

VOTING SYSTEM



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<u>Abstract</u>:

The word VOTE means to choose from a list, to elect or to determine. The main goal of voting (in a scenario involving the citizens of a given country) is to come up with leaders of the people's choice. Most countries, India not an exception, have problems when it comes to voting. Some of the problems involved include rigging votes during election, insecure or inaccessible polling stations, inadequate polling materials and also inexperienced personnel. The Voting System is a simple, safe and secure method that takes a minimum amount of time. The objective is to prepare an application or a software, which could maintain data & provide a user friendly interface for retrieving candidate related details just in a few seconds. with 100% accuracy. Software is completely computerized, so it is not a time consuming process, no paperwork required & can be implemented further. This smart system reduces the time for voting and also the system is reliable, and faster. This will reduce the manual workload and give information instantly. The software will maintain the list of users records. The software will be user friendly so that even a beginner can operate the package and thus maintain the status of users records. It allows only authorised voters to cast their vote and even bans the users doing illegal activities and cancels out their votes. It even counts the number of votes received by each candidate and declares the winner. The application also facilitates the addition of new Candidate's records, deletion of Candidate's records and modification of existing candidate's records.

Goals of this Voting System include:

- ❖ Allows us to set up a flexible and trustworthy voting system
- ❖ Applicable for large as well as small groups of people e.g. a batch, a class.
- * Keeps a record of every voting process.

Topics of SDF Used:

- **❖** IF....ELSE Statements.
- ❖ FOR and WHILE Loop.
- Switch Case Statements
- Concept of Arrays.
- Concept of Strings.
- Concept of Functions.
- Structures.
- Pointers.
- ❖ File Handling.

Design Of The Project:

This is a web-related application that permits us to approach the entire knowledge regarding the Voting System . This smart system reduces the time for voting and also the system is reliable, and faster. This will reduce the manual workload and give information instantly. The main objective of this system is to reduce the consumption of time during maintaining the records of the Voting System. Separate divisions are provided to maintain the records of voters, candidates, etc.

This has following two panels:

VOTER PANEL:

This panel takes in the voter's id and allows him/her to cast their vote with privacy.

ADMIN PANEL:

The admin panel asks the admin to enter their user id along with the password to log into.

- 1.) **NEW ELECTION INITIATION-** This function helps the admin to initiate new elections of a particular branch for a particular year.
- 2.) **CONTINUE PREVIOUS ELECTIONS-** This function helps to continue the previous election.
 - 3.) **DELETE ILLEGAL VOTES-** This function helps us to delete illegitimate votes
 - 4.) BAN USER ID- This function will ban the user IDs to prohibit illegal voting.
- 5.) **RESULT DECLARATION** This function will declare the winner along the total votes received by the winner.
- 6.)LOGOUT- This function will help the admin to sign-out.

Code:

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
#include<stdlib.h>
struct currentValidID
  int year;
  char branch[6];
  int totalVoters;
};
typedef struct candidate
  int cid;
  char cname[20];
  int votes;
}CANDIDATE;
//GLOBALS -----
//stores current Valid user ID parameters
struct currentValidID currentValidID;
//to store information all candidates
CANDIDATE candidateArray[20];
//Total number of candidates standing for election
int numberOfCandidates;
//to store information of votes given by each voter
char Votes[200];
/*To extract year from userID
For example, userID:2021prrcs00064 year:2021*/
int extractYear(char userID[15])
{
  int year=o;
  char tmp;
  for(int i=0;i<4;i++)
    tmp=userID[i];
```

```
year = (year*10) + (tmp-48);
   }
 return year;
//-----
/*this function will extract user's roll number
For example, userID:2021prrcs00064, roll no= 0064*/
int extractRollNo(char userID[15])
 int rollno=o;
 char tmp;
 for(int i=9;i<14;i++)
   {
   tmp=userID[i];
           rollno=(rollno*10)+(tmp-48);
 return rollno;
//-----
//Will check whether the global branch code and inputed branch code is matching or not
//For example, userID:2021prrcs00064, branch code= prrcs
int checkBranchCode(char userID[15])
 char branchCode[6];
 for(int i=4;i<9;i++)
   branchCode[i-4]=userID[i];
 branchCode[5]='\o';
 if(strcmp(branchCode,currentValidID.branch)==0)
   return 1;
 else
   return o;
//this function will verify the true identity of the admin
// this function will take username and password to login into admin panel
/*nt main()
```

```
{
  char pass[10],password[10]="abc";
  int i=o;
  printf("\n\n\t\t\t *******");
  printf("\n\n\t\t\t ******");
  printf("\n\t\t\t\t User Login");
  printf("\n\n\t\t\t *******");
  printf("\n\n\t\t\t *******");
  printf("\n\n\n\t\t\t\t
  scanf("%s",pass);
  if (strcmp(pass,password)==0)
  {
   printf("\n\nPassword Match!\nLOADING");
   for(i=0; i<=6; i++)
     fordelay(10000000);
     printf(". ");
   }
   printf("\n");
   system("pause");
   system("cls");
   menu();
  else
   printf("\n\nWrong password!!\a\a\a");
login try:
   printf("\n\n");
   printf("Enter 1 to go to the main menu ");
   printf("\n");
   printf("Enter o to exit:");
   printf("\n");
   printf("Enter your choice: ");
   scanf("%d",&main_exit);
   if (main exit==1)
```

```
system("cls");
      main();
    }
    else if (main_exit==0)
    {
      system("cls");
      close();
    }
    else
      printf("\nInvalid!");
      fordelay(100000000);
      system("cls");
      goto login_try;
  }
  return o;
int authenticateAdmin()
  char username[15], password[6];
  printf("\n");
  printf(" Enter username: ");
  scanf("%s",username);
  if((strcmp(username,"SDFproject"))!=o)
    return o;
  else
    printf(" Enter Password: ");
    int i=o;
    for(i=0;i<6;i++)
      password[i]=getch();
      printf("%c",'*');
    password[i]='\o';
    if((strcmp(password,"sdfPRR"))!=0)
      return o;
```

```
return 1;
//-----
//this function will prohibit illegal voting
void banID()
  printf("\n");
  printf(" Creating Banned.txt...");
 printf("\n");
  FILE *fp;
  fp=fopen("Banned.txt", "w");
  if(fp==NULL)
   printf(" Error: Banned.txt not created.");
   printf("\n");
   fclose(fp);
   return;
  printf(" Just Enter last roll number to ban");
  printf("\n");
  printf(" Press o to exit...");
  int input;
  while(1)
   {
     printf("\n");
     printf(" Enter Number: ");
     scanf("%d",&input);
     if(input==0)
     break;
     Votes[input-1]='$';
     fprintf(fp,"%d\n",input);
    }
  fclose(fp);
  printf(" Created Successfully");
  printf("\n");
//-----
```

//this function will create the list of candidates

```
void createCandidateFiles()
  printf("\n");
  printf(" Creating candidate files...");
  printf("\n");
  FILE *fp;
       char filename[20];
  for(int i = 1;i <= numberOfCandidates; i++)</pre>
    sprintf(filename,"candidate%d.txt",i);
              fp=fopen(filename,"w");
    fprintf(
      fp,"o\n%s",
      candidateArray[i-1].cname
    );
              fclose(fp);
  printf(" Created Files successfully");
  printf("\n");
//this function will delete the illegitimate votes
void deleteIllegalVote(char userID[15])
  FILE *fp;
  FILE *fcp;
  char filename[20];
  char line[20];
  int location = extractRollNo(userID);
  sprintf(filename,"candidate%d.txt",candidateArray[Votes[location-1]-49].cid);
  candidateArray[Votes[location-1]-49].votes--;
  Votes[location-1]='0';
  if ((fp = fopen(filename, "r")) == NULL)
    printf("\n");
    printf(" File cannot be opened...Operation Failed");
    return;
  printf("\n");
```

```
printf(" Deleting in process... ");
printf("\n");
if ((fcp = fopen("tmp.txt", "w")) == NULL)
  printf("\n");
  printf(" File cannot be opened...Operation Failed");
  return;
}
while (!feof(fp))
  fscanf(fp,"%s",line);
  fprintf(fcp,"%s\n",line);
}
fclose(fp);
fclose(fcp);
if ((fp = fopen(filename, "w")) == NULL)
{
  printf("\n");
  printf(" File cannot be opened...Operation Failed");
  return;
}
int numFromFile;
char cnameFromFile[20];
fcp = fopen("tmp.txt","r");
fscanf(fcp,"%d",&numFromFile);
fprintf(fp,"%d",numFromFile-1);
fscanf(fcp,"%s",cnameFromFile);
fprintf(fp,"\n%s",cnameFromFile);
while(!feof(fcp))
  fscanf(fcp,"%d",&numFromFile);
  if(numFromFile!=location)
    fprintf(fp,"\n%d",numFromFile);
  }
fclose(fp);
fclose(fcp);
remove("tmp.txt");
printf("\n");
```

```
printf(" Vote deleted successfully");
  printf("\n");
  printf(" Press any key to continue...");
  getch();
//this function will find out and return the winner's name
//along with the number of maximum votes of winning candidate
int getWinner()
{
  int maxV = -1;
  int winnerCid;
  for(int i = 0;i < numberOfCandidates; i++)</pre>
    if(candidateArray[i].votes > maxV)
      winnerCid = candidateArray[i].cid;
      maxV = candidateArray[i].votes;
    else if(candidateArray[i].votes == maxV)
      return -1;
    }
  return winnerCid;
//-----
//this function will commence fresh elections
void initiateNewElection()
  printf("\n");
  printf(" ***********");
  printf("\n");
  printf(" New Election Initiation:");
  printf("\n");
  printf(" ***********");
  printf("\n");
  printf(" Elections for which Year: ");
```

```
scanf("%d",&currentValidID.year);
  printf(" Enter branch code:");
  scanf("%s",currentValidID.branch);
  printf(" Enter max roll number:");
  scanf("%d",&currentValidID.totalVoters);
  printf(" Enter the number of candidates:");
  scanf("%d",&numberOfCandidates);
 for (int i = 0; i < currentValidID.totalVoters; i++)
    Votes[i] = 'o';
  for (int i = 0;i < numberOfCandidates; i++)
  {
    candidateArray[i].cid=i+1;
    printf(" Enter name of candidate %d: ",i+1);
    scanf(" %s",candidateArray[i].cname);
    candidateArray[i].votes=0;
  }
  return;
//-----
//this function will save the information of election in a new file
void saveElectionInfoInFile()
{
  printf(" Saving Election Info in File...");
  printf("\n");
  FILE *fp;
  fp = fopen("ElectionInfo.txt", "w");
  if(fp==NULL)
    printf("\n");
    printf(" Error in file creation");
    printf("\n");
    fclose(fp);
```

```
return;
  fprintf
    fp, "YEAR=%d\n BRANCH CODE=%s\n TOTAL NO. OF VOTERS= %d\n NO. OF
CANDIDATES=%d",
    currentValidID.year,
    currentValidID.branch,
    currentValidID.totalVoters,
    numberOfCandidates
  );
  fclose(fp);
  printf(" Saved Successfully : ");
  printf("\n");
}
//this function will extract the election information from the existing file
void loadElectionInfoFromFile()
{
  FILE *f1;
  FILE *f2;
  FILE *f3;
  f1=fopen("ElectionInfo.txt","r");
  if(f1==NULL)
    printf(" Not Exist");
  fscanf(f1,"%d",&currentValidID.year);
  fseek(f1,2,SEEK_CUR);
  fscanf(f1,"%s",currentValidID.branch);
  fseek(f1,2,SEEK_CUR);
  fscanf(f1,"%d",&currentValidID.totalVoters);
  fseek(f1,2,SEEK CUR);
  fscanf(f1,"%d",&numberOfCandidates);
  fclose(f1);
  //load candidates information and votes
  for (int i = 0; i < currentValidID.totalVoters; i++)
  {
```

```
Votes[i] = 'o';
  for(int i=1;i<=numberOfCandidates;i++)
    int location;
    char filename[20];
    sprintf(filename,"candidate%d.txt",i);
    f2=fopen(filename,"r+");
    candidateArray[i-1].cid=i;
    fscanf(f2,"%d",&candidateArray[i-1].votes);
    fscanf(f2,"%s",candidateArray[i-1].cname);
    while(!feof(f2))
      fscanf(f2,"%d",&location);
      Votes[location-1] = i+48;
    fclose(f2);
  //-----
  //load banned votes
  int location;
  f3=fopen("banned.txt","r+");
  while(!feof(f3))
    fscanf(f3,"%d",&location);
    Votes[location-1] = '$';
  fclose(f3);
//this function will help us login to the election portal
void adminPanel()
  while(1)
    {
      if(authenticateAdmin()!=1)
        printf("\n");
```

```
printf(" Wrong Username or Password ");
    printf("\n");
    printf(" Please Try Again");
    break;
printf("\n\n");
printf(" LOGGED IN SUCCESSFULLY");
printf("\n\n");
printf(" To continue press ENTER");
         getch();
while(1)
  char inputID[15];
  char input; char banInp;
  int WinnerCid, totalVotedNow=o;
  printf("\n");
  printf(" 1.New Election");
  printf("\n");
  printf(" 2.Continue Previous Election");
  printf("\n");
  printf(" 3.Delete Illegal Vote");
  printf("\n");
  printf(" 4.Ban User IDs");
  printf("\n");
  printf(" 5.Result");
  printf("\n");
  printf(" 6.Logout");
  printf("\n");
  printf(" Enter Your Choice:");
                scanf(" %c",&input);
  switch(input)
  {
    case '1':
      initiateNewElection();
      saveElectionInfoInFile();
      createCandidateFiles();
      break;
```

```
case '2':
           loadElectionInfoFromFile();
           break;
         case '3':
           printf("\n");
           printf(" Enter user ID to delete its vote: ");
           scanf("%s",inputID);
           deleteIllegalVote(inputID);
           break;
         case '4':
           printf(" Do you want to ban particular ID's?");
           printf("\n");
           printf(" Press 1 if yes or any other key to continue...");
           scanf(" %c",&banInp);
           if(banInp=='1')
           {
             banID();
           break;
         case '5':
           WinnerCid = getWinner();
           if(WinnerCid != -1)
             {
               printf("\n");
               printf(" Winner is %s with %d
votes\n",candidateArray[WinnerCid-1].cname,candidateArray[WinnerCid-1].votes);
             }
           else
             printf("\n");
             printf(" Its A TIE");
           printf("\n");
           printf(" Full Result");
           printf("\n");
           for(int i=o;i<numberOfCandidates;i++)</pre>
             totalVotedNow+=candidateArray[i].votes;
```

```
printf("%d. %s -> %d
votes\n",candidateArray[i].cid,candidateArray[i].cname,candidateArray[i].votes);
          printf("\n Voting Percentage: %d
%%\n\n",(totalVotedNow*100)/currentValidID.totalVoters);
          break;
        case '6':
          return;
        default:
          printf(" Invalid Option");
                               getch();
      }
//-----
//this function checks for valid user id
int isValid(char userID[15])
  if(strlen(userID)!=14)
    return o;
  int inputedYear=extractYear(userID);
  int inputedRollNo = extractRollNo(userID);
  if(inputedYear!=currentValidID.year || checkBranchCode(userID)!=1 ||
inputedRollNo>currentValidID.totalVoters)
    return o;
  return 1;
//this function will check whether the user has voted or not
int isVoted(char userID[15])
```

```
int location=extractRollNo(userID);
 if(Votes[location-1]=='0')
   return o:
 else
   return 1;
}
//-----
//this function will check whether the invalid user is banned from voting or not
int isBanned(char userID[15])
{
 int location=extractRollNo(userID);
 if(Votes[location-1]=='$')
   return 1;
 else
   return o;
}
//-----
//this function will save the votes of registered and eligible users
void saveVote(char userID[15],char voteInput)
{
 char filename[20];
 sprintf(filename,"candidate%d.txt",voteInput-48);
 FILE *fp = fopen(filename,"r+");
 int location=extractRollNo(userID);
 Votes[location-1]=voteInput;
 candidateArray[voteInput-49].votes++;
 fseek(fp, o, SEEK_SET);
 fprintf(fp,"%d\n",candidateArray[voteInput-49].votes);
 fseek(fp, o, SEEK_END);
 fprintf(fp,"\n%d",location);
 fclose(fp);
//-----
```

```
char userID[15];
char voteInput;
while(1)
    {
      printf("\n\n");
           printf(" To exit press o");
           printf("\n");
  printf(" Enter user ID:");
  scanf("%s",userID);
  if(strcmp(userID, "o")==o)
                         return;
  if(isValid(userID)!=1)
  {
    printf("\n");
    printf(" Invalid User ID");
    printf("\n");
    printf(" To continue press Enter");
    getch();
    continue;
  if(isBanned(userID)!=0)
    printf("\n");
    printf(" This User ID is currently banned...");
    printf("\n");
    printf(" Contact Admin for the reason...");
    printf("\n");
    printf(" To Continue press Enter");
    getch();
    continue;
  if(isVoted(userID)!=0)
    printf("\n");
    printf(" Your PRN entered is already voted");
    printf("\n");
    printf(" Contact Admin for furthur query");
    getch();
    continue;
  }
```

```
printf("\n\n");
    printf(" Candidates for election:");
            for (int i = 0; i < numberOfCandidates; i++)
     printf("\n %d. %s",i+1,candidateArray[i].cname);
    printf("\n");
    printf(" Your Vote(Enter Number):");
    voteInput=getch();
    printf("*");
    if(voteInput-48 < 1 || voteInput-48 > numberOfCandidates)
     printf("\n");
     printf(" Invalid Vote");
     printf("\n");
     printf(" Try Again...");
     getch();
     continue;
    saveVote(userID,voteInput);
    printf("\n\n");
    printf(" Thanks for your precious vote");
    printf("\n\n");
    printf("To continue press Enter");
    getch();
  }
};
//main function
int main()
{
  while(1)
    {
    printf("\n\t\t\t************\n");
    printf("\t\t\************\n");
    printf("\n\t\t-----> WELCOME TO ONLINE VOTING SYSTEM
<----\n");
   printf("\n\t\t\t***********\n");
   printf("\t\t\************\n");
    printf("\n\t\t\t CHOOSE FROM THE FOLLOWING OPTIONS:\n");
```

```
printf("\n\t\t 1.VOTER PANEL");
  printf("\n\t\t\t 2.ADMIN PANEL");
  printf("\n\t\t\t 3.EXIT");
   printf("\n\n\t\t\ ENTER YOUR CHOICE:");
         char input;
  scanf(" %c",&input);
  switch(input)
   {
    case '1':
     printf("\n\n\n -----\n");
      voterPanel();
      break;
    case '2':
      printf("\n\n\n -----\n");
      adminPanel();
     break;
    case '3':
     printf("\n\n\n -----\n");
      printf("\n\n -----\n");
     printf("\n\n\n -----\n");
     return o;
    default:
     printf("\n");
     printf(" Invalid option");
     printf("\n");
     printf(" Please Try Again");
     getch();
  }
 return o;
// END OF CODE :
```



Select "C:\Users\sunii\Downloads\SDF PROJECT.exe"		
	> WELCOME TO ONLINE VOTING SYSTEM <	
	CHOOSE FROM THE FOLLOWING OPTIONS: 1.VOTER PANEL 2.ADMIN PANEL 3.EXIT	
	ENTER YOUR CHOICE:2	

Select "C:\Users\sunil\Downloads\SDF PROJECT.exe"

```
-----> WELCOME TO ADMIN PANEL<-----
Enter username: SDFproject
Enter Password: *****
LOGGED IN SUCCESSFULLY
To continue press ENTER
 1.New Election
 2.Continue Previous Election
 3.Delete Illegal Vote
 4.Ban User IDs
 5.Result
 6.Logout
 Enter Your Choice:1
New Election Initiation:
************
Elections for which Year: 2022
Enter branch code:prrcs
Enter max roll number:100
Enter the number of candidates:3
Enter name of candidate 1: NARENDRA_MODI
Enter name of candidate 2: RAHUL_GANDHI
Enter name of candidate 3: ARVIND_KEJRIWAL
Saving Election Info in File...
Saved Successfully:
Creating candidate files...
))) Created Files successfully
```

ElectionInfo.txt - Notepad
File Edit Format View Help
VEAR=2022
BRANCH CODE=prrcs
TOTAL NO. OF VOTERS= 100
NO. OF CANDIDATES=3

■ "C:\Users\sunil\Downloads\SDF PROJECT.exe"

> WELCOME TO ONLINE VOTING SYSTEM <

CHOOSE FROM THE FOLLOWING OPTIONS:
1.VOTER PANEL
2.ADMIN PANEL
3.EXIT
ENTER YOUR CHOICE:1

```
-----> WELCOME TO VOTER PANEL <-----
 To exit press 0
 Enter user ID:2022prrcs00001
 Candidates for election:
 1. NARENDRA MODI
 2. RAHUL_GANDHI
 3. ARVIND KEJRIWAL
Your Vote(Enter Number):*
Thanks for your precious vote
To continue press Enter
 To exit press 0
 Enter user ID:2022prrcs00002
 Candidates for election:
 1. NARENDRA MODI
 2. RAHUL GANDHI
 3. ARVIND KEJRIWAL
Your Vote(Enter Number):*
Thanks for your precious vote
To continue press Enter
 To exit press 0
 Enter user ID:2022prrcs00003
 Candidates for election:
 1. NARENDRA MODI
 2. RAHUL GANDHI
 3. ARVIND KEJRIWAL
Your Vote(Enter Number):*
Thanks for your precious vote
```

"C:\Users\sunil\Downloads\SDF PROJECT.exe"

```
To exit press 0
 Enter user ID:2022prrcs00004
 Candidates for election:
 1. NARENDRA MODI
 RAHUL_GANDHI
 3. ARVIND_KEJRIWAL
Your Vote(Enter Number):*
Thanks for your precious vote
To continue press Enter
 To exit press 0
 Enter user ID:2022prrcs00005
 Candidates for election:
 1. NARENDRA MODI
 2. RAHUL GANDHI
 3. ARVIND KEJRIWAL
Your Vote(Enter Number):*
Thanks for your precious vote
To continue press Enter
 To exit press 0
 Enter user ID:2022prrcs00006
 Candidates for election:
 1. NARENDRA MODI
 2. RAHUL GANDHI
 3. ARVIND KEJRIWAL
Your Vote(Enter Number):*
Thanks for your precious vote
To continue press Enter
 To exit press 0
 Enter user ID:0
```

```
Gandidate Ltxt - Notepad
File Edit Format View Help

candidate2.txt - Notepad
File Edit Format View Help

candidate3.txt - Notepad
```

"C:\Users\sunil\Downloads\SDF PROJECT.exe" .New Election 2.Continue Previous Election 3.Delete Illegal Vote 4.Ban User IDs 5.Result 6.Logout Enter Your Choice:4 Do you want to ban particular ID's? Press 1 if yes or any other key to continue...1 Creating Banned.txt... Just Enter last roll number to ban Press 0 to exit... Enter Number: 00006 Enter Number: 00005 Enter Number: 0 Created Successfully 1.New Election 2.Continue Previous Election 3.Delete Illegal Vote 4.Ban User IDs 5.Result 6.Logout Enter Your Choice:6 -----> WELCOME TO ONLINE VOTING SYSTEM <-----CHOOSE FROM THE FOLLOWING OPTIONS: 1.VOTER PANEL 2.ADMIN PANEL


```
Banned.txt - Notepad
File Edit Format View Help
```

3.EXIT

ENTER YOUR CHOICE:1

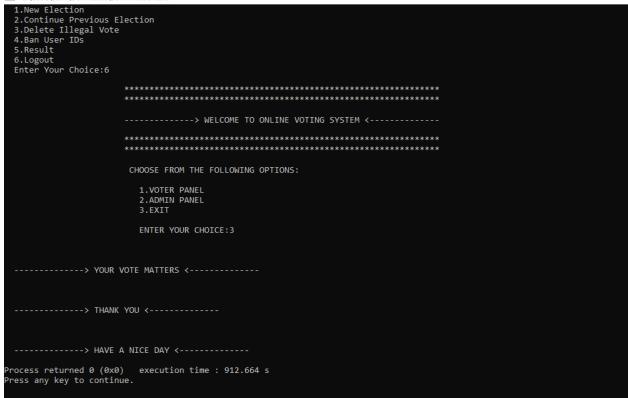
"C:\Users\sunil\Downloads\SDF PROJECT.exe"

```
-----> WELCOME TO ADMIN PANEL<-----
Enter username: SDFproject
Enter Password: *****
LOGGED IN SUCCESSFULLY
To continue press ENTER
 1.New Election
 2.Continue Previous Election
 3.Delete Illegal Vote
 4.Ban User IDs
 5.Result
 6.Logout
 Enter Your Choice:3
Enter user ID to delete its vote: 2021prrcs00001
Deleting in process...
Vote deleted successfully
Press any key to continue...
 1.New Election
 2.Continue Previous Election
 3.Delete Illegal Vote
 4.Ban User IDs
 5.Result
 6.Logout
 Enter Your Choice:5
Winner is NARENDRA_MODI with 3 votes
Full Result

    NARENDRA MODI -> 3 votes

2. RAHUL GANDHI -> 1 votes
ARVIND_KEJRIWAL -> 1 votes
Voting Percentage: 5 %
```

"C:\Users\sunil\Downloads\SDF PROJECT.exe"



References:

- 1. https://www.geeksforgeeks.org/
- 2. https://www.javatpoint.com/pointer-arithmetic-in-c
- 3. https://www.tutorialspoint.com/cprogramming/index.htm
- 4. Yashwant Kanetkar, "Let us C", Vth Edition, Bpb publications