**AUTOMATIC VOTING SYSTEM**



**Project by: Suhas M S**

**Candidate id: 105287**

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# 1 INTRODUCTION

## 1.1 Problem statement:

To develop a system with c programming, which automatically records votes casted for candidates in an election and displays the results of election. The main aim is to overcome the problems faced in using traditional voting systems.

Some of the traditional voting systems based on ballot papers and punch card techniques have inherent disadvantages wherein they provide easier ways for malpractices. For example, in ballot paper method, these papers can be easily altered to favor against any of the candidate in order to increase the number of votes for that candidate. Also, they have many technical problems such as error in scanning of ballots or inherent problem with the padding machine. In governmental elections, multiple ballot papers may be issued to a single person and might be asked to vote for a particular candidate. This leads to false counts of the votes, favoring one of the candidates in the election. In addition, due to manual counting of votes by human, these systems are more prone to manual errors which occur while counting votes and would lead to false vote counts and might even affect the overall result of elections.

Hence these traditional voting systems lead to unfair selection of candidates in elections. This might have serious impact on society as it might lead to selection of untruthful and unfit candidates. These problems also affect the honest and truthful candidates. As a whole, this might indirectly lead to corruption and would also affect the economy of the country. At, the organizational levels such traditional methods of voting might lead to selection of ineligible and unfit employees for responsible posts and this would hamper the growth of the organization as a whole. Finally, these voting systems involve using machines for counting and scanning which increases the overall cost.

## 1.2 Description:

This project involves developing a system using c programming, which automatically records the votes casted by voters to candidates in an election and displays the result i.e the winner of the election and the number of votes obtained by each candidate in the election. This is basically a console application.

* Basically, there will be two options one for the voters and the other for election administrator.
* The user can only cast the vote, while the information such as number of votes obtained by each candidate and name of the leading candidate can be accessed only by authorized election administrator.
* If the user is a voter, then he/she will be asked for unique voter id, if it is valid then a list of candidates contesting in the election is displayed and the voter will be asked to select the candidate of his/her choice with corresponding serial number. The voter can also choose none of the above, if he/she is not interested to cast vote to any of the candidates.
* Each voter can cast his/her vote only once, if a second attempt is made to cast the vote, then the system displays that the entered voter id is a duplicate indicating that the voter has already casted his/her vote and is not allowed to cast another vote.
* If the user is election administrator, then the system asks for unique password of admin, if it matches then the election administrator can view either total number of votes obtained by each individual or leading candidate at that point of time.
* If there is a tie between two or more candidates then the system outputs that there is no win (tie) situation.

**1.2.1 Aim**: The goal of this project is to develop an automatic voting system which records the votes casted by voters and displays the winner of the election. This system would overcome the limitations of traditional voting systems and provide transparent, cost effective, dynamic and less error prone method for casting votes.

**1.2.2 Scope**: It has wide range of scope right from being able to be used in elections conducted in educational institutions and private organizations to feedback polls and governmental elections.

# 2. Research:

In earlier days most of the elections were conducted using ballot papers, where the voters used to write or mark the name of the candidate they wanted to vote and put the paper into the vote collection boxes or scanning machines. These techniques have inherent disadvantages wherein they provide easier ways for malpractices. For example, in ballot paper method, these papers can be easily altered to favor against any of the candidate in order to increase the number of votes for that candidate. Also, they have many technical problems such as error in scanning of ballots or inherent problem with the padding machine. In governmental elections, multiple ballot papers may be issued to a single person and might be asked to vote for a particular candidate. This leads to false counts of the votes, favoring one of the candidates in the election. In addition, due to manual counting of votes by human, these systems are more prone to manual errors which occur while counting votes and would lead to false vote counts and might even affect the overall result of elections.

Hence these traditional voting systems lead to unfair selection of candidates in elections. This might have serious impact on society as it might lead to selection of untruthful and unfit candidates. These problems also affect the honest and truthful candidates. As a whole, this might indirectly lead to corruption and would also affect the economy of the country. At, the organizational levels such traditional methods of voting might lead to selection of ineligible and unfit employees for responsible posts and this would hamper the growth of the organization as a whole. Finally, these voting systems involve using machines for counting and scanning which increases the overall cost.

In-order to overcome the limitations of these traditional voting systems. Electronic voting machines (EVM) were invented. The automatic voting system developed in this project incorporates several features of EVMs along with new ones.

The automatic voting system developed in this project overcomes the limitations and problems faced in traditional voting systems due to following reasons:

1. It is transparent, as it does not involve any external items such as ballot paper.
2. It is cost effective, as most of the task is achieved at software level using the program.
3. It does not involve any mechanical parts, such as a counting machine. Hence it is safe from external damage and alterations.
4. Time taken for counting votes and declaring results are very less compared to traditional systems where it takes time in hours for counting votes and declaring results.
5. Less prone to errors, as it does not involve any human intervention.

## 2.1 Applications:

Following are some of the applications of automatic voting system:

1. Elections conducted in educational institutions.
2. Elections conducted in private organizations.
3. To get feedback and ratings at shopping malls.
4. For selection of candidates in governmental organizations.

# 3. Requirements

## 3.1 Functional requirements:

Following are the features that the system shall have:

* The main menu shall contain three options:

1. Option for the voter to cast his/her vote
2. Option for election administrator to view total number of votes obtained by each individual or leading candidate at that point of time.
3. Option to exit from the application.

* Each voter is provided with unique 4 digits voter-id.
* Each voter is allowed to vote only one, further attempts to vote must be avoided.
* A voter must be allowed to cast his/her vote only if he/she enters his/her unique voter-id.
* The election administrator is also provided with unique 4 digist password.
* The election administrator must enter valid password in-order to access options available for him/her. If he/she enters invalid password then access must be denied.
* The system must record the votes casted by voters for each candidate and display the results when accessed by the election administrator.
* If there is a tie between two or more candidates then the system must display that there is a tie.

## 3.2 Non-functional requirements:

* The system shall provide the results of election in short amount of time (less than a minute).
* The overall cost of the system shall be less than that of traditional systems.
* The system must consume lesser power than traditional voting systems.
* The system should be secure from external software and hardware modifications which might lead to malfunctioning of the system.

## 3.3 Software requirements:

1. A complier for compiling c code such as GNU GCC compiler, Borland etc.
2. An Ide such as code-blocks or visual studio or turbo c for executing the c code and provide user interface.

## 3.4 Hardware requirements:

* A laptop or a desktop with modern processor and adequate storage apace.
* A well working keyboard to read inputs such as voter id, admin password and options from users.
* Any modern operating system (windows or linux or mac) installed.
* Power supply source and adapter.

# 4 Design

## 4.1 High level design:

* The main menu will contain three options

1. Option for the voter to cast his/her vote
2. Option for election administrator to view total number of votes obtained by each individual or leading candidate at that point of time.
3. Option to exit from the application

* If the user enters invalid option then the system displays that the option is invalid.
* If the user selects option 1 to cast his/her vote, the system first asks for the unique voter id of the voter.
* If the voter id entered by user is invalid or duplicate (voter has already casted the vote and trying to cast the vote again), then the system displays that the entered voter id is incorrect or duplicate and denies the voter from casting vote.
* If the voter id entered by voter is correct and if it is the first vote of the voter then the system will display the list of candidates contesting in the election along with corresponding serial number and asks the user to select the serial number of the candidate whom they want to vote. Voter can also choose none of the above if he/she is not willing to vote any of the candidates. The vote casted by the user will be recorded and added to the total number of votes obtained by selected candidate.
* If the user selects option 2 i.e if the user is election administrator, then the system will ask the user for administrator password. If the entered password is incorrect then the system will display that the entered password is incorrect and denies further action.
* If the entered password is correct then the system provides three options.

1. Option to view the total number of votes obtained by each candidate.
2. Option to view the leading candidate.
3. Option to exit from the application.

* If the entered option is 1, then the system will display a list containing the total number of votes obtained by each candidate.
* If the entered option is 2, then the system will display the name of the leading candidate, if there is a tie between two or more candidates then the system prints that there is a tie.
* If the entered option is 3, then the user exits from the application.
* If the user selects invalid option, then the system displays that it is invalid option.

## 4.2 Low level design:

## Functions defined in the program:

1. cast\_Vote() : This function checks if the voter id is correct and if it is the first vote by the voter and displays the list of candidates contesting in election and records the vote casted by voter to a particular candidate.
2. vote\_Count() : This function displays the total number of votes obtained by each candidate. This function is called when only when the election admin password is correct.
3. leadingCandidate() : This function displays the name of the leading candidate, if there is a tie then it prints that there is a tie. This function is called when only when the election admin password is correct.
4. main(): as in any other c program this function is mandatory. It controls the functioning of main menu. It basically displays the options available for user i.e voter and election admin options as well as option to exit from the program. Based on option entered by user it calls one of the functions defined above.
5. admin\_password(): checks if entered admin password is correct or incorrect. (admin password: 1723). Returns 0 if password is correct, returns 1 if password is incorrect.
6. voter\_check(): checks if entered voter id is valid or invalid. (typicaly voter id is four digits number such as 1234,1324,1432,1243 etc). returns 1 if entered voter id is valid and returns 0 if entered voter id is invalid.

## 4.3 Outlook of the program

1. following is the list that appears when a new user enters the program.

* Option 1: for voter.
* Option 2: for admin.
* Option 3: exit from the program.

1. In this program a record of 15 voters is maintained just for the purpose of demonstration and can be programmed to accommodate any number of voters.
2. The voter id is a 4 digits unique number such as 1234,1431 etc.
3. The election administrator password is also a 4 digits number 1723.
4. When voter enters valid voter id a list of four candidates contesting in election along with none of the above option appears.
5. Following is the list of candidates that appears when voter enters valid voter id

* Serial no 1: Rohit Sharma
* Serial no 2: Shikhar Dhawan
* Serial no 3: Virat Kohli
* Serial no 4: M S Dhoni
* Serial no 5: None of the above

1. Following is the list of options available for election administrator

* Option 1: view total number of votes available for each candidate.
* Option 2: view the name of the leading candidate.
* Option 3. Exit from the program.

## 4.4 Activity diagram

Enter option corresponding to voter or admin

Option 3: exit

Option 2: admin

Display “invalid option”

Invalid option

Check validity of option

Option 1: voter

Enter admin password

Enter voter id

invalid

Check validity

Check validity

Display “invalid admin password”

Invalid or duplicate voter id

Display “invalid or duplicate voter id”

Valid voter id

Display candidates serial no. and voter enters serial no.

Display options, admin enters desired option

Display name of leading candidate or tie message

Display number of votes obtained by each candidate

Option 2

Option 1

Record the vote for the chosen candidate

invalid

Display “invalid option

Invalid serial no.

Check entered option

Check entered serial no

Valid serial no

Display “invalid serial no”

”

# 5.Test plan

## 5.1 Test objectives:

1. To ensure whether the system distinguishes between options available for voter and election administrator.
2. To ensure that the system allows only authorized voter (who enters his/her valid unique voter id) to cast their votes.
3. To ensure that the system allows a voter to cast his/her vote only once.
4. To ensure that the system allows only the user entering valid election admin password to view the results of election.
5. To ensure that the system displays correct results (total number of votes obtained by each candidate and the name of the leading candidate).

## 5.2 Testing methods:

One or both of the following methods can be used for testing:

1. Manual testing by executing mentioned test cases.
2. By using automatic testing frameworks such as unity.

## 5.3 Testing strategy:

1. Unit testing: All the modules or functions are testing for specific requirements. If there are any issues then they must be resolved. This also involves regression testing.
2. Integration and system testing: The entire application is tested for the required functionality after unit testing is successful.
3. Acceptance testing: Typically carried out in real time or customer environments.

## 5.4 Assumptions:

1. It is assumed that each voter is issued with unique four digits voter id.
2. It is assumed that the election administrator has unique four digits password (1723).

## 5.5 Test deliverables:

Results depicting the details of test cases which have either failed or passed. This helps in identification of bugs and errors which can be fixed.

## 5.6 Exit criteria for testing:

Testing is stopped only when all the test cases pass. If any of the test cases fail, then the corresponding bug has to be fixed and again tested. By manual testing, all of the below mentioned test cases have passed.

## 5.7 Test scenarios:

1. Ts1: Check if the system provides two options, one for voter and other for admin.
2. Ts2: Check functionality of voter.
3. Ts3: Check if the voter is allowed to vote only once or not.
4. Ts4: Check voting function
5. Ts5: Check functionality of admin
6. Ts6: Check the option available for admin to view the number of votes obtained by each candidate
7. Ts7: Check the option available for admin to view the name of leading candidate

## 5.8 Test case table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| TSN | TCN | Test case | Test data | Expected results | Actual results | P/F |
| Ts1 | Tc1 | Enter option for voter | enter option 1 | Voter id of voter is asked | Same as expected result | P |
| Ts1 | Tc2 | Enter option for admin | Enter option 2 | Password of admin is asked | Same as expected result | P |
| Ts1 | Tc3 | Enter option to exit from program | Enter option 3 | Exit from main menu | Same as expected result | P |
| Ts1 | Tc4 | Enter invalid option (1 digit number) | Enter invalid option  Ex: 5 | System displays “invalid option” | Same as expected result | P |
| Ts2 | Tc5 | Enter valid 4 digits voter id | Enter valid 4 digits  voter id  ex: 1234 | List of candidates is displayed | Same as expected result | P |
| Ts2 | Tc6 | Enter invalid 4 digits voter id | Enter invalid 4  digits voter id ex: 1763 | System displays “invalid or duplicate voter id” | Same as expected result | P |
| Ts3 | Tc7 | Enter duplicate (used) voter id | Enter already used voter id ex: 1234 | System displays “invalid or duplicate voter id” | Same as expected result | P |
| Ts3 | Tc8 | Enter 1 digit serial no. of any candidates | Enter either 1/2/3/4/5 | Message “thank you for voting” is displayed | Same as expected result | P |
| Ts3 | Tc9 | Enter invalid 1 digit serial no. | Enter 1 digit number other than 1 to 5 | Message “invalid choice” is displayed and main menu is displayed. | Same as expected result | P |
| Ts4 | Tc10 | Enter valid password of admin | Enter 1723 | A list of options for admin is displayed | Same as expected result | P |
| Ts4 | Tc11 | Enter invalid password | Enter 4 digits incorrect password ex: 1521 | Message “invalid password” is displayed | Same as expected result | P |
| Ts5 | Tc12 | Enter option 1 to view the number of votes obtained by each candidate | Enter option 1 to view the number of votes obtained by each candidate | Number of votes obtained by each candidate is displayed | Same as expected result | P |
| Ts6 | Tc12 | Enter option 2 to view the name of leading candidate | Enter option 2 to view the name of leading candidate | The name of the candidate with highest votes is displayed, if there is a tie a message “tie” is displayed | Same as expected result | P |

Table 1. Test cases table

## 5.9 Abbreviations:

1. TSN: test scenario number.
2. TCN: test case number.
3. P/F: pass or fail.

# 6 Conclusion and outcomes:

The automatic voting system developed in this project using c programming serves as alternative to traditional voting systems such as ballot and punch card methods, in that it is more secure and faster than these conventional systems. This system does not involve use of papers for casting vote hence it does not harm the environment as it does not involve any waste. It is less prone to errors, especially it is free from manual errors which occur in conventional systems while counting votes. As mentioned earlier the automatic voting system has various applications right from elections conducted in educational institutions to feedback polls and elections conducted by government.