**Voting with Blockchain**

**Problem Statement:**

The election is a fundamental pillar of a democratic system, which enables the public to express their views in the form of a vote. Due to their significance in our society, the election process should be transparent and reliable to ensure participants of its credibility.

Online voting is a trend that is gaining momentum in modern society. It has great potential to decrease organizational costs and increase voter turnout. It eliminates the need to print ballot papers or open polling stations—voters can vote from wherever there is an Internet connection. Despite these benefits, online voting solutions are viewed with a great deal of caution because of:

* Eligibility: Only legitimate voters should be able to take part in voting.
* Nonreusability: Each voter can vote only once.
* Privacy: No one except the voter can obtain information about the voter’s choice.
* Fairness: No one can obtain intermediate voting results.
* Soundness: Invalid ballots should be detected and not taken into account during tallying.
* Completeness: All valid ballots should be tallied correctly.

Blockchain technology came into the ground to overcome these issues. It offers decentralized nodes for electronic voting and is used to produce electronic voting systems for their end-to-end verification advantages. This technology is a replacement for traditional electronic voting solutions with distributed, non-repudiation, and security protection characteristics.

In this use case, three parties are involved:

1. Voting Admin

* Start election
* End election
* Show results

1. Voter

* Register a new voter
* Vote for the candidate
* Delegate the voting right
* View voter details

1. Candidate

* Register a new candidate
* View the list of candidates
* View candidate details

**Features of the application:**

1. Add a new candidate

This function helps to add a new candidate to the election, which can be done only by the admin before the election starts. This function takes the following parameters:

* string memory \_name 🡪 Name of the candidate
* string memory \_proposal 🡪 Election promise of the candidate
* address owner 🡪 Owner of the contract

1. Add a new voter

This function helps to add a voter, which can be done only once by the admin before the election starts. This function takes the given parameters:

* address \_voter 🡪 Ethereum address of the voter
* address owner 🡪 Owner of the contract

1. Start Election

This function helps the admin to start the election (setting the Election state to ONGOING). This function takes the address of the contract owner as an input parameter.

1. Display the candidate details

This function helps to show candidate details. The input to this function is the ID of the candidate, and in the response, it returns the following parameters:

* ID 🡪 ID of the candidate
* Proposal 🡪 Election promise of the candidate
* Name 🡪 Name of the candidate

1. Show the Winner of the election

This function helps to show the winner of the election. This function has no input arguments, but it returns the following fields:

* Candidate name
* Candidate ID
* Votes secured

1. Delegate the voting right

This function helps to delegate a voter’s voting rights to someone else. This function can be called only when the election is going on and by a voter who has not yet voted. This function has the following two input parameters:

* Delegate person address
* Voter address

1. Cast the vote

This function helps voter to cast their vote. It has the below two input arguments:

* Candidate ID is the candidate who has to be voted
* Voter address

1. End the election

This function helps the admin to end the ongoing election. This function can be called only by the admin (contract owner).

1. Show election results (candidate wise)

This function helps to show the votes received by any given candidate. This function takes the candidate ID as input and returns the below fields in response.

* Candidate ID
* Candidate name
* Number of votes received

1. View the voter’s profile

This function helps to view the voter profile. It takes the voter’s address as input and returns the following fields in response:

* Voter’s name
* The candidate who has been voted
* If the vote is delegated or not

**Recommended technologies:**

1. Smart Contract development: Solidity
2. IDE Tool: Remix
3. Blockchain: Ethereum
4. Server: Ganache Blockchain

**Project development guidelines:**

* The project will be delivered within four sprints with every sprint delivering a minimal viable product.
* It is mandatory to do proper sprint planning with user stories to develop all the components of the project.
* The learner can use any technology from the above-mentioned technologies for different layers of the project.
* The learner has to maintain the version of the application over GitHub and every new change should be sent to the repository.
* The learner should also deploy and host the application on any blockchain instance.

**Project output:**

Graphical user interface, application

Description automatically generated

Start the election by admin:

Graphical user interface, application

Description automatically generated

Add a New candidate:

Graphical user interface, application, chat or text message

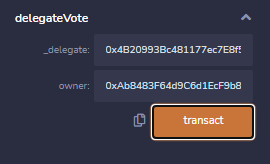
Description automatically generated

Add a new voter:

Graphical user interface, application

Description automatically generated

Delegate the vote:



Cast the vote:

Graphical user interface, application, Teams

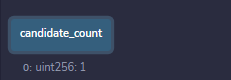
Description automatically generated

End the election:

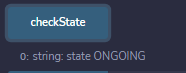
Graphical user interface, application

Description automatically generated

Count the number of candidates participating in the election:



Check the status of the election:



View candidate details:

A screenshot of a computer

Description automatically generated with medium confidence

Get voter details:

A screenshot of a computer

Description automatically generated with medium confidence

Show election results:

A screenshot of a computer

Description automatically generated with medium confidence

Show the Election winner:

Graphical user interface, text, application, chat or text message

Description automatically generated

Number of Voters who participated in voting:

Graphical user interface, application

Description automatically generated

View the voter’s profile:

A screenshot of a computer

Description automatically generated with medium confidence