Simple Ethereum Smart Contract Tutorial

# Step 1: Set Up Your Environment

Tools Required:  
1. Remix IDE → https://remix.ethereum.org (Online tool to write & deploy smart contracts)  
2. MetaMask → https://metamask.io/ (Browser wallet to interact with Ethereum)  
3. Web3.js (For interacting with the contract using JavaScript)

# Step 2: Write a Simple Smart Contract

This is a very simple voting contract where users can vote for Alice or Bob.  
1. Open Remix IDE → https://remix.ethereum.org  
2. Create a new file SimpleVoting.sol  
3. Copy and paste the following easy Solidity code:

// SPDX-License-Identifier: MIT  
pragma solidity ^0.8.0;  
  
contract SimpleVoting {  
 mapping(string => uint) public votes;  
  
 function vote(string memory candidate) public {  
 require(  
 keccak256(abi.encodePacked(candidate)) == keccak256(abi.encodePacked("Alice")) ||  
 keccak256(abi.encodePacked(candidate)) == keccak256(abi.encodePacked("Bob")),  
 "Candidate must be Alice or Bob"  
 );  
 votes[candidate]++;  
 }  
}

# Step 3: Compile the Smart Contract

1. In Remix, go to the Solidity Compiler tab.  
2. Select Solidity version 0.8.0 or later.  
3. Click Compile SimpleVoting.sol.

# Step 4: Deploy the Smart Contract

1. Open the Deploy & Run Transactions tab in Remix.  
2. Select Injected Web3 as the environment (this connects to MetaMask).  
3. Click Deploy and confirm the transaction in MetaMask.  
4. Your contract is now deployed! 🎉

# Step 5: Interact with the Contract

Once deployed, you can vote and check votes:  
1. In Remix, under Deployed Contracts, click on your contract.  
2. Call the vote function:  
 - Type 'Alice' or 'Bob' and click vote.  
 - Confirm the transaction in MetaMask.  
3. Check votes by clicking on votes('Alice') or votes('Bob').

# Step 6: Interact Using Web3.js (Optional)

If you want to interact using JavaScript & Web3.js, follow these steps:  
1. Install Web3.js (if not installed):  
 npm install web3  
2. Create a JavaScript file (index.js) and add this simple script:

const Web3 = require("web3");  
const web3 = new Web3(window.ethereum);  
const contractAddress = "YOUR\_DEPLOYED\_CONTRACT\_ADDRESS";  
const contractABI = [  
 {  
 "inputs": [{ "name": "candidate", "type": "string" }],  
 "name": "vote",  
 "outputs": [],  
 "stateMutability": "nonpayable",  
 "type": "function"  
 }  
];  
  
const contract = new web3.eth.Contract(contractABI, contractAddress);  
  
async function vote(candidate) {  
 const accounts = await web3.eth.getAccounts();  
 await contract.methods.vote(candidate).send({ from: accounts[0] });  
 console.log(`Voted for ${candidate}`);  
}  
  
async function getVotes(candidate) {  
 const votes = await contract.methods.votes(candidate).call();  
 console.log(`${candidate} has ${votes} votes`);  
}