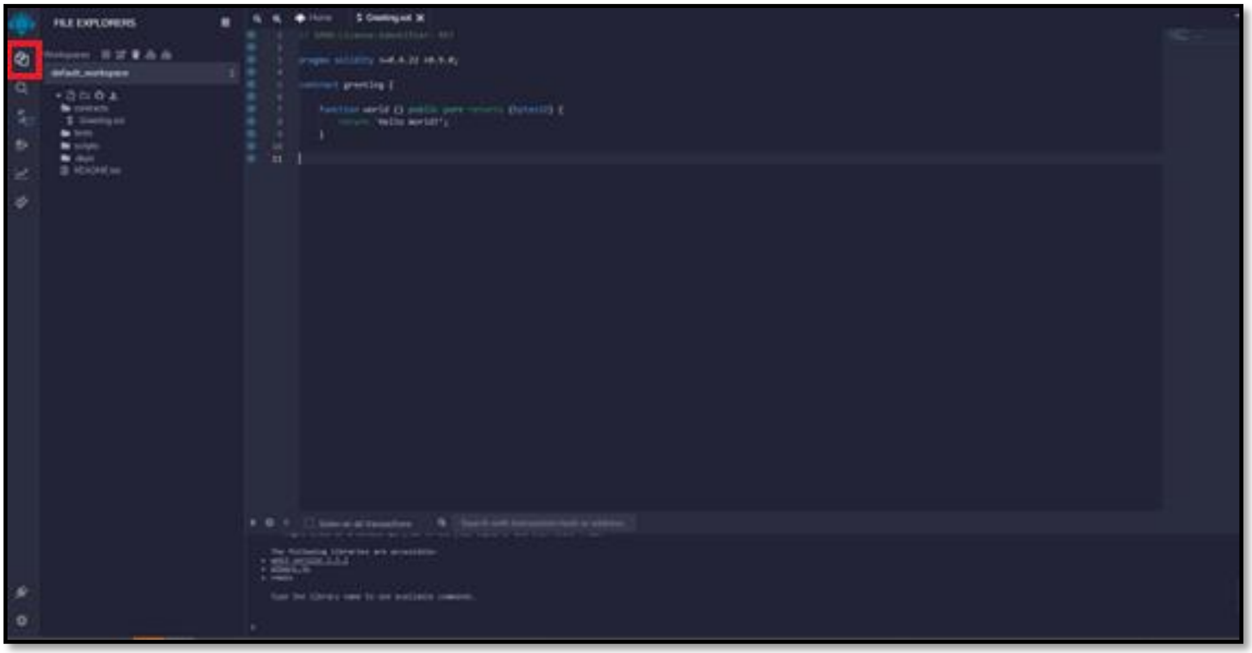
```
// SPDX-License-Identifier: MIT
pragma solidity >=0.4.22 <0.9.0;
contract greeting {
function world () public pure returns (bytes32) {
 return 'Hello World!';
 }
}
```

The code should look exactly like this:

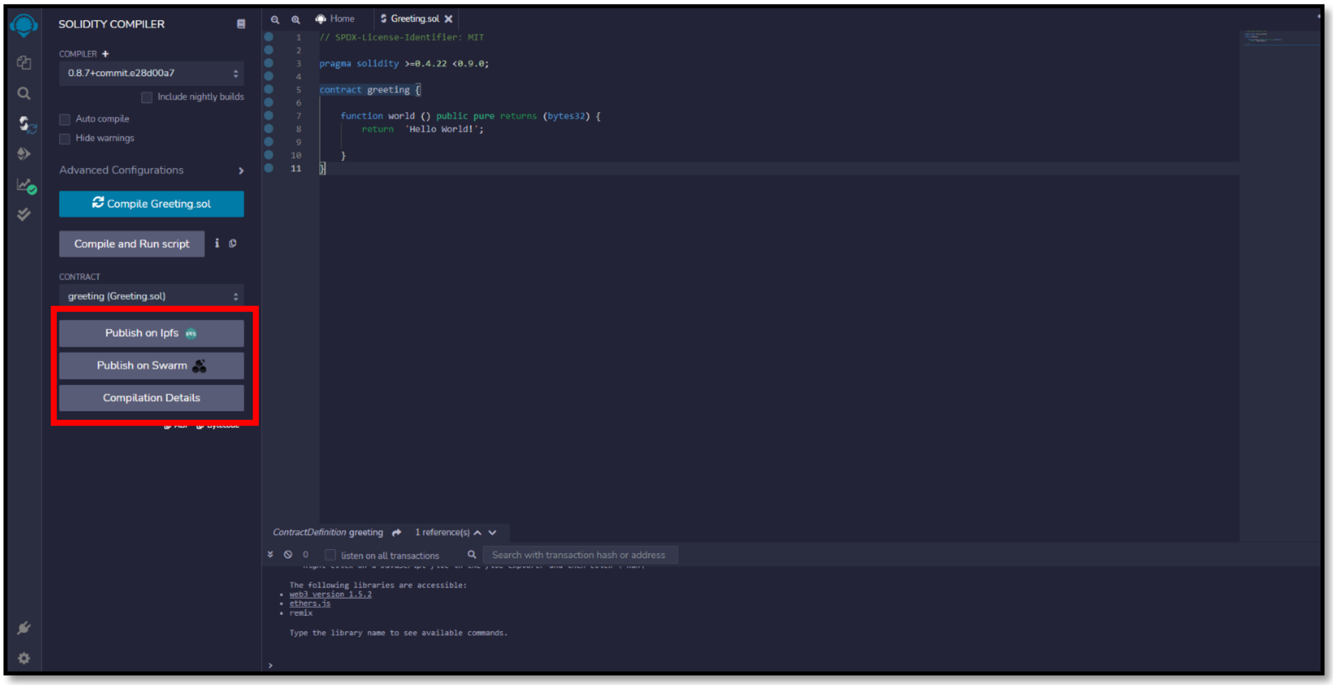


```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

    function world () public pure returns (bytes32) {
        return  'Hello World!';

    }
}
```

On the left-hand side vertical toolbar, click on the “compile” highlighted button:



Click on the blue “Compile Greeting.sol” button. Please note that if the three boxes highlighted in the red frame appear, it means you have successfully compiled the contract.



COMPILER: 0.8.7+commit.e28d00a7

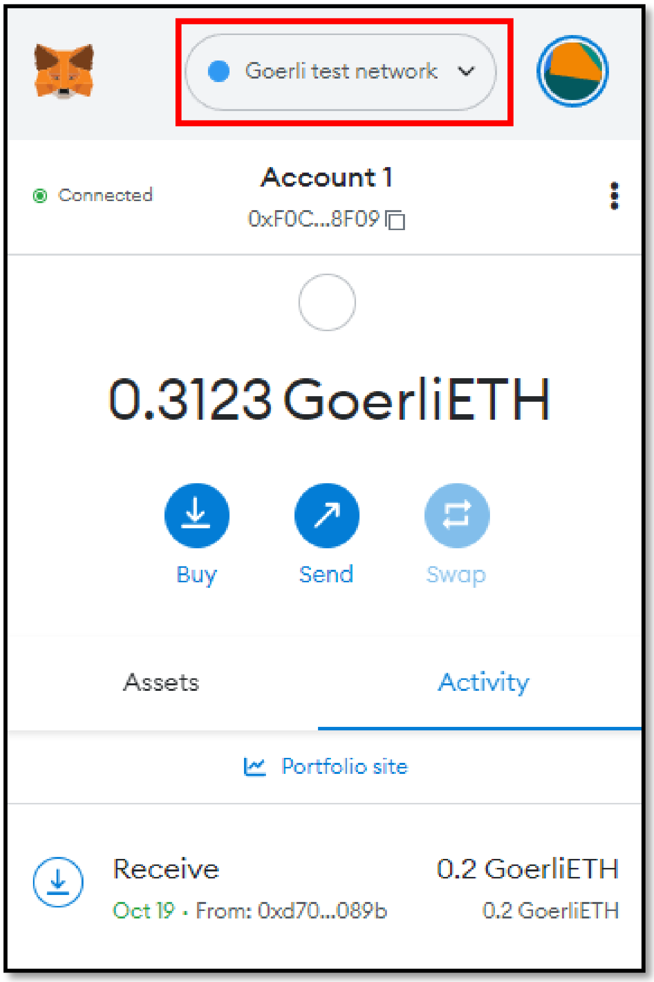
CONTRACT: greeting (Greeting.sol)

```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

    function world () public pure returns (bytes32) {
        return  'Hello World!';

    }
}
```

```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.
```

Before continuing, go back to your MetaMask to double-check you are in the Goerli Test Network. Remember, if the test networks do not appear, go to “Settings,” click “Show/hide networks,” and mark the toggle as “on.” If you have trouble finding this option, check with your learning facilitator.

Double-check that you have ETH funds and that your account address is correct. If you do not have GoerliETH, please ask your learning facilitator for it.



Goerli test network

Connected

Account 1

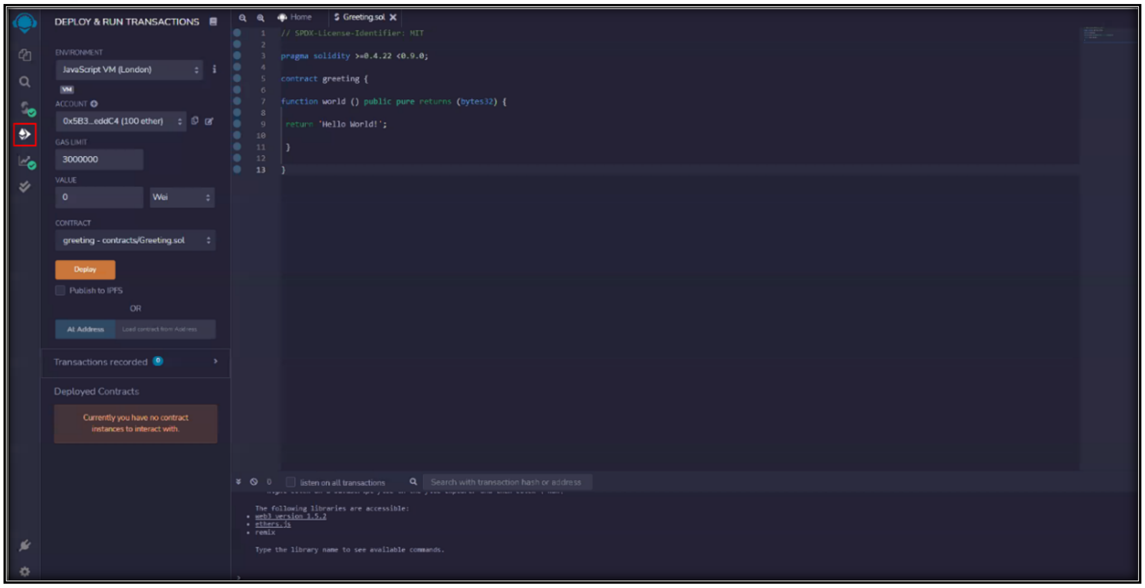
0xF0C...8F09

0.3123 GoerliETH

Receive 0.2 GoerliETH

Oct 19 · From: 0xd70...089b 0.2 GoerliETH

Go back to Remix. On the left-hand side vertical toolbar, click on the highlighted button.



DEPLOY & RUN TRANSACTIONS

ENVIRONMENT: JavaScript VM (London)

ACCOUNT: 0x5B3...eddC4 (100 ether)

GAS LIMIT: 3000000

VALUE: 0 Wei

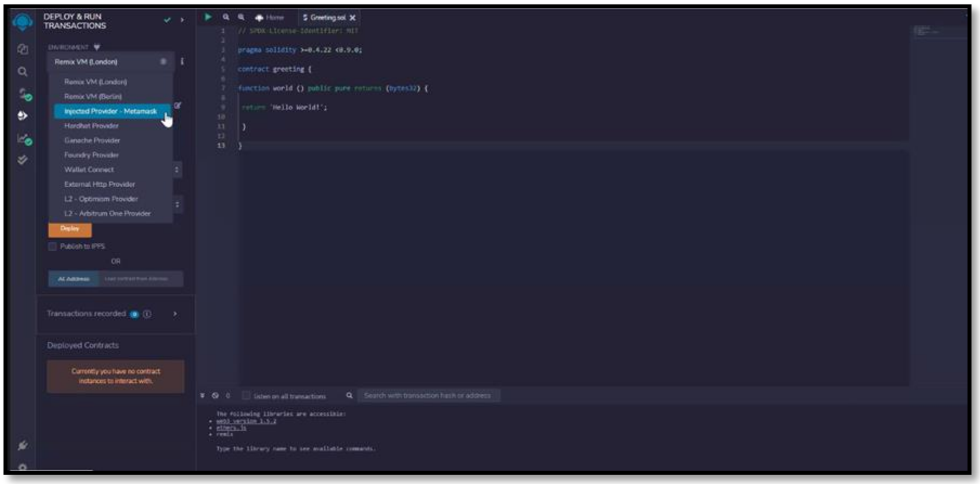
CONTRACT: greeting - contracts/Greeting.sol

```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

function world () public pure returns (bytes32) {

 return 'Hello World!';

 }

}
```

```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.
```

Home
Greeting.sol
VM
Deploy
Publish to IPFS
OR
At Address
Load contract from Address
Transactions recorded 0
Deployed Contracts
Currently you have no contract instances to interact with.
listen on all transactions
Search with transaction hash or address

On the “environment” drop-down menu, select the “Injected Provider - Metamask” environment.



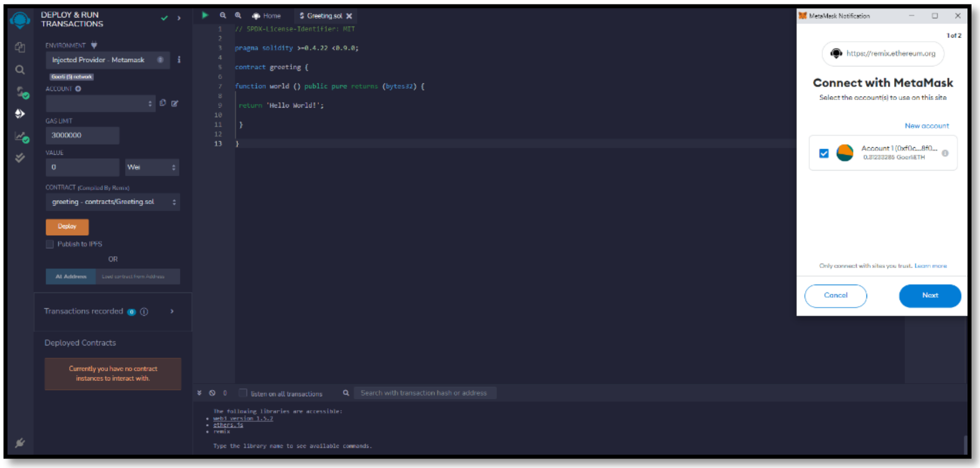
DEPLOY & RUN TRANSACTIONS

ENVIRONMENT: Remix VM (London)

```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

function world () public pure returns (bytes32) {

 return 'Hello World!';

 }

}
```

```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.
```

A MetaMask pop-up will appear with your account number. Check the details are correct. If this is your first time using MetaMask, click the “Next” button.



ENVIRONMENT: Injected Provider - Metamask

Goerli (5) network

ACCOUNT

GAS LIMIT: 3000000

VALUE: 0 Wei

CONTRACT (Compiled By Remix): greeting - contracts/Greeting.sol

□ Publish to IPFS

OR

Transactions recorded 0

Deployed Contracts

Currently you have no contract instances to interact with.

```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

function world () public pure returns (bytes32) {

 return 'Hello World!';

 }

}
```

□ listen on all transactions

Search with transaction hash or address

```
The following libraries are accessible:
• web3 version 1.5.2
• ethers.js
• remix

Type the library name to see available commands.
```

MetaMask Notification

1 of 2

https://remix.ethereum.org

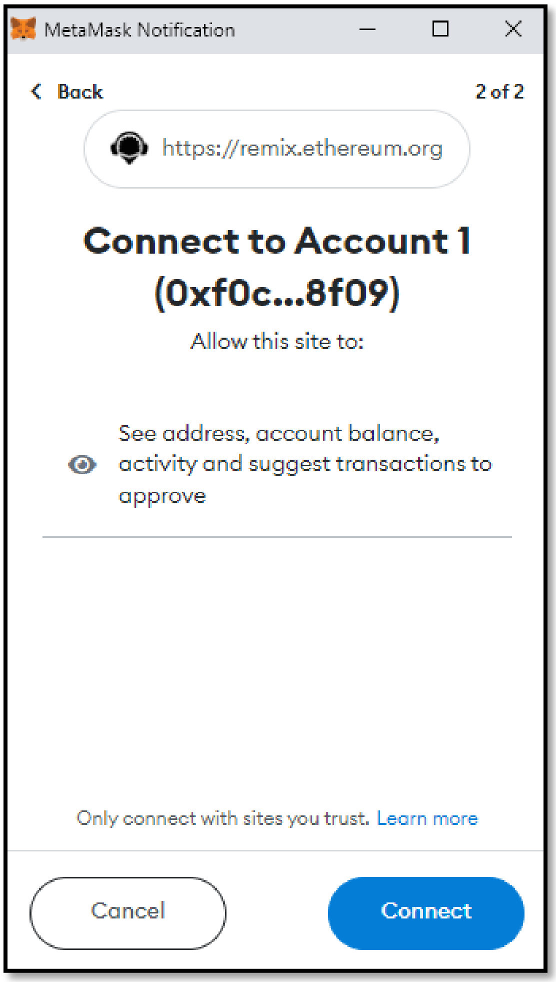
Connect with MetaMask

Select the account(s) to use on this site

☑ Account 1 (0xf0c...8f0...
0.81233286 GoerliETH

Only connect with sites you trust. Learn more

Click “Connect.”



MetaMask Notification

2 of 2

https://remix.ethereum.org

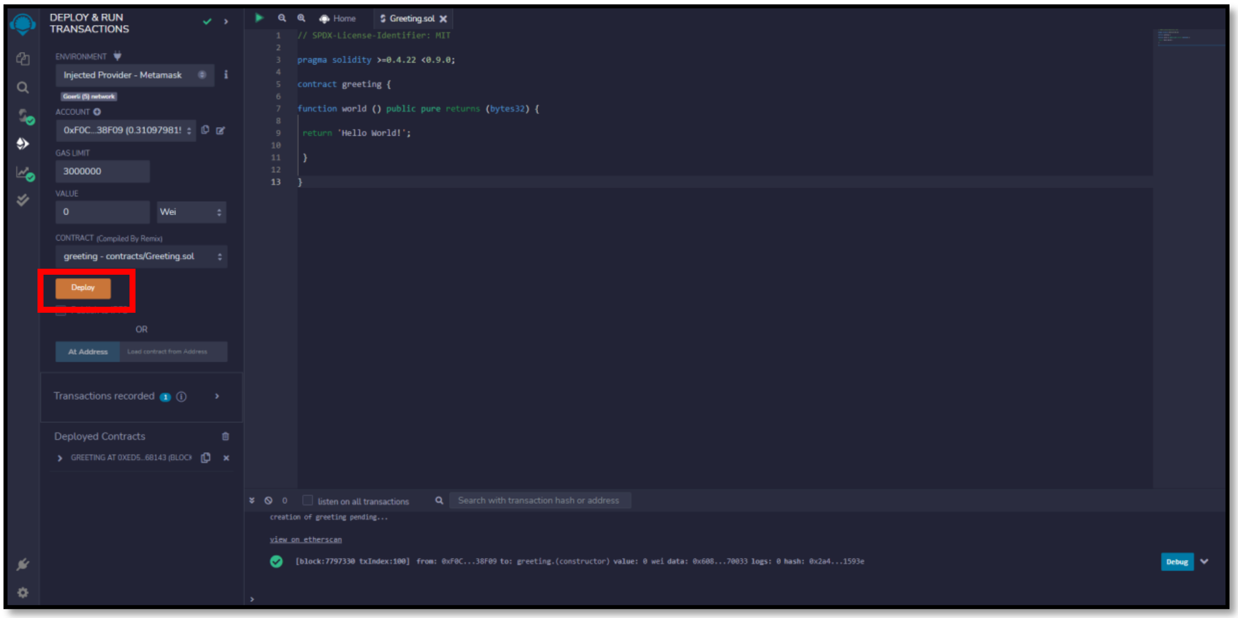
Connect to Account 1 (0xf0c...8f09)

Allow this site to:

See address, account balance, activity and suggest transactions to approve

Only connect with sites you trust. Learn more

Click the “Deploy” button.



ENVIRONMENT: Injected Provider - Metamask

Goerli (5) network

ACCOUNT: 0xF0C...38F09 (0.31097981!

GAS LIMIT: 3000000

VALUE: 0 Wei

CONTRACT (Compiled By Remix): greeting - contracts/Greeting.sol

Transactions recorded 1

Deployed Contracts

GREETING AT 0XED5...68143 (BLOCK

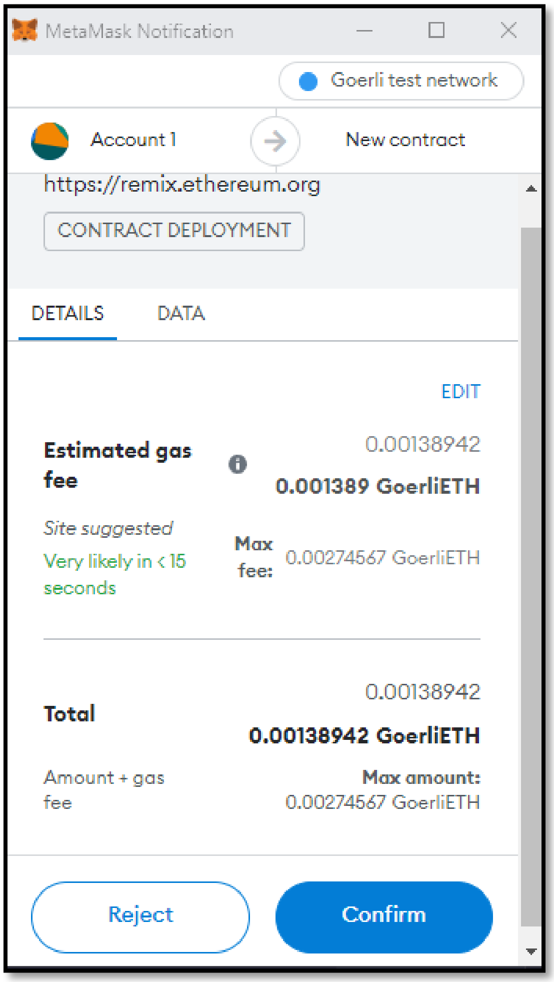
```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

function world () public pure returns (bytes32) {

 return 'Hello World!';

 }

}
```

☐ listen on all transactions

Search with transaction hash or address

```
creation of greeting pending...

view on etherscan

[block:7797330 txIndex:100] from: 0xF0C...38F09 to: greeting.(constructor) value: 0 wei data: 0x608...70033 logs: 0 hash: 0x2a4...1593e
```

A pop-up will appear with the details. If everything is correct, click “Confirm.” Note that this could take a couple of minutes to complete.



Account 1 → New contract

https://remix.ethereum.org

CONTRACT DEPLOYMENT

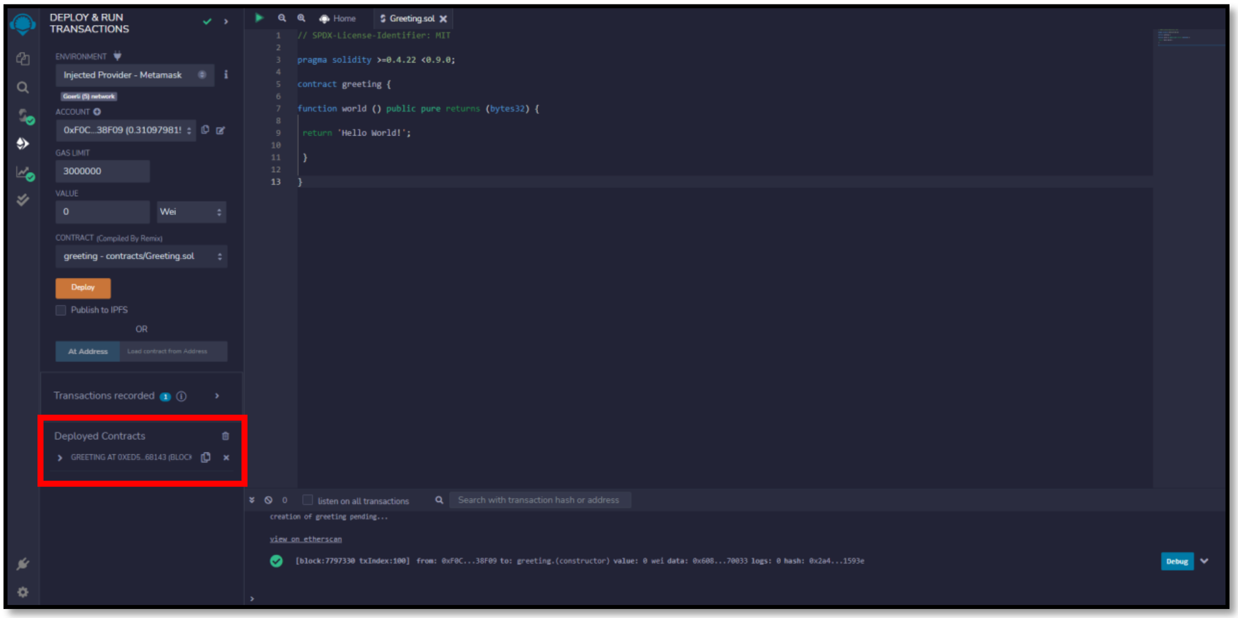
Estimated gas fee 0.00138942
0.001389 GoerliETH

Site suggested
Very likely in < 15 seconds
Max fee: 0.00274567 GoerliETH

Total 0.00138942
0.00138942 GoerliETH

Amount + gas fee
Max amount: 0.00274567 GoerliETH

Once the contract has been deployed, it should appear like this:


DEPLOY & RUN TRANSACTIONS
Deploy
Publish to IPFS
OR
At Address
Load contract from Address
Transactions recorded 1
Deployed Contracts
Home
Greeting.sol
listen on all transactions
Search with transaction hash or address
Debug

ENVIRONMENT: Injected Provider - Metamask

Goerli (5) network

ACCOUNT: 0xF0C...38F09 (0.31097981!

GAS LIMIT: 3000000

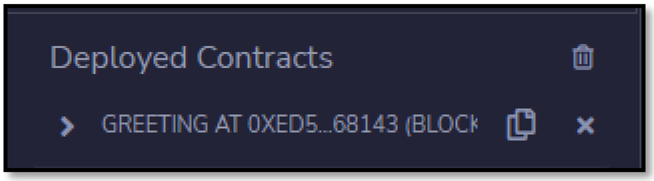
VALUE: 0 Wei

CONTRACT (Compiled By Remix): greeting - contracts/Greeting.sol

GREETING AT 0XED5...68143 (BLOCK

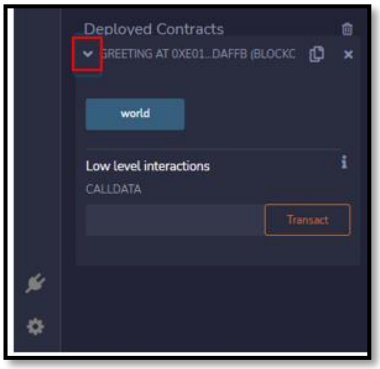
```
// SPDX-License-Identifier: MIT

pragma solidity >=0.4.22 <0.9.0;

contract greeting {

function world () public pure returns (bytes32) {

 return 'Hello World!';

 }

}
```

```
creation of greeting pending...

view on etherscan

[block:7797330 txIndex:100] from: 0xF0C...38F09 to: greeting.(constructor) value: 0 wei data: 0x608...70033 logs: 0 hash: 0x2a4...1593e
```



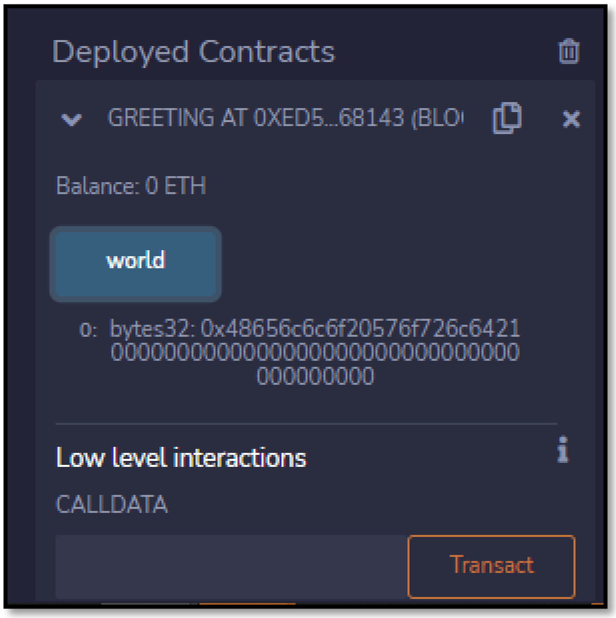
GREETING AT 0XED5...68143 (BLOCK

Click the arrow next to “Deployed Contracts” to display the contract.



GREETING AT 0XE01...DAFFB (BLOCKC

Click the “world” button to display the bytes32 value of the smart contract.



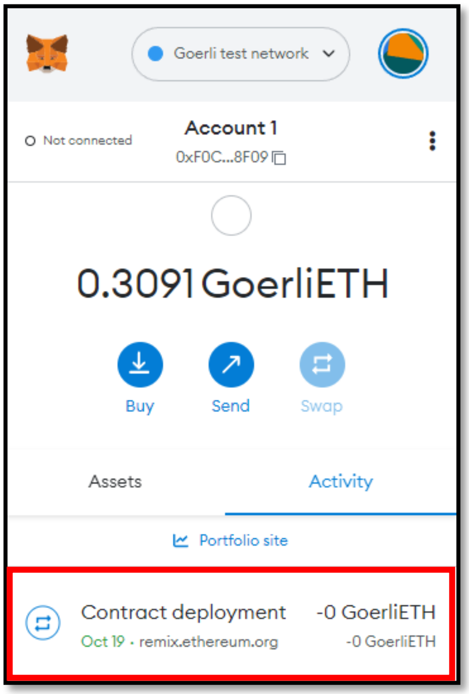
Balance: 0 ETH

```
0: bytes32: 0x48656c6c6f20576f726c6421
   0000000000000000000000000000000
   000000000
```

Bonus for Question 2

Now, go back to the “Solidity Compiler” option. In the code, substitute “bytes32” for “string memory”. Compile it again. Go to the “Deploy & Run Transactions” option. Press the “Deploy” button. Confirm the transaction on your MetaMask. Expand the dropdown menu of the new contract. Press the “world” button. See the result and answer question number 2 on your assignment.

In MetaMask, open the contract under “Activity” to check that it has been successful.



Goerli test network

○ Not connected

Account 1

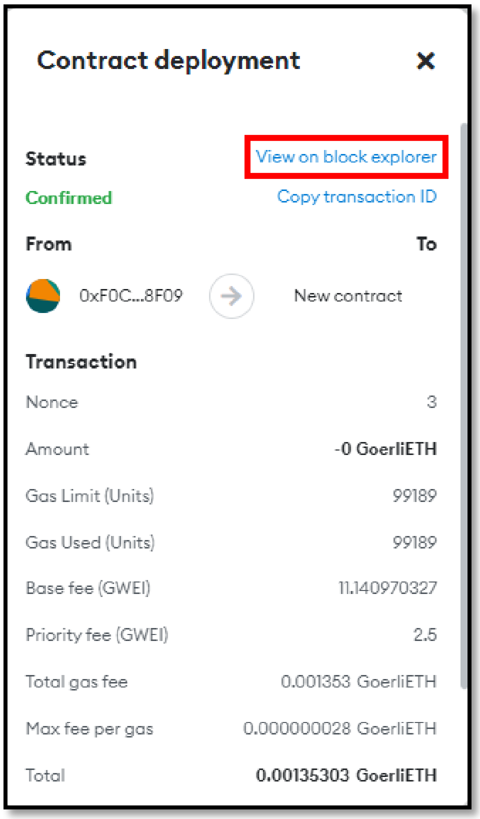
0xF0C...8F09

0.3091 GoerliETH

Contract deployment -0 GoerliETH

Oct 19 · remix.ethereum.org -0 GoerliETH

Select “View on block explorer.”



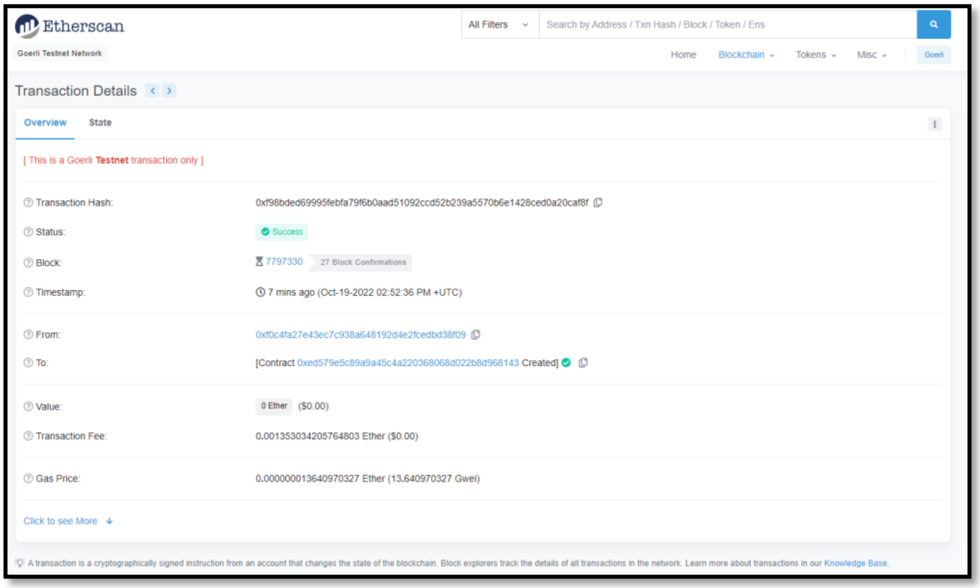
Contract deployment

Status	View on block explorer
Confirmed	Copy transaction ID
From	To
0xF0C...8F09	New contract

Transaction

Nonce	3
Amount	-0 GoerliETH
Gas Limit (Units)	99189
Gas Used (Units)	99189
Base fee (GWEI)	11.140970327
Priority fee (GWEI)	2.5
Total gas fee	0.001353 GoerliETH
Max fee per gas	0.000000028 GoerliETH
Total	0.00135303 GoerliETH

Here you can check the transaction details in Etherscan.



Transaction Details

[This is a Goerli **Testnet** transaction only]

Transaction Hash:	0xf98bded69995febfa79f6b0aad51092ccd52b239a5570b6e1428ced0a20caf8f
Status:	Success
Block:	7797330 27 Block Confirmations
Timestamp:	7 mins ago (Oct-19-2022 02:52:36 PM +UTC)
From:	0xf0c4fa27e43ec7c938a648192d4e2fcedbd38f09
To:	[Contract 0xed579e5c89a9a45c4a220368068d022b8d968143 Created] ✓
Value:	0 Ether ($0.00)
Transaction Fee:	0.001353034205764803 Ether ($0.00)
Gas Price:	0.000000013640970327 Ether (13.640970327 Gwei)

A transaction is a cryptographically signed instruction from an account that changes the state of the blockchain. Block explorers track the details of all transactions in the network. Learn more about transactions in our Knowledge Base.