

"Hello World" smart contract

solidity code

```
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 <0.9.0;

contract HelloWorld {
    uint256 private 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;
    }
}
```

screenshot

The screenshot displays the Remix IDE interface. On the left, the 'DEPLOY & RUN TRANSACTIONS' sidebar is active, showing the 'ENVIRONMENT' set to 'JavaScript VM (London)', the 'ACCOUNT' as '0x5B3...eddC4 (99.99999999)', and the 'GAS LIMIT' set to '3000000'. The 'CONTRACT' dropdown shows 'HelloWorld - contracts/1_Storage.sol'. Below this, there are buttons for 'Deploy', 'Publish to IPFS', and 'At Address'. The 'Transactions recorded' section shows '2' transactions. The 'Deployed Contracts' section shows a contract 'HELLOWORLD AT 0xD91...39138 (MEMO)' with buttons for 'store' and 'retrieve'. The 'Low level interactions' section shows a 'CALLDATA' field and a 'Transact' button.

The main editor shows the Solidity code for the 'HelloWorld' contract:

```

1 // SPDX-License-Identifier: GPL-3.0
2 pragma solidity >=0.7.0 <0.9.0;
3
4 contract HelloWorld {
5     uint256 private number;
6
7     /**
8      * @dev Store value in variable
9      * @param num value to store
10     */
11     function store(uint256 num) public {
12         number = num;
13     }
14
15     /**
16      * @dev Return value
17      * @return value of 'number'
18     */
19     function retrieve() public view returns (uint256) {
20         return number;
21     }
22 }
23

```

The bottom panel shows the 'creation of HelloWorld pending...' status. A green checkmark indicates the transaction was successful. The transaction details are as follows:

Field	Value
status	true Transaction mined and execution succeed
transaction hash	0x8f1a3a05aa840b358371e7466aedc9fc43a52e3245a64849c828349cec3d7110
from	0x5B38Da6a701c568545dCfcB03Fc875f56beddC4
to	HelloWorld.(constructor)
gas	80000000 gas
transaction cost	125677 gas
execution cost	125677 gas

Ballot

solidity code

write a batch function(giveRightToVoters) for reducing the number of transactions in the "giveRightToVote" function.The code is as follows:

```

/**
 * @dev Give 'voters' the right to vote on this ballot. May only be called by
 * 'chairperson'.
 * @param _voters addresses of voters
 */
function giveRightToVoters(address[] memory _voters) external {
    require(
        msg.sender == chairperson,
        "Only chairperson can give right to vote."
    );
    for (uint256 i = 0; i < _voters.length; i++) {
        address voter = _voters[i];
        if (!voters[voter].voted && (voters[voter].weight == 0)) {
            voters[voter].weight = 1;
        }
    }
}

```

gas cost

giveRightToVote:

CONTRACT: Ballot - contracts/3_Ballot.sol

Deploy: [0x7a6b750000000000000000000000000000000000]

At Address: Load contract from Address

Transactions recorded: 12

Deployed Contracts: BALLOT AT 0x9D7...B5E99 (MEMORY)

delegate: address to

giveRightToVote: 0x10379EC68C32563E2321F023A96e4F4Dc8a8B4

vote: uint256 proposal

chairperson

0: address: 0x5B38Da6a701c568545dCfC803FcB875F56beddC4

proposals: uint256

voters: address

```

53
54 function giveRightToVote(address voter) public {
55     require(
56         msg.sender == chairperson,

```

[vm] from: 0x5B3...eddC4 to: Ballot.giveRightToVote(address) 0x9D7...b5E99 value: 0 wei data: 0x9e7...8a0b4 logs: 0 hash: 0xc24...652d

status: true Transaction mined and execution succeed

transaction hash: 0xc2451b30be62e068229Fe7e210c8dbf38dca767639eeceb9884a81fb5c1652d5

from: 0x5B380a6a701c568545dCfC803FcB875F56beddC4

to: Ballot.giveRightToVote(address) 0x9D7F74d0C41E726EC95884E0e97Fa6129e3b5E99

gas: 80000000 gas

transaction cost: 48657 gas

execution cost: 48657 gas

hash: 0xc2451b30be62e068229Fe7e210c8dbf38dca767639eeceb9884a81fb5c1652d5

input: 0x9e7...8a0b4

decoded input: { "address voter": "0x10379EC68C32563E2321F023A96e4F4Dc8a8B4" }

decoded output: {}

logs: []

val: 0 wei

the gas cost of giving 1 voter the right to vote is 48657. So the gas cost of giving 10 voters the right to vote is 486570.

giveRightToVoters:

ENVIRONMENT: JavaScript VM (London)

ACCOUNT: 0x5B3...eddC4 (99.99999999)

GAS LIMIT: 3000000

VALUE: 0 Wei

CONTRACT: Ballot - contracts/3_Ballot.sol

Deploy: [0x7a6b750000000000000000000000000000000000]

At Address: Load contract from Address

Transactions recorded: 18

Deployed Contracts: BALLOT AT 0xCd6...99DF9 (MEMORY)

delegate: address to

giveRightToVote: address voter

giveRightToVote: [0xc2451b30be62e068229Fe7e210c8dbf38dca767639eeceb9884a81fb5c1652d5]

vote: uint256 proposal

chairperson

proposals: uint256

```

59     require(
60         !voters[voter].voted,
61         "The voter already voted."
62     );
63     require(voters[voter].weight == 0);
64     voters[voter].weight = 1;
65 }
66
67 function giveRightToVoters(address[] memory _voters) external {
68     require(
69         msg.sender == chairperson,
70         "Only chairperson can give right to vote."
71     );
72     for (uint256 i = 0; i < _voters.length; i++) {
73         address voter = _voters[i];

```

[vm] from: 0x5B3...eddC4 to: Ballot.giveRightToVoters(address[]) 0xcD6...99DF9 value: 0 wei data: 0xa1c...05c03 logs: 0 hash: 0x4f1...69e9c

status: true Transaction mined and execution succeed

transaction hash: 0x4f1abe2c6ad262665d2ad76c635ce353aebefc538c4da604dcf24f608a69ebc

from: 0x5B380a6a701c568545dCfC803FcB875F56beddC4

to: Ballot.giveRightToVoters(address[]) 0xcD6a42782d23807c13A74ddc5d0148e55499DF9

gas: 80000000 gas

transaction cost: 279412 gas

execution cost: 279412 gas

hash: 0x4f1abe2c6ad262665d2ad76c635ce353aebefc538c4da604dcf24f608a69ebc

input: 0xa1c...05c03

decoded input: { "address[] _voters": ["0xf664087a5b09237a8BA46742852ec6a60A27a", "0x59f8CE10f6fCf9010ae294557A23561765C41", "0xA1c8423AdBfBCf889567C58fa76784d88973342", "0xDeceFA6CC9A08680D0e68Aac1c888d6fAcB4d598", "0x808c34657cd931e4136fAd0c837597704CD48", "0x72Cb18C6bFA5624d07Ef688827366b6990048F", "0xFe1b516A7297eb03229AB85FA080703911E1cB", "0xE211Df0856330A8C5d6a82E60c726550045d1D", "0x725533c9aA9039326273A076D03163037716A", "0x999a0353a351ff3679A9bA56cded78970285C83"] }

the gas cost of giving 10 voters the right to vote is 279412.