E-Voting Smart Contracts

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Solidity Functions

Modifiers

```
    /**
* @notice To check if the voter's age is greater than or equal to 18
* @param currentTime_ Current epoch time of the voter
     */
    modifier votingLinesAreOpen(uint256 currentTime_) {
require(currentTime_ >= votingStartTime);
        require(currentTime_ <= votingEndTime);
        _;
    }

    /**
* @notice To check if the voter's age is greater than or equal to 18
* @param voterAadhar_ Aadhar number of the current voter
* @param nominationNumber_ Aadhar number of the candidate
     */
    modifier isEligibleVote(uint256 voterAadhar_, uint256 nominationNumber_) {
        Types.Voter memory voter_ = voter[voterAadhar_];
        Types.Candidate memory politician_ = candidate[nominationNumber_];
require(voter_.age >= 18);              require(voter_.isAlive);
require(voter_.votedTo != 0);           require(
            (politician_.stateCode == voter_.stateCode &&
politician_.constituencyCode == voter_.constituencyCode)
        );
        _;
    }

    /**
     * @notice To check if the user is Election Chief or not
     */
```

```solidity
    modifier isElectionChief() {
require(msg.sender == electionChief);
        _;
    }
```

Voting timelines

- •Voting will only be opened between a particular date(s) & election chief has the right to update the start & end dates of the voting process.

- •start date can only be updated only if the voting process is not started yet

- •Can extend the voting end date after the voting is started & before the voting is ended

```solidity
    /**
* @dev used to update the voting start & end times
* @param startTime_ Start time that needs to be updated
* @param currentTime_ Current time that needs to be updated
     */
    function updateVotingStartTime(uint256 startTime_, uint256 currentTime_)
public           isElectionChief
    {
        require(votingStartTime > currentTime_);
votingStartTime = startTime_;        }


    /**
* @dev To extend the end of the voting
* @param endTime_ End time that needs to be updated
* @param currentTime_ Current time that needs to be updated
     */
    function extendVotingTime(uint256 endTime_, uint256 currentTime_)
public           isElectionChief
    {
        require(votingStartTime < currentTime_);
require(votingEndTime > currentTime_);
        votingEndTime = endTime_;        }
```

Results

Everyone can check the voting results once the voting lines are closed

```solidity
    /**
* @dev sends all candidate list with their votes count        * @param currentTime_
  Current epoch time of length 10.
* @return candidateList_ List of Candidate objects with votes count
     */
    function getResults(uint256 currentTime_)
public        view            returns
(Types.Results[] memory)
    {
```

```solidity
        require(votingEndTime < currentTime_);

        Types.Results[] memory resultsList_ = new Types.Results[](
candidates.length             );

        // Since the candidates will be lesser in count than voter.

        // So looping is acceptable.             for (uint256 i = 0; i <
candidates.length; i++) {                    resultsList_[i] = Types.Results({
name: candidates[i].name,                    partyShortcut:
candidates[i].partyShortcut,                    partyFlag:
candidates[i].partyFlag,                    nominationNumber:
candidates[i].nominationNumber,                    stateCode:
candidates[i].stateCode,                    constituencyCode:
candidates[i].constituencyCode,                    voteCount:
votesCount[candidates[i].nominationNumber]
            });
}
        return resultsList_;

    }
```

Custom Types

```solidity
    struct Voter {              uint256 aadharNumber; // voter unique
ID           string name;             uint8 age;             uint8
stateCode;             uint8 constituencyCode;             bool
isAlive;           uint256 votedTo; // aadhar number of the
candidate
    }


    struct Candidate {

        // Note: If we can limit the length to a certain number of bytes,             // we can
use one of bytes1 to bytes32 because they are much cheaper


        string name;             string partyShortcut;
string partyFlag;           uint256 nominationNumber; // unique ID of
candidate           uint8 stateCode;

        uint8 constituencyCode;
    }


    struct Results {             string name;             string
partyShortcut;           string partyFlag;             uint256
voteCount; // number of accumulated votes           uint256
nominationNumber; // unique ID of candidate           uint8
stateCode;

        uint8 constituencyCode;        }
```

Voting Methods

Function Name	Input Params	Return Value	Description

Function Name	Input Params	Return Value	Description
isVoterEligible()	voterAadharNumber	Boolean voterEligible_	To check whether voter is eligible to vote or not based on the pre-defined assumptions like the age greater than or equal to 18
Function Name	Input Params	Return Value	Description
			& is alive
didCurrentVoterVoted()	voterAadharNumber	Boolean userVoted_, Candidate	To check if the current voter has casted their vote or not. If voted then returns the candidate object to whom he/she casted their vote to
getVotingEndTime()	-	End time in epoch	To get the voting end time
getCandidateList()	voterAadharNumber	Candidate[]	To get the list of candidates who belongs to the current voter constituency
vote()	nominationNumber of candidate, voterAadharNumber, current Time in epoch	-	To cast one's vote to a particular candidate who belong to their own constituency
getResults()	current time in epoch	Results[]	To get the voting results. Can be called by anyone but only after the voting lines are closed
updateVotingStartTime()	start time in epoch, current time in epoch	-	To update the voting start date & time (Can only be called prior to voting start)
extendVotingTime()	end time in epoch, current time in epoch	-	To extend the voting timelines (Can only be done once voting process starts & before the voting ends)

Versions

Quick Start

1. cd into project repro

```
cd E-Voting cd
blockchain
```

2.download node libraries

```
npm install
```

3.Download/Start ganache https://truffleframework.com/ganache

4.Compiling contracts

```
truffle compile
```

5.Migrating to ganache

Note depending on ganache cli/ui you my need to change truffle.js port settings Current listing on port : 7545   `truffle`

```
migrate --network development  --reset --all
```

6.Testing on ganache

```
truffle test
```

7.Switch to FrontEnd & Testing

Note Change settings to your Contract address to point to local

```
cd ..
cd front-end
```
`npm install`   `npm start`

8.Migrating to Rinkeby

Note Change truffle settings to your Contract Creator address within the "from" rinkeby configuration

```
truffle migrate --network rinkeby  --reset --all
```

9.Start FrontEnd on Rinkeby

Note Revert back all your local configurations & configure it to point to rinkeby   `npm`
`start` Test Voters

User Name	Aadhar Number	State	Constituency	Age	isAlive
Suresh	482253918244	Andhra Pradesh	Guntur	21	☑
Ramesh	532122269467	Andhra Pradesh	Guntur	37	✖
Mahesh	468065932286	Andhra Pradesh	Guntur	26	☑
User Name	Aadhar Number	State	Constituency	Age	isAlive
Krishna	809961147437	Andhra Pradesh	Krishna	19	☑

Narendra	908623597782	Andhra Pradesh	Krishna	3 6	☑
Raghu	760344621247	Andhra Pradesh	Krishna	4 2	☑
Pushkar Kumar	908704156902	Bihar	Patna	2 5	☑
Kunal Kumar	778925466180	Bihar	Patna	3 7	☑
Aausi	756623869645	Bihar	Patna	8 5	✖
Ruchika	967746320661	Bihar	Patna	2 6	☑
Rambabu	727938171119	Bihar	Patna	1 7	☑
Matajii	609015917688	Bihar	Patna	9 8	☑
Kumar Sanket	393071790055	Bihar	Dehri	2 9	☑
Pratik	983881786161	Bihar	Dehri	4 0	☑
Pratiba	588109459505	Bihar	Dehri	6 8	✖
Mamata	620107691388	Bihar	Dehri	6 3	✖
Ravi Varma	403561319377	Bihar	Dehri	4 2	☑
Rahul	837970229674	Bihar	Dehri	5 6	☑

Politicians who participate in elections

Candidate Name	Party Name	State	Constituency
Chandra Babu Naidu	TDP	Andhra Pradesh	Guntur
Jagan Mohan	YSRCP	Andhra	Guntur

Candidate Name	Party Name	State	Constituency
Reddy		Pradesh	

G V Anjaneyulu	TDP	Andhra Pradesh	Krishna
Anil Kumar Yadav	YSRCP	Andhra Pradesh	Krishna
Narendra Modi	BJP	Bihar	Patna
Rahul Gandhi	INC	Bihar	Patna
Tejaswi Yadav	RJD	Bihar	Patna
Arvind Kejriwal	AAP	Bihar	Patna
Mamata Banarjee	TMC	Bihar	Patna
Jyoti Basu	CPIM	Bihar	Patna
Amit Shah	BJP	Bihar	Dehri
Priyanka Gandhi	INC	Bihar	Dehri
Lalu Yadav	RJD	Bihar	Dehri
Manish Sisodia	AAP	Bihar	Dehri
Prakash Karat	CPIM	Bihar	Dehri