

A Project Report

on

Trustworthy E-Voting System

Submitted in partial fulfillment of the requirements

for the award of the degree of

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by

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Certificate

This is to certify that the project report entitled **TRUSTWORTHY E-VOTING SYSTEM** is the bonafide work carried out by **S.Surekha** bearing Roll Number **164G1A05A8**, **B.Sheshi Rekha** bearing Roll Number **164G1A0595**, **P.Rohith** bearing Roll Number **164G1A0582** and **K.Simran** bearing Roll Number **164G1A0596**, in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science & Engineering** during the academic year 2019-2020.

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DECLARATION

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The results embodied in this project report have not been submitted to any other Universities or Institute for the award of Degree.

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ABSTRACT

On-line Voting System is a web based system that facilitates the running of elections and surveys online. Users are individuals who interact with the system. All user interaction is performed remotely through the user's web browser. Users are provided with an online registration form before voting user should fill online form and submit details these details are compared with details in database and if they match then user is provided with username and password using this information user can login and vote. If conditions are not correct entry will be canceled. It contains two level of user's administrator level and voter level where each level has different functionality.

The advantage of online voting over the common "queue method" is that the voters have the choice of voting at their own free time and there is reduced congestion. It also minimizes on errors of vote counting. The individual votes are submitted in a database which can be queried to find out who of the aspirants for a given post has the highest number of votes and votes are categorized in different categories. It also reduces the fraud occurring during the elections. In this it check the voter whether he/she cast the vote before. If any voter cast their vote second time the system will display alert message if not they can cast their votes.

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List of Abbreviations

XML	Extensible Markup Language
CLR	Common Language Runtime
IL	Intermediate Language
CTS	Common Type System
CLS	Common Language Specification
GUI	Graphical User Interface
SQL	Structured Query Language
SSME	SQL Server Management Studio Express
UDT	User Defined Types
EVM	Electronic Voting Machine
NSF	National Science Foundation
ATM	Automated Teller Machine
ICT	Information and Communications Technology
SRS	Software Requirement Specification
UML	Unified modeling Language
DFD	Dataflow Diagrams

CHAPTER - 1

INTRODUCTION

1.1 Problem Definition:

The online voting system is the system that aims in reducing the complexity and cost of the election process. Here the voter can vote inspite of his absence in the particular locality. The administrator's effort is much reduced by checking the election status of all the localities individually forms a place and it is easy for him to announce the election result. The administrator is the soul controller of the online voting system in all process including refreshing the votes, editing the voter details, creating new nominee and so on. Thus the online voting system can reduce the cost and effort of election process.

In this voting system each voter will be provided with a specific voter-id and password through which access for the voting can be granted. If once the access is granted for a voter-id then the access is denied for logging in till the voting system is refreshed for the next election. Similarly the administrator will be provided with a special id through which he can view the status of the election.

Based on the id segregation between the voter and administrator is carried out initially. If the user id is invalid then it redirect to same login page. If the id entered is of type administrator then an information i.e., the election status will be displayed which changes dynamically. Otherwise the voter information will be displayed which changes dynamically depending on the changes made which will proceed him to the next level in which he can cast his vote and it is updated automatically.

The advantages of the online voting system is that the speed of information retrieval and updating is made easy and other advantage are

- High level security to avoid illegal polling.
- Online implementation makes it easy for voters to participate in election.
- As for considering election commission board it becomes easier to conduct election.
- Election expenses can be reduced.
- Non-Residential citizens can also participate in the election.

1.2 Scope:

Over the last decade there has been next to no improvement in the overall accessibility of polling stations or postal voting. There is a pressing need for clearer

accountability over how elections are delivered, to help improve the accessibility of current voting methods, as well as expanding these to include alternative methods. Unless this happens disabled people will continue to struggle to exercise their right to vote. In a digital age where people can vote by text for the X-Factor and shop and bank online, our voting system really needs to catch up.

1.3 Objectives of the project:

The most crucial factor for a system like e-VOTE to be successful is to exhibit a Voting Protocol that can prevent opportunities for fraud or for sacrificing the voter's privacy.

The Voting Protocol that will be designed and implemented for the e-VOTE system will combine the advantages of existing protocols and techniques, while at the same time it will aim at eliminating most of the identified deficiencies and problems. The related attributes that the e-VOTE system will fully support, and against which it will be extensively tested and validated, are listed below. These attributes can be also considered, according to the literature, as a set of criteria for a "good" electronic voting system that can easily enjoy the trust and confidence of the voters and process organizers.

1.4 Limitations of the project:

Limitations are:

1. It requires an active internet connection.
2. It allows only registered voters to cast votes.

CHAPTER - 2

LITERATURE SURVEY

2.1 Introduction:

Building a secure electronic voting system that offers the fairness and privacy of current voting schemes, while providing the transparency and flexibility offered by electronic systems has been a challenge for a long time. In this work-in-progress paper, we evaluate an application of blockchain as a service to implement distributed electronic voting systems. The paper proposes a novel electronic voting system based on blockchain that addresses some of the limitations in existing systems and evaluates some of the popular blockchain frameworks for the purpose of constructing a blockchain-based e-voting system. In particular, we evaluate the potential of distributed ledger technologies through the description of a case study; namely, the process of an election, and the implementation of a blockchain-based application, which improves the security and decreases the cost of hosting a nationwide election.

2.2 Existing system

In the present system there no such application level system provisions to carry out the voting and procedure as a whole. Also in the present status, there is no such application in use for automated system for voting according to the voting structure existing in secure way. All the step by step procedures are carried out by the authorized authorities according to the jobs assigned. The fact is all the procedures are carried out manually, starting from the registration process to result publishing.

To do this process manually wastes a lot of time and money. Thus the present system proves itself to be an inefficient one. The existing system is not web based. The user or person must want to go to the polling station for casting their votes.

2.3 Proposed system

The new implemented voting protocol has two main players: The voter and administrator sections. The voter(which can be found at home, in a working station, in a special polling station or any other device have the function of performing the Authentication and voting).The administrator performs the function of voter and candidate registration, authorization and validation of voter, database and counting and the result.

The main advantages of the new protocol are the following:

1. Public transparency by the administrator (publication of Voter ID key, etc.).
2. Inured to technical troubles like interruption of access, etc, uncomplicated recovery.
3. Possibility of configuration for different voting models by policies and Greater performance.

Furthermore it is assumed that a trustworthy Administrator is available. Apart from that, the accessibility to the public in the voting procedure plays a special role, which means that the voting result can be monitored, although casting of the votes has to be secret as a matter of course.

Accessibility to the public is necessary for all voting stages and is performed by the electoral committee, but also by any member of the public.

2.4 Software Development tool

2.4.1 Introduction

Microsoft .NET is a set of Microsoft software technologies for rapidly building and integrating XML Web services, Microsoft Windows-based applications, and Web solutions. The .NET Framework is a language-neutral platform for writing programs that can easily and securely interoperate. There's no language barrier with .NET: there are numerous languages available to the developer including Managed C++, C#, Visual Basic and Java Script. The .NET framework provides the foundation for components to interact seamlessly, whether locally or remotely on different platforms. It standardizes common data types and communications protocols so that components created in different languages can easily interoperate.

“.NET” is also the collective name given to various software components built upon the .NET platform. These will be both products (Visual Studio.NET and Windows.NET Server, for instance) and services (like Passport, .NET My Services, and so on).

2.4.2 The .net Framework

The .NET Framework has two main parts-

1. The Common Language Runtime (CLR).
2. A hierarchical set of class libraries.

The CLR is described as the “execution engine” of .NET. It provides the environment within which programs run. The most important features are

Conversion from a low-level assembler-style language, called Intermediate Language (IL), into code native to the platform being executed on.

- Memory management, notably including garbage collection.
- Checking and enforcing security restrictions on the running code.
- Loading and executing programs, with version control and other such features.

Objectives of .Net Framework:

1. To provide a consistent object-oriented programming environment whether object codes is stored and executed locally on Internet-distributed, or executed remotely.
2. To provide a code-execution environment to minimizes software deployment and guarantees safe execution of code.
3. Eliminates the performance problems.

There are different types of application, such as Windows-based applications and Web-based applications.

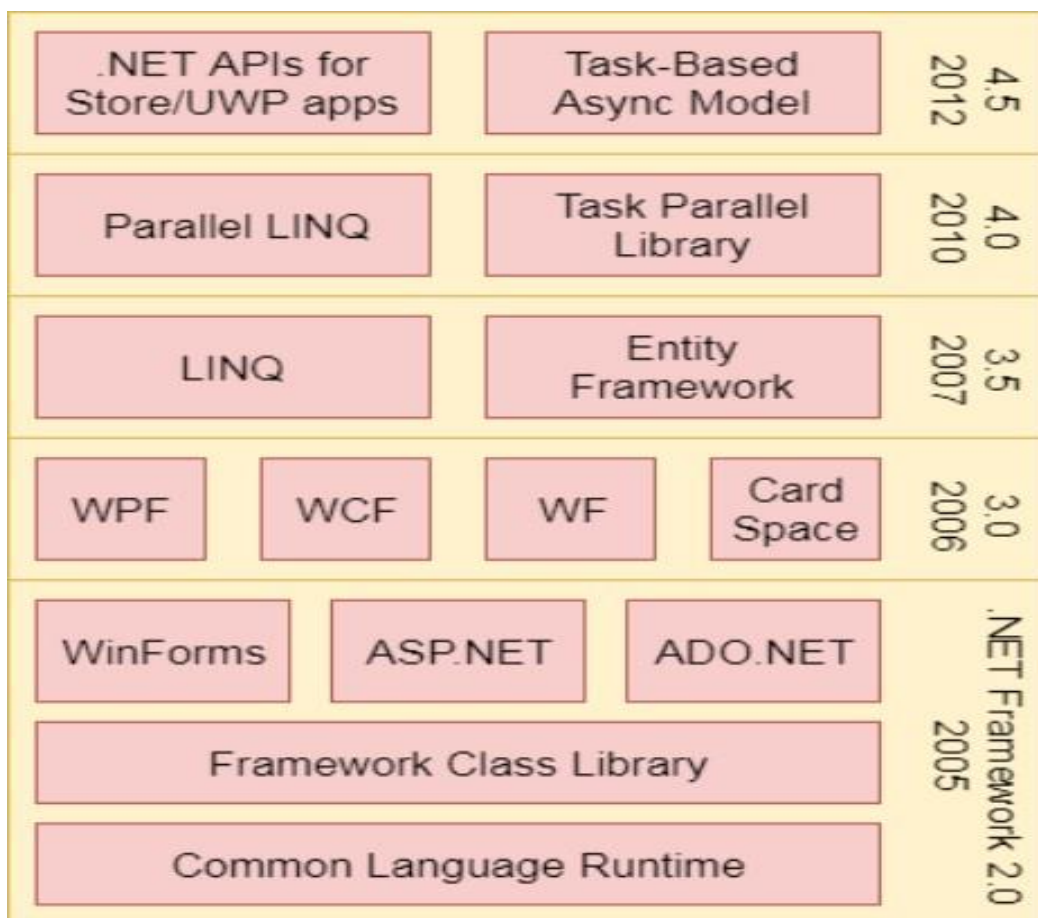


Fig: 2.1 .net framework architecture

The following features of the .NET framework are also worth description.

The .NET Framework is a new computing platform that simplifies application development in the highly distributed environment of the Internet.

Managed Code

The code that targets .NET, and which contains certain extra Information - “metadata” - to describe itself. Whilst both managed and unmanaged code can run in the runtime, only managed code contains the information that allows the CLR to guarantee, for instance, safe execution and interoperability.

Managed Data

With Managed Code comes Managed Data. CLR provides memory allocation and Deal location facilities, and garbage collection. Some .NET languages use Managed Data by default, such as C#, Visual Basic.NET and JScript.NET, whereas others, namely C++, do not. Targeting CLR can, depending on the language you’re using, impose certain constraints on the features available. As with managed and unmanaged code, one can have both managed and unmanaged data in .NET applications - data that doesn’t get garbage collected but instead is looked after by unmanaged code.

Common Type System

The CLR uses something called the Common Type System (CTS) to strictly enforce type-safety. This ensures that all classes are compatible with each other, by describing types in a common way. CTS define how types work within the runtime, which enables types in one language to interoperate with types in another language, including cross-language exception handling. As well as ensuring that types are only used in appropriate ways, the runtime also ensures that code doesn’t attempt to access memory that hasn’t been allocated to it.

Common Language Specification

The CLR provides built-in support for language interoperability. To ensure that you can develop managed code that can be fully used by developers using any programming language, a set of language features and rules for using them called the Common Language Specification (CLS) has been defined. Components that follow these rules and expose only CLS features are considered CLS-compliant.

The class library:

.NET provides a single-rooted hierarchy of classes, containing over 7000 types. The root of the namespace is called System; this contains basic types like Byte, Double, Boolean, and String, as well as Object. All objects derive from System. Object. As well as objects, there are value types. Value types can be allocated on the stack, which can provide useful flexibility. There are also efficient means of converting value types to object types if and when necessary.

The set of classes is pretty comprehensive, providing collections, file, screen, and network I/O, threading, and so on, as well as XML and database connectivity.

The class library is subdivided into a number of sets (or namespaces), each providing distinct areas of functionality, with dependencies between the namespaces kept to a minimum.

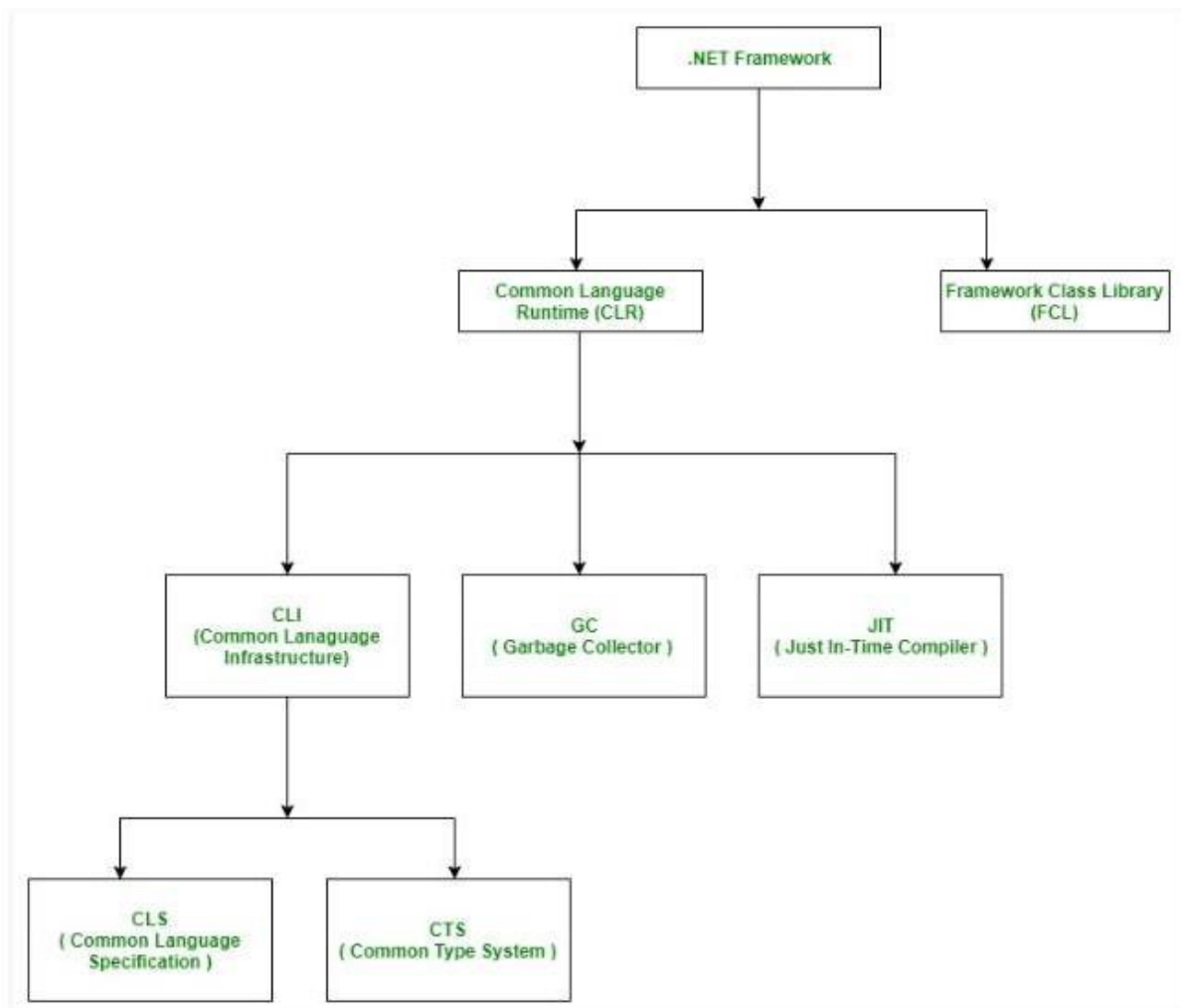


Fig: 2.2 .net framework classification

Languages supported by .net:

The multi-language capability of the .NET Framework and Visual Studio .NET enables developers to use their existing programming skills to build all types of applications and XML Web services. The .NET framework supports new versions of Microsoft's old favourites Visual Basic and C++ (as VB.NET and Managed C++), but there are also a number of new additions to the family.

Visual Basic .NET has been updated to include many new and improved language features that make it a powerful object-oriented programming language. These features include inheritance, interfaces, and overloading, among others. Visual Basic also now supports structured exception handling, custom attributes and also supports multi-threading.

Visual Basic .NET is also CLS compliant, which means that any CLS-compliant language can use the classes, objects, and components you create in Visual Basic .NET.

Managed Extensions for C++ and attributed programming are just some of the enhancements made to the C++ language. Managed Extensions simplify the task of migrating existing C++ applications to the new .NET Framework.

C# is Microsoft's new language. It's a C-style language that is essentially "C++ for Rapid Application Development". Unlike other languages, its specification is just the grammar of the language. It has no standard library of its own, and instead has been designed with the intention of using the .NET libraries as its own.

Microsoft Visual J# .NET provides the easiest transition for Java-language developers into the world of XML Web Services and dramatically improves the interoperability of Java-language programs with existing software written in a variety of other programming languages.

Active State has created Visual Perl and Visual Python, which enable .NET-aware applications to be built in either Perl or Python. Both products can be integrated into the Visual Studio .NET environment. Visual Perl includes support for Active State's Perl Dev Kit. Other languages for which .NET compilers are available include

Constructors and Destructors

Constructors are used to initialize objects, whereas destructors are used to destroy them. In other words, destructors are used to release the resources allocated to the object. In C#.NET the sub finalize procedure is available. The sub finalize procedure is used to

complete the tasks that must be performed when an object is destroyed. The sub finalize procedure is called automatically when an object is destroyed. In addition, the sub finalize procedure can be called only from the class it belongs to or from derived classes.

Garbage Collection

Garbage Collection is another new feature in C#.NET. The .NET Framework monitors allocated resources, such as objects and variables. In addition, the .NET Framework automatically releases memory for reuse by destroying objects that are no longer in use.

In C#.NET, the garbage collector checks for the objects that are not currently in use by applications. When the garbage collector comes across an object that is marked for garbage collection, it releases the memory occupied by the object.

Overloading

Overloading is another feature in C#. Overloading enables us to define multiple procedures with the same name, where each procedure has a different set of arguments. Besides using overloading for procedures, we can use it for constructors and properties in a class.

Multithreading

C#.NET also supports multithreading. An application that supports multithreading can handle multiple tasks simultaneously, we can use multithreading to decrease the time taken by an application to respond to user interaction.

Structured Exception Handling

C#.NET supports structured handling, which enables us to detect and remove errors at runtime. In C#.NET, we need to use Try...Catch...Finally statements to create exception handlers. Using Try...Catch...Finally statements, we can create robust and effective exception handlers to improve the performance of our application.

The .NET Framework

The .NET Framework is a new computing platform that simplifies application development in the highly distributed environment of the Internet.

ASP.NET is a web platform that provides all the services that you require to build enterprise-class server-based web applications. ASP.NET is built on the .NET Framework, so all .NET Framework features are available to ASP.NET applications. Your applications can be written in any language that is compatible with the common language runtime (CLR), including Visual Basic and C#.

To create ASP.NET web applications, you can use Visual Studio. In addition, a free standalone product—Visual Studio Express for Web—is available that includes the core set of web design features from Visual Studio.

Implementing security in a site has the following aspects:

- **Authentication:** It is the process of ensuring the user's identity and authenticity.
ASP.NET allows four types of authentications:
 - Windows Authentication
 - Forms Authentication
 - Passport Authentication
 - Custom Authentication
- **Authorization:** It is the process of defining and allotting specific roles to specific users.
- **Confidentiality:** It involves encrypting the channel between the client browser and the web server.
- **Integrity:** It involves maintaining the integrity of data. For example, implementing digital signature.

2.4.3 SQL server management studio:

SQL Server Management Studio is a GUI tool included with SQL Server 2008 and later for configuring, managing, and administering all components within Microsoft SQL Server. The tool includes both script editors and graphical tools that work with objects and features of the server. SQL Server Management Studio replaces Enterprise Manager as the primary management interface for Microsoft SQL Server since SQL Server 2008. A version of SQL Server Management Studio is also available for SQL Server Express Edition, for which it is known as SQL Server Management Studio Express (SSMSE).

SQL Server Management Studio (SSMS) is an integrated environment for managing any SQL infrastructure. Use SSMS to access, configure, manage, administer, and develop all components of SQL Server, Azure SQL Database, and SQL Data Warehouse. SSMS provides a single comprehensive utility that combines a broad group of graphical tools with a number of rich script editors to provide access to SQL Server for developers and database administrators of all skill levels.

A central feature of SQL Server Management Studio is the Object Explorer, which allows the user to browse, select, and act upon any of the objects within the server. It can be used to visually observe and analyze query plans and optimize the database performance, among others. SQL Server Management Studio can also be used to create a new database, alter any existing database schema by adding or modifying tables and indexes, or analyze

performance. It includes the query windows which provide a GUI based interface to write and execute queries.

Microsoft Visual Studio includes native support for data programming with Microsoft SQL Server. It can be used to write and debug code to be executed by SQL CLR. It also includes a data designer that can be used to graphically create, view or edit database schemas. Queries can be created either visually or using code. SSMS 2008 onwards, provides intelligence for SQL queries as well.

Microsoft SQL Server 2005 includes a component named SQL CLR ("Common Language Runtime") via which it integrates with .NET Framework. Unlike most other applications that use .NET Framework, SQL Server itself hosts the .NET Framework runtime, i.e., memory; threading and resource management requirements of .NET Framework are satisfied by SQLOS itself, rather than the underlying Windows operating system. SQLOS provides deadlock detection and resolution services for .NET code as well. With SQL CLR, stored procedures and triggers can be written in any managed .NET language, including C# and VB.NET. Managed code can also be used to define UDT's (user defined types), which can persist in the database. Managed code is compiled to CLI assemblies and after being verified for type safety, registered at the database. After that, they can be invoked like any other procedure. However, only a subset of the Base Class Library is available, when running code under SQL CLR. Most APIs relating to user interface functionality are not available.

Conclusion:

Literature survey helps us to know the functionality about the existing system and provides to create a application with new features that do not exist already.

CHAPTER - 3

ANALYSIS

3.1 Introduction

Electronic Voting Machine is a basic electronic machine that is used to store the votes in place of ballot papers and boxes which were used in traditional voting system. It is a simple device that is operated smoothly by the polling officers and the voters. It is a single machine without any network connection, and nobody can hamper with its programming and change the result. Keeping in mind the unpredictable power supply position in many areas in the country, the machines have been made to run on the simple batteries. EVM has only two main units: Control unit and Ballot unit. The main role of the Control Unit is to store all information and control the working of EVM. The solution which controls the operation of the control unit is written into a micro chip on a in a manner which cannot be altered. Once it burn, cannot be read, replicate or modified. The EVM uses effective coding to increase security of data communicated from ballot unit to control unit. The recent EVM have also implemented real time clock and date-time facility which authorize them to record the real time and date whenever a key is pushed. When the voting is over and the close button is pushed, the machine does not receive any information or store any vote. With the pressing of “TOTAL” button, the control unit displays the total number of votes stored in the machine till that time which can also be verified with the manual register of voters. EVM display screen on control unit displays total number of votes recorded in at a polling station along with candidate-wise votes recorded in the machine when the ‘RESULT’ button is pushed by the counting officer in the presence of counting representative at the vote counting centre. The control unit also exposes any physical damaging made, if any, with the associating cable and communicate the same in the display unit.

The NSF Internet Voting Report addresses the feasibility of different forms of Internet voting from both the technical and social science perspectives, and defines a research agenda to pursue, if Internet voting is to be viable in the future. It groups Internet voting systems into three general categories as follows:

Poll-site Internet voting: It offers the promise of greater satisfaction and effectiveness in that voter could cast their ballots from any poll site and the tallying process would be fast and

definite. More importantly, since election officers would control the voting platform and the physical environment, managing the safety risks of such systems is reasonable.

Kiosk voting: Voting machines would be located away from conventional polling places, in such convenient public places as malls, libraries, colleges or schools just like ATM . The voting platforms would still be under the supervision and full control of election officials. Physical environment could be modified by the election officials as per need to address security and privacy concerns and prevent any kind of outside interference or coercion.

Remote Internet voting: It aims to maximize the percent of voting by maximizing the convenience and access of the voters to enable them to cast their votes from internet access with no restriction on geographical location. Concept of remote internet voting is very attractive and offers significant benefits by taking the advantages of ICT in electoral process provided security issues has to be addressed properly during framework design and implementation.

3.1.1 Comparative features

Paper audit trails: Out of the ten countries surveyed, only Brazil used paper audit trails on any significant scope. The Brazilian government introduced them on a limited basis for the October 2002 elections where paper audit trails were used on 12% of all machines. The system allowed voters to see the printout of their vote, before both paper and electronic votes were recorded and saved. The paper audit trails were phased out by October 2004 in Brazil.

Basis by which system was introduced: In all ten countries surveyed, electronic voting was first introduced in either limited constituencies or for sub-national elections. Ireland, which introduced electronic voting first in the three constituencies in the 2002 elections, would also fall under this category. Furthermore, the trials in progress in a number of countries where national-level elections have not yet used fully electronic voting. In several cases (e.g. Brazil, Australia) the authorities audited the results from a subset of the machines to verify whether the results were accurate or not.

Treatment of blank or invalid votes: Two of the systems permitted blank votes to be cast (Brazil and Australia), and both of these preserved the anonymity of the voter casting such votes. In the Brazilian system, a blank vote is included in the count of total valid votes, while in Australia it is not. India's system does not permit invalid votes to be cast, owing largely to substantive reasons and the fact that the level of invalid votes has traditionally been very high, and one of the key advantages for electronic voting was seen as the ability to reduce the

high level of invalid voting. Belgium's system no longer permits the casting of blank or invalid votes.

Open-source versus proprietary software: Two of the countries surveyed (Australia and Belgium) post the source code of the electronic voting software used on the Internet for inspection. Australia initially posted its software source code and Belgium chose this measure in 1999, in order to increase public confidence in the system. Brazil permits a partial inspection of its code for a short time before the election and it was only available for inspection by political parties and by the electoral commission.

For constructing e-voting system the following list of requirements are required:

- An election system should not enable coerced voting.
- An election system should allow a method of secure authentication via an identity verification service.
- An election system should not allow traceability from votes to respective voters.
- An election system should provide transparency, in the form of a verifiable assurance to each voter that their vote was counted, correctly, and without risking the voter's privacy.
- An election system should prevent any third party from tampering with any vote.
- An election system should not afford any single entity control over tallying votes and determining the result of an election.
- An election system should only allow eligible individuals to vote in an election.

3.2 Software Requirement Specification:

Software Requirement Specification (SRS) is the starting point of the software development activity. It is a complete description of the behaviour of a system which is to be developed. The SRS document enlists all necessary requirements for project development. To derive the requirements we need to have clear and thorough understanding of the product which is to be developed. This is prepared after detailed communication with project team and the customer.

A SRS is a comprehensive description of the intended purpose and environment for software under development. The SRS fully describes what the software will do and how it will be expected to perform.

An SRS minimizes the time and effort required by developers to achieve desired goals and also minimizes the development cost. A good SRS defines how an application will

interact with system hardware, other programs and human users in a wide variety of real-world situations.

3.2.1 Characteristics of SRS:

Correct - An SRS is correct if, and only if, every requirement stated therein is one that the software shall meet. Traceability makes this procedure easier and less prone to error.

Unambiguous - An SRS is unambiguous if, and only if, every requirement stated therein has only one interpretation. As a minimum, this requires that each characteristic of the final product be described using a single unique term.

Verifiable – It is verifiable if there exists some finite cost-effective process with which a person or machine check whether software product meets requirements.

Consistent - Consistency refers to internal consistency. If an SRS does not agree with some higher-level document, such as a system requirements specification, then it is not correct. An SRS is internally consistent if, and only if, no subset of individual requirements described in it conflict.

Modifiable – SRS is said to be modifiable if its structure and style are such that any changes to the requirements can be made easily, completely and consistently while retaining the structure and style.

Traceable – SRS is said to be traceable if the origin of each of its requirements is clear and it facilitates the referencing of each requirement in future enhancement.

Ranked for importance or stability – SRS is ranked for importance or stability if each requirement in it has an identifier to indicate either the importance or stability of that particular requirement.

3.2.2 User Requirements

The software requirements specification is produced at the culmination of the analysis task. The function and performance allocated to the software as a part of system engineering and refined by establishing a complex information description, detailed functional and behavioural description and indication of performance requirements, design constraints, appropriate validation criteria and other data pertinent to requirements.

The major requirement included in this application is to reduce illegal votes. This is the highest level abstraction of the requirement, this to be converted into lower level requirement language in detail. The programmer has to correctly understand.

3.2.3 Software Requirements

- Operating System: Windows 7 and above
- Database: MySQL Server
- Language: .net
- Tools: Visual Studio

3.2.4 Hardware Requirements

- CPU type: Intel Pentium
- Ram size: 5GB
- Hard disk: 200GB

3.3 Visual Studio Installation Procedure:

Step 1 - Make sure your computer is ready for Visual Studio

Before you begin installation:

1. Check the system requirements. These requirements help you know whether your computer supports Visual Studio 2019.
2. Apply the latest Windows updates. These updates ensure that your computer has both the latest security updates and the required system components for Visual Studio.
3. Reboot. The reboot ensures that any pending installs or updates don't hinder the Visual Studio install.
4. Free up space. Remove unneeded files and applications from your System Drive by, for example, running the Disk Cleanup app.

Step 2 - Download Visual Studio

Next download Visual Studio application. Click on download button. Next it asks to save the application. Choose the location and click on save button.

Step 3 – Setting the requirements for install

After completion of download double click on the vs_professional.exe. Before installation we must agree License term. And if you want you can check the customer experience improvement program (optional).



Fig: 3.1 setup the location

After agreed the license click on next button.

Step 4 – Choose Optional features to install Visual Studio

Here you can select the features you want based on your requirement. Otherwise click on select all. It will select all the features. After selecting it will show the space required for the application next click on install button.



Fig: 3.2 select optional features to install

Step 5 – Install Visual Studio

After that click on install button. Installation begins.



Fig: 3.3 installing the application



Fig: 3.4 applying the features

It takes some time to complete the installation.

Step 6 – Launch the application



Fig: 3.5 launch the application

Next click on LAUNCH. It launches the application.

Step 7 – Select default environment Settings

Select default environment settings that you want next click on start visual studio to start the application. After that it loads user settings.

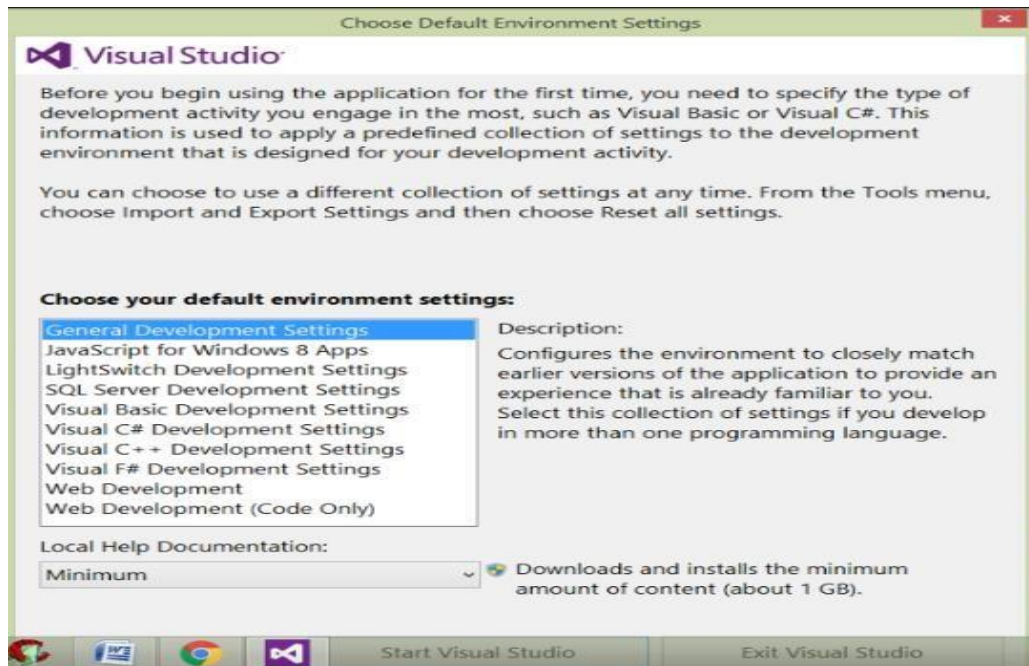


Fig: 3.6 select the default environment settings

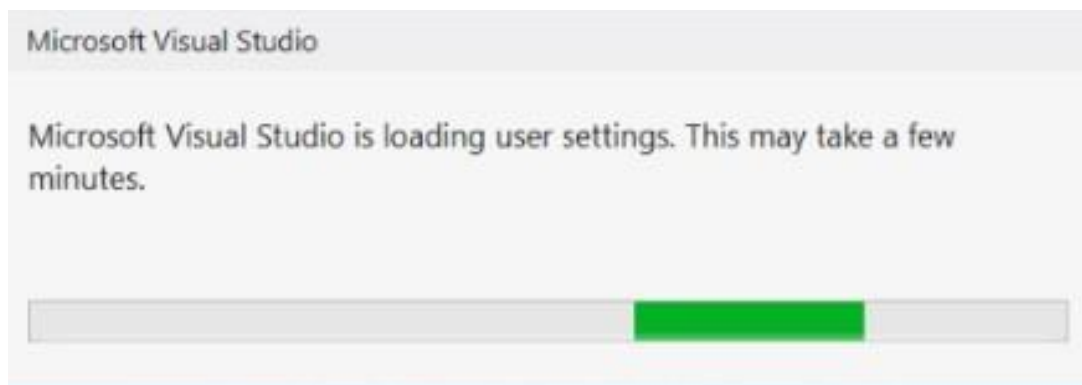


Fig: 3.7 loading user settings

Step 8 – Start developing the application

Click on file tab and click start new project. Then select required template. And it opens your new project and ready to code.

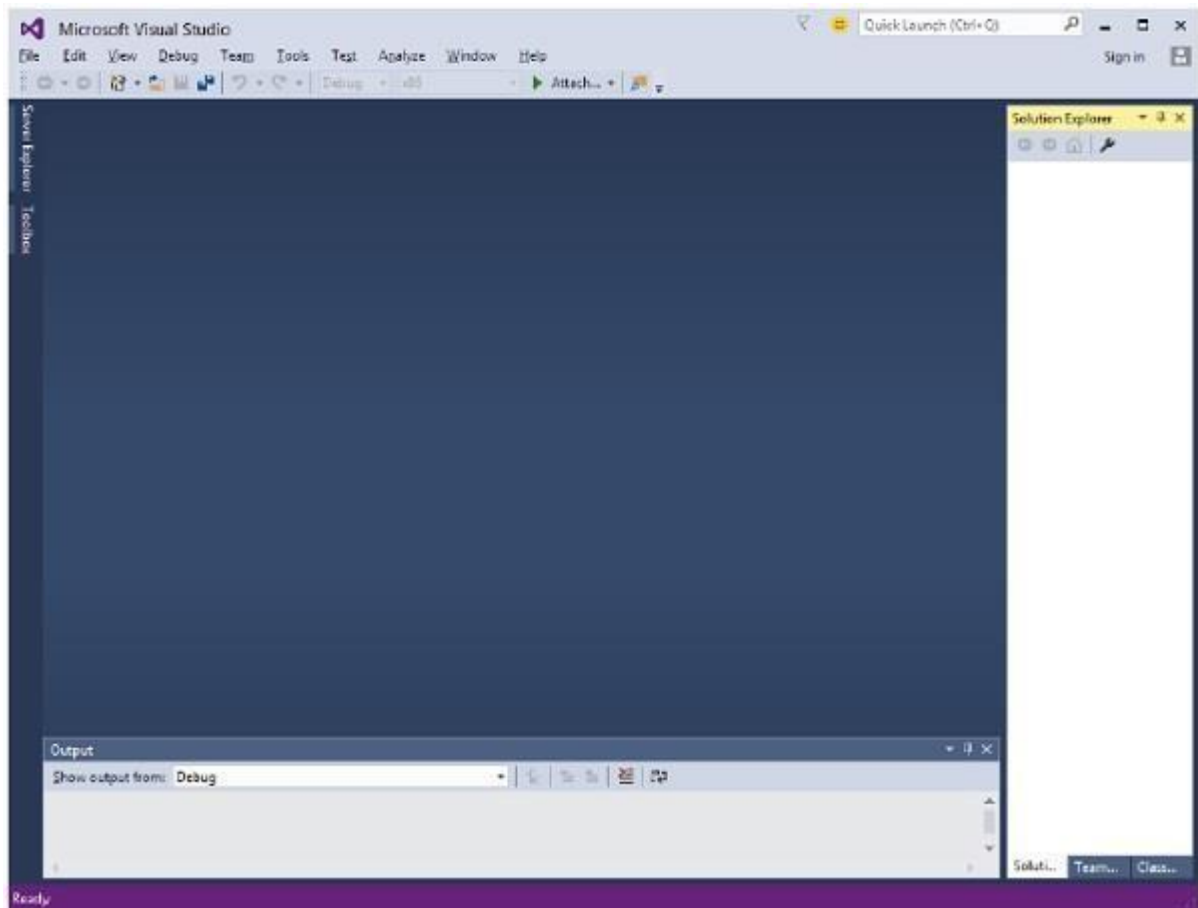


Fig: 3.8 once all is done a main window will be displayed

3.4 System Study

Feasibility study

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden. For feasibility analysis, some understanding of the major requirements for the system is essential.

The importance of a feasibility study is based on organizational desire to “get it right” before committing resources, time, or budget. A feasibility study might uncover new ideas that could completely change a project’s scope. It’s best to make these determinations in advance, rather than to jump in and to learn that the project won’t work. Conducting a feasibility study is always beneficial to the project as it gives you and other stakeholders a clear picture of the proposed project.

Three key considerations involved in the feasibility analysis are

- Economical feasibility
- Technical feasibility
- Social feasibility

Economical feasibility

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

This assessment typically involves a cost/ benefits analysis of the project, helping organizations determine the viability, cost, and benefits associated with a project before financial resources are allocated. It also serves as an independent project assessment and enhances project credibility—helping decision-makers determine the positive economic benefits to the organization that the proposed project will provide.

Technical feasibility

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

This assessment focuses on the technical resources available to the organization. It helps organizations determine whether the technical resources meet capacity and whether the technical team is capable of converting the ideas into working systems. Technical feasibility also involves the evaluation of the hardware, software, and other technical requirements of the proposed system.

Social feasibility

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system

and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

Conclusion:

We can see how requirements gathering and design are very critical in software development to make sure that the project solves the right problem in right approach.

CHAPTER - 4

DESIGN

4.1 Introduction

System design is the solution to the creation of a new system. This phase is composed of several systems. This phase focuses on the detailed implementation of the feasible system. It emphasis on translating design specifications to performance specification is system design. System design has two phases of development logical and physical design.

During logical design phase the analyst describes inputs (sources), outputs (destinations), databases (data stores) and procedures (data flows) all in a format that meets the uses requirements. The analyst also specifies the user needs and at a level that virtually determines the information flow into and out of the system and the data resources. Here the logical design is done through data flow diagrams and database design.

The physical design is followed by physical design or coding. Physical design produces the working system by defining the design specifications, which tell the programmers exactly what the candidate system must do.

The programmers write the necessary programs that accept input from the user, perform necessary processing on accepted data through call and produce the required report on a hard copy or display it on the screen.

4.2 UML Introduction

The unified modelling language allows the software engineer to express an analysis model using the modelling notation that is governed by a set of syntactic, semantic and pragmatic rules. A UML system is represented using five different views that describe the system from distinctly different perspective.

UML is specifically constructed through two different domains, they are:

- UML Analysis modelling, this focuses on the user model and structural model views of the systems.
- UML Design modelling, this focuses on the behavioural modelling, implementation modelling and environmental model views.

4.2.1 Usage of UML diagrams in project:

As the strategic value of software increases for many companies, the industry looks for techniques to automate the production of software and to improve quality and reduce cost and time to the market. These techniques include component technology, visual programming, patterns and frameworks. Additionally, the development for the World Wide Web, while making some things simpler, has exacerbated these architectural problems. The UML was designed to respond to these needs.

Simply, systems design refers to the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements which can be done easily through UML diagrams.

4.2.2 UseCase diagram:

A UML use case diagram is the primary form of system/software requirements for a new software program underdeveloped. Use cases specify the expected behaviour (what), and not the exact method of making it happen (how). Use cases once specified can be denoted both textual and visual representation (i.e. use case diagram). A key concept of use case modelling is that it helps us design a system from the end user's perspective. It is an effective technique for communicating system behaviour in the user's terms by specifying all externally visible system behaviour.

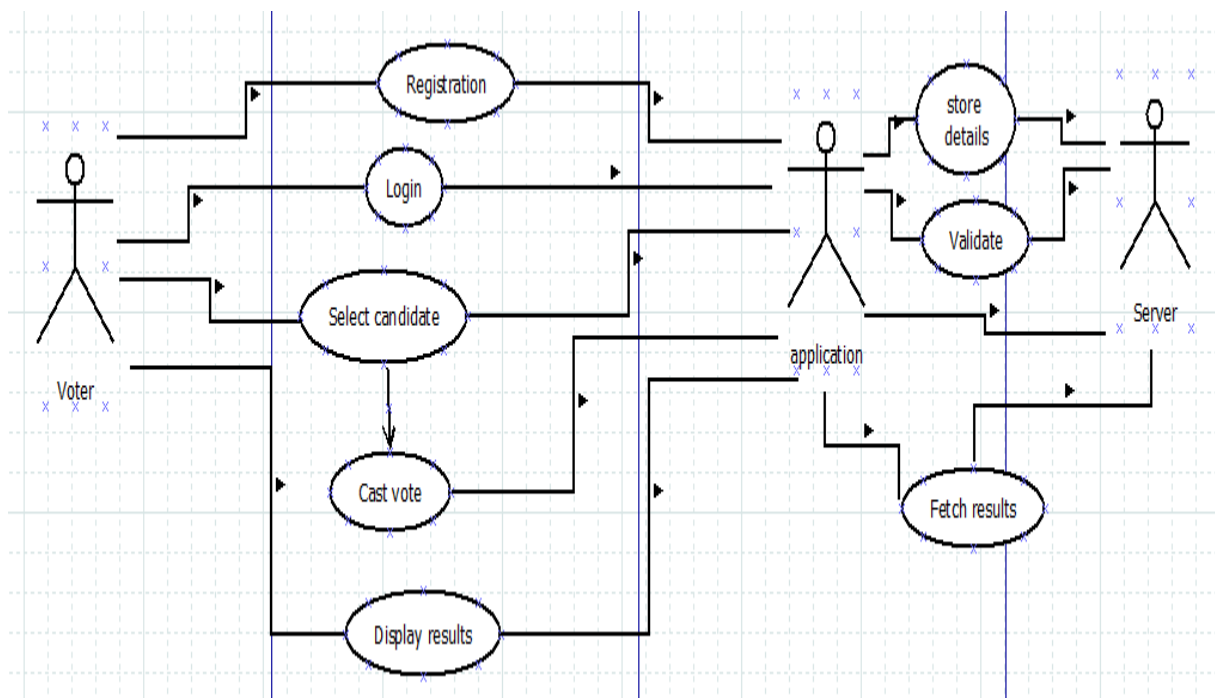


Fig: 4.1 Usecase diagram

4.2.3 Class diagram:

In software engineering, a class diagram in the Unified Modelling Language (UML) is a **type of static structure diagram** that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

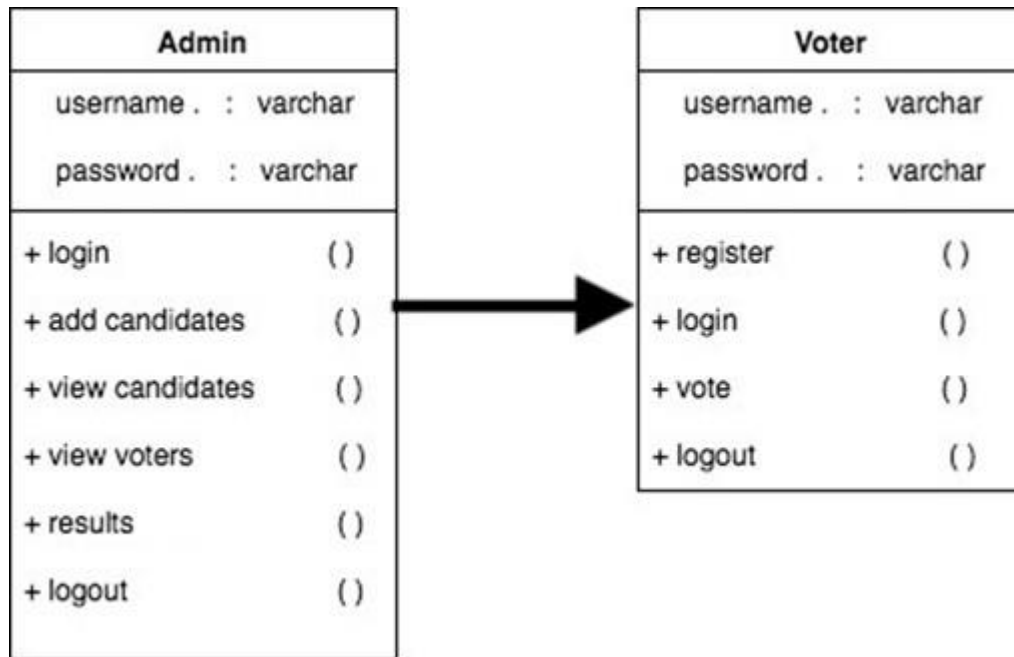


Fig: 4.2 class diagram

4.2.4 Sequence diagram:

Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when.

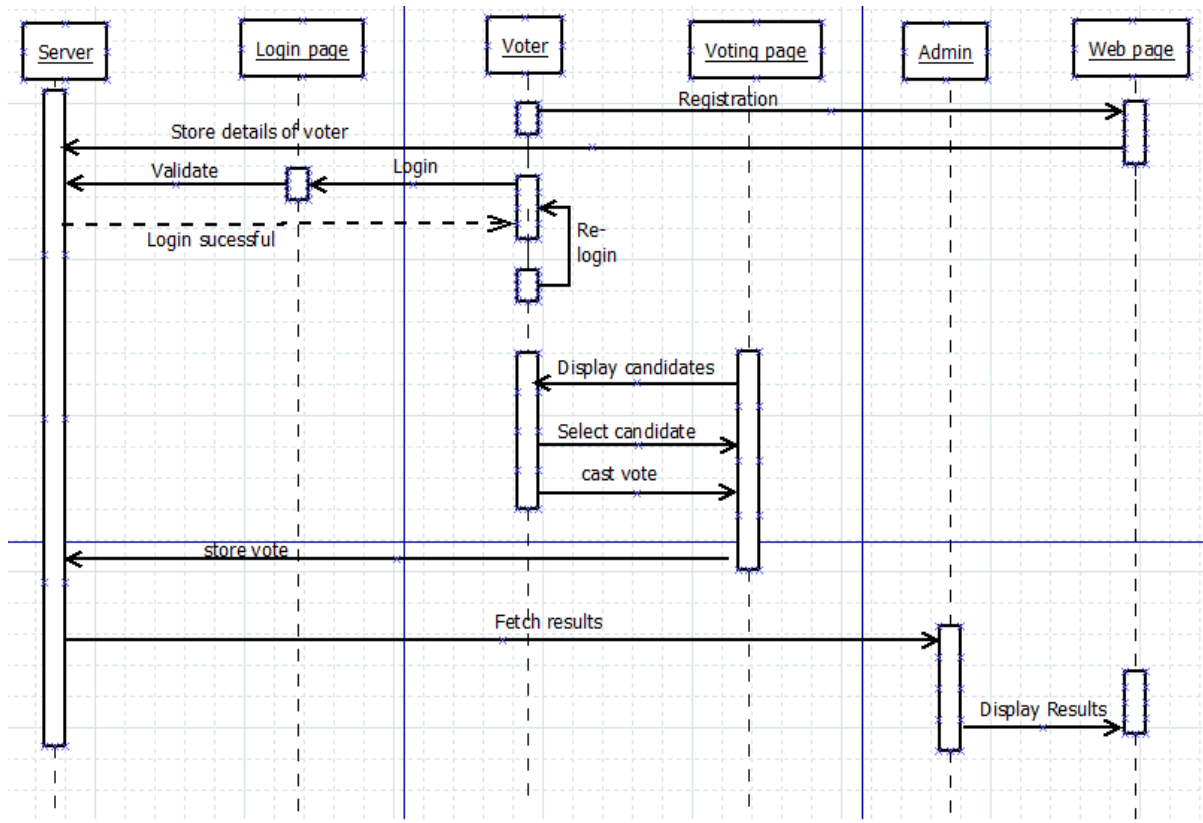


Fig: 4.3 sequence diagram

4.3 Dataflow Diagram

Data flow diagram will describe the flow of the project in a cleared manner. The data flow diagrams (DFD) are used for modelling the requirements and it focus on flow of the data but not order of the data. DFD can be represented in the form of levels.

4.3.1 DFD: Level-0

The below diagram is a 0-level DFD that only shows the flow of data between the various entities and the system. In online voting system the Administrator is the controller of the system and all the decisions are made by him. The Administrator can handle the entire voter and their details, voting details etc. and view details of them and he can update that detail also.

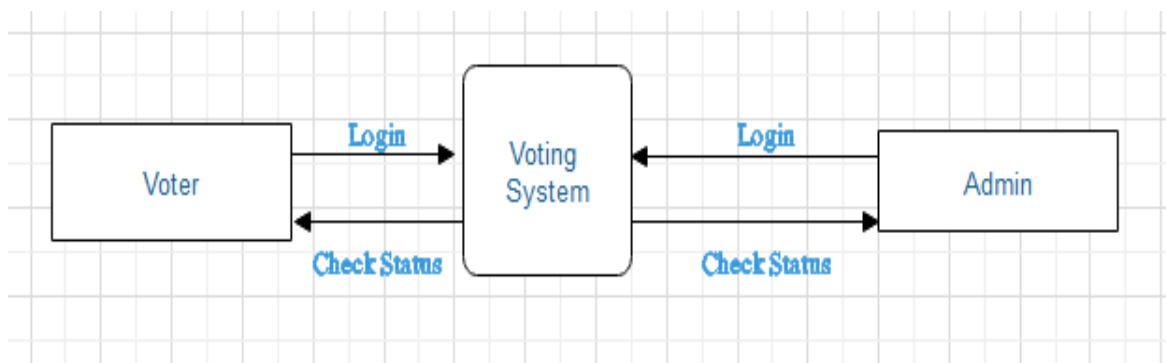


Fig: 4.4 level-0 data flow diagram

4.3.2 DFD: Level 1

The below shown diagram is a 1-level Data Flow Diagram for the online voting system. According to this DFD various process are done after login process. First voter register for the election after login he/she will cast the vote. The voter can view the final report after giving vote. Fig4.5 shows the admin operations.

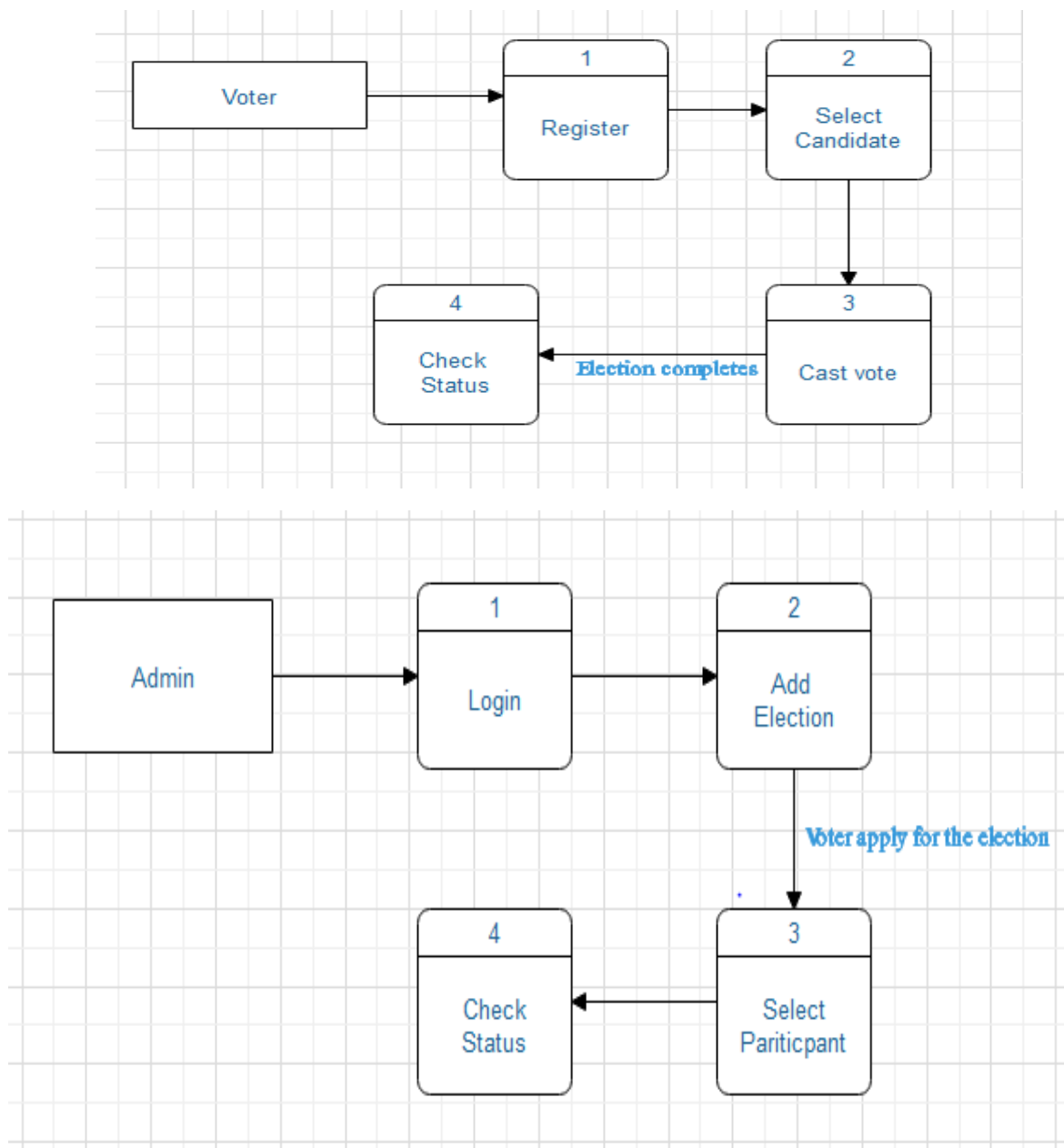


Fig: 4.5 level-1 data flow diagram for voter and admin

4.3.3 DFD: Level 2

The below shown diagram is a 2-level Data Flow Diagram for the Online voting system.

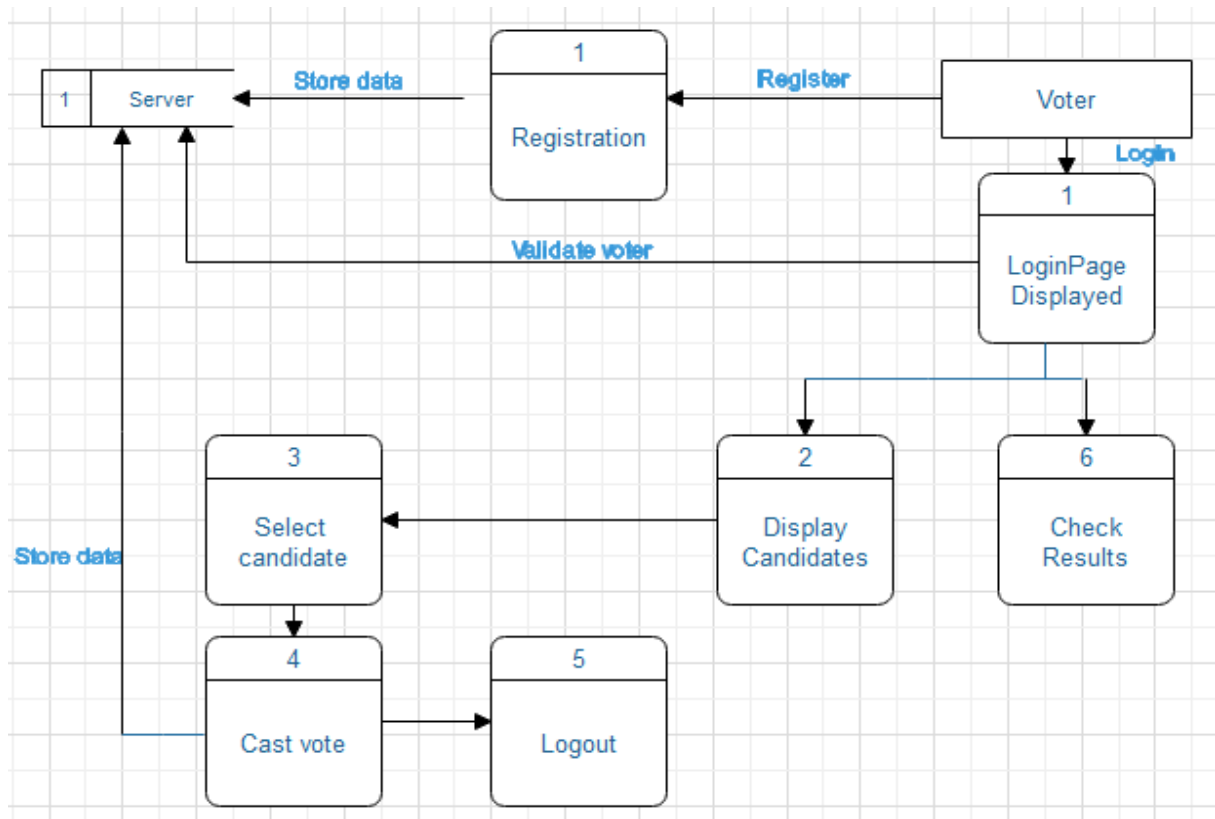


Fig: 4.6 level-2 data flow diagram

4.4 Modules

The proposed system consists of two modules:

- Administrator Module
- User Module

4.4.1 Administrator module

Administrator interface consists of a login name and unique password using which admin can login into the Online Voting System. Administrator has the main control of the system. By logging into the page it can perform the following tasks.

Select Candidate

Here the admin can select the list of candidates in the election. It includes candidates name, Roll number etc. The candidates will be added to the list only after completing the procedures.

Add Election

Here the election to be conducted is selected. To add an election should be give required fields like name, description, start date, end date along with timings.

Selected Candidate List

The list of candidates participating in the election can be seen. It includes the candidates name and Roll Number.

The sub-modules of administrator are:

- Voting Structure
- Voters Registration
- Candidate Registration
- Counting & Categorization of Results

Voting Structure

Here the eligible voters who are permitted to login to the system can utilize the right to vote. Each voter can register a single vote to a candidate's favour in his/her election. The security measures taken within the system prevents them from exercising their votes again i.e. the second vote by the same user goes invalid. The starting and ending dates of the election are specified by the administrator.

Voters Registration

The registration procedure of all the eligible voters .This registration process is done by the user itself. According to voters database each voter is provided with a unique identification codes which includes username as college roll number and password. The details of the voters include username, password, name, address, gender, group, etc.

Candidate Selection

The selection of the candidates in each election is done by the administrator. The detail of the candidate includes name, address, gender, his/her election. With the candidate selection, thus producing the candidate list with the given information of the candidates. The candidate list can be viewed by admin and the vote within their respective homepages. According to candidates database (manual) each details of the candidates are stored in database controlled by the admin including candidate's details.

Categorization of Results

When the voter votes, the number of votes obtained by the selected candidate is incremented by 1. The result is published during the voting process. Result can be viewed by administrator who visits into the site with proper authentication.

Results are categorized in following ways.

1. Total votes polled to each candidate
2. Total votes polled based on Groups
3. Total votes Polled based on gender
4. Total Votes Polled based on Year.

4.4.2 USER (VOTER) MODULE

User interface consists of a login name as roll id and unique password using which he/she can login into the Online Voting System. This will be supplied by the system to the user. Once the user has logged in, he has the privilege to view the names of the election and selected candidates listed by the administrator. The user module constitutes only one sub module:

Authentication & Voting

Each voter is provided with unique roll id and password manually by the system. The voter uses the username and password for login and exercise the fundamental right of voting. If incorrect username and password is entered, the access to is denied to the user. And also voter is allowed to vote only once by election. This is the security feature provided against external access of the system. After login the voter enters the voter home page.

Candidate List

This facilitates the voter to view the candidate names and the election name.

Vote

This provides the voter with a list of candidate with in his/her election along with selection option to select the preferred candidate from the list.

View Results

This provides user friendly representation of the votes obtained by each candidate. It includes the votes obtained by each candidate.

Logout

This provides an option for the voter to quit the session, while in the voter home page.

Conclusion:

Design is the main phase in every project. In this application design provides clear explanation of all modules and their functionalities with their uml and Dataflow diagrams.

CHAPTER - 5

IMPLEMENTATION & RESULTS

5.1 Introduction

After designing the new system, the whole system is required to be converted into computer understanding language. Coding the new system into computer programming language does this.

It is an important stage where the defined procedures are transformed into control specifications by the help of a computer language. This is also called the programming phase in which the programmer converts the program specifications into computer instructions, which we refer as programs. The programs coordinate the data movements and control the entire process in a system.

It is generally felt that the programs must be modular in nature. This helps in fast development, maintenance and future change, if required.

The validity and proper functionality of all the modules of the developed application is assured during the process of implementation. Implementation is the process of assuring that the information system is operational and then allowing user to take over its operation for use and evaluation.

Implementation is the stage in the project where the theoretical design is turned into a working system. The implementation phase constructs, installs and operated the new system. The most crucial stage in achieving a new successful system is that it works effectively and efficiently.

5.2 Methods of Implementation

5.2.1 Output Screens

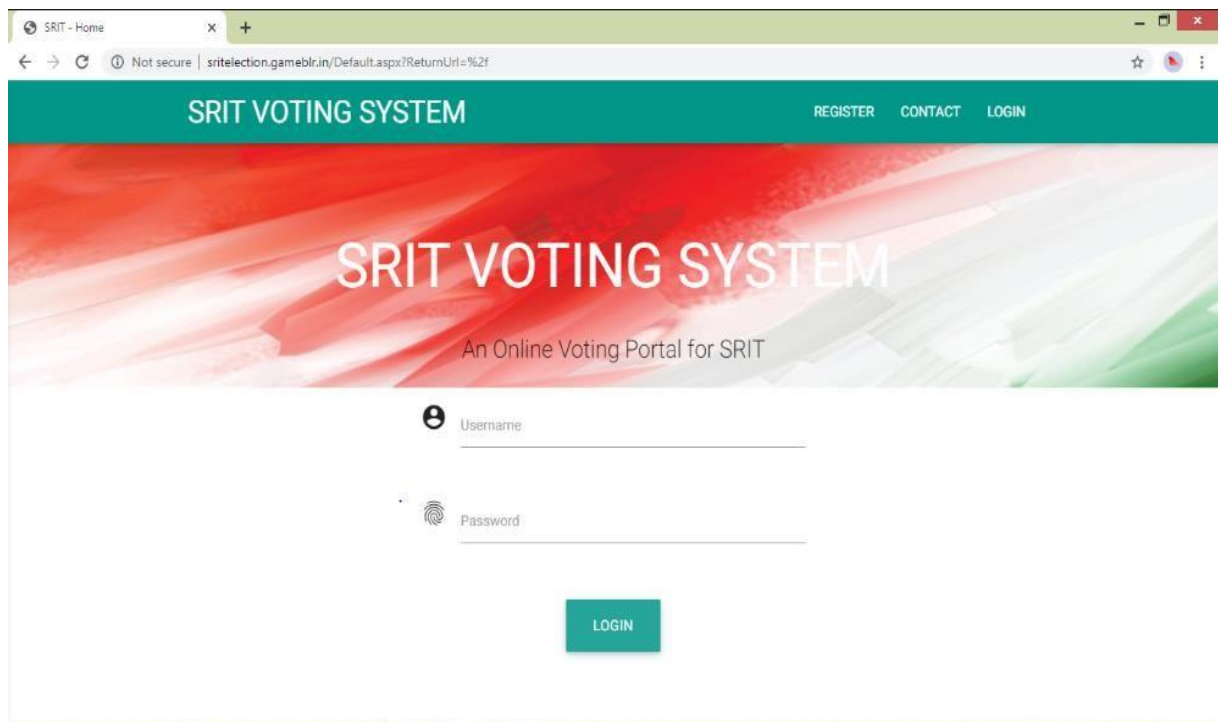


Fig: 5.1 Login page

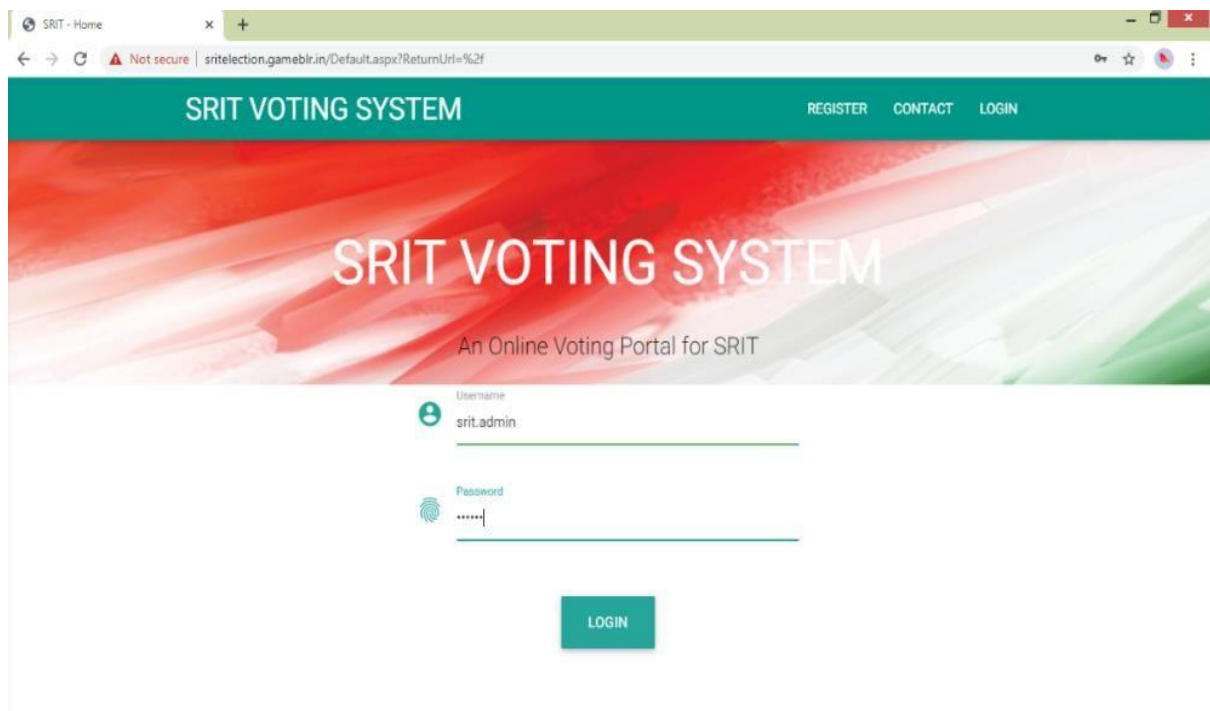


Fig: 5.2 admin login into the system

The screenshot shows a web browser window with the URL `sritelection.gameblr.in/Register.aspx`. The page has a green header with the text "SRIT VOTING SYSTEM" and navigation links for "REGISTER", "CONTACT", and "LOGIN". Below the header is a large red banner with the text "REGISTER HERE". The registration form consists of several input fields arranged in two columns: "First Name", "Last Name", "Roll number", "State", "Mobile", "Email", "Birthdate", and "Percentage". At the bottom, there are two dropdown menus for "Hostel" (with "Hosteler" selected) and "Course" (with "Btech" selected).

Fig: 5.3 voter registration form

The screenshot shows a web browser window with the URL `sritelection.gameblr.in/addElections.aspx`. The page has a green header with the text "SRIT VOTING SYSTEM" and navigation links for "ADD ELECTIONS", "EDIT ELECTIONS", "SELECTION & RESULTS", and "Logout". Below the header is a section titled "ADD YOUR ELECTION HERE:". The form contains several input fields: "Title" (with "voting- 2020" entered), "Description" (with "voting" entered), "StartDate" (with "29 March, 2020" entered), "Time" (with "10:00" entered), "EndDate" (with "29 March, 2020" entered), and "Time" (with "05:00" entered). A green button labeled "ADD ELECTION" is positioned below the form fields.

Fig: 5.4 admin adding the election

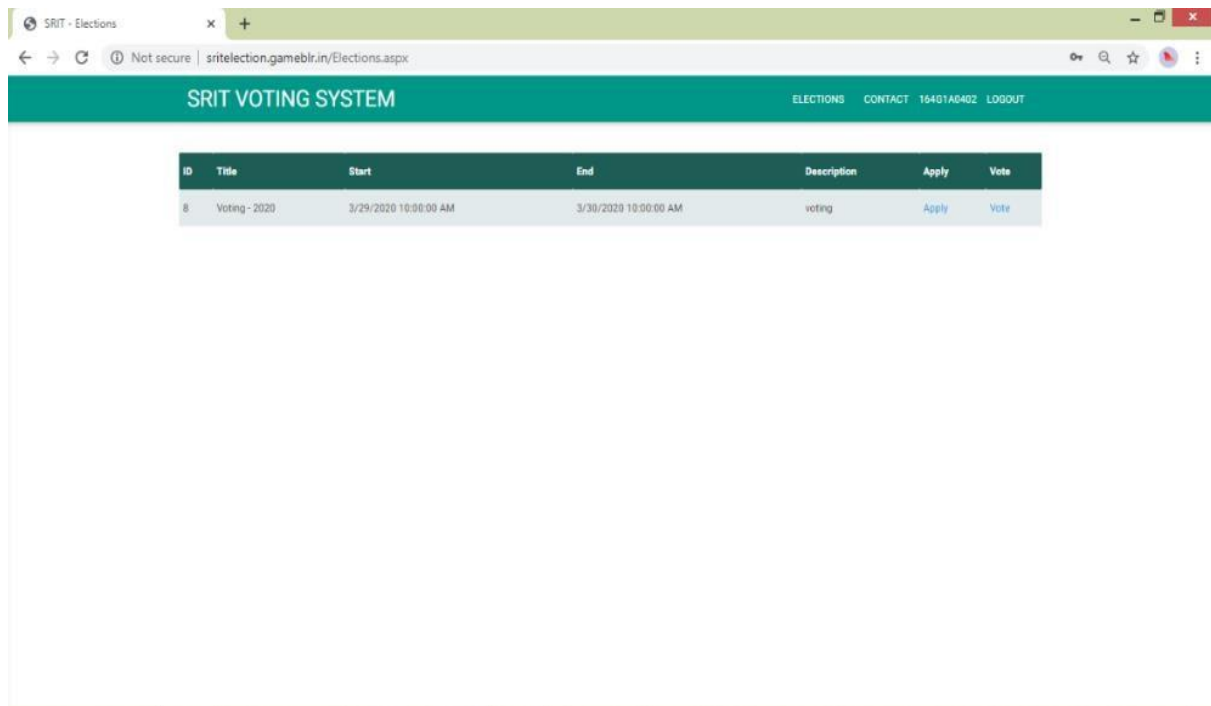


Fig: 5.5 candidates applying for the election

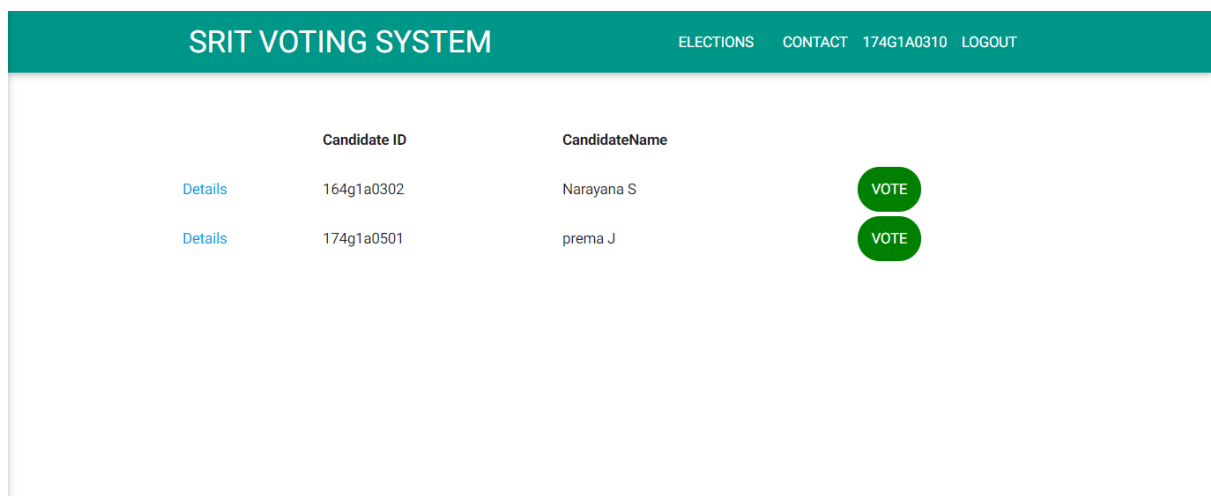


Fig: 5.6 voters cast the vote

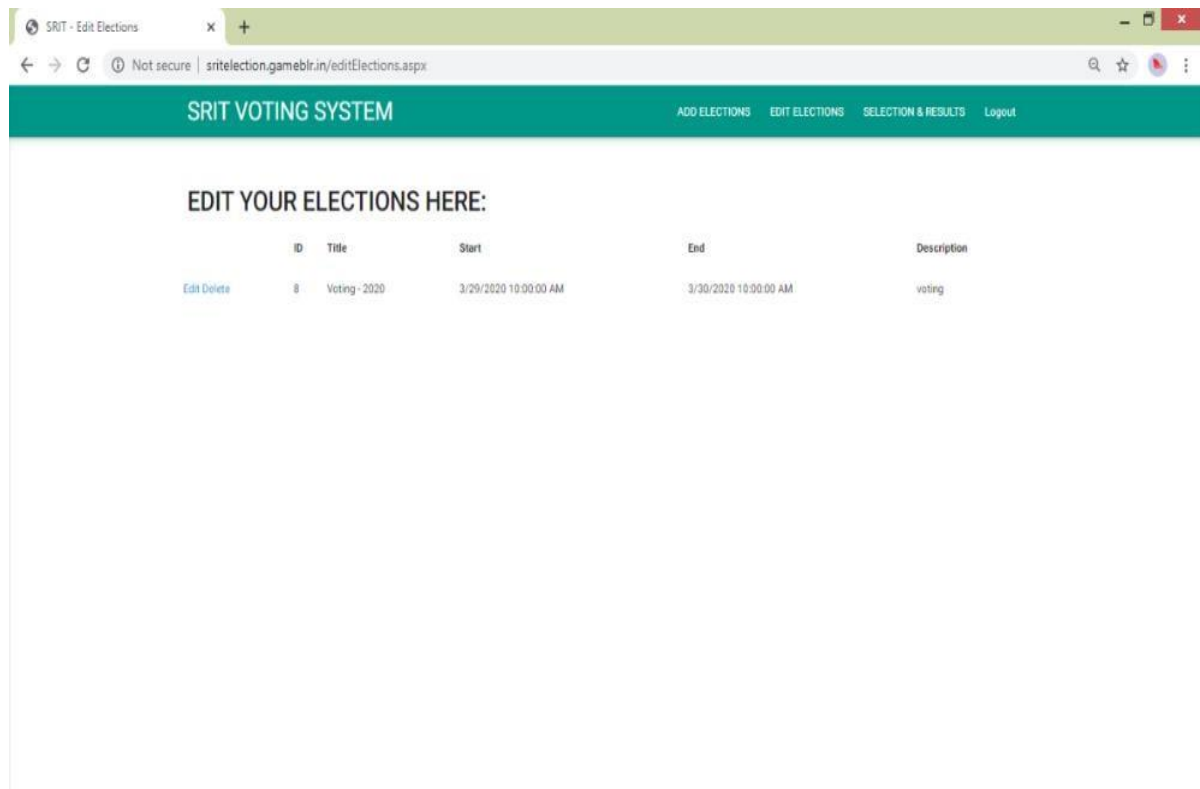


Fig: 5.7 edit the elections

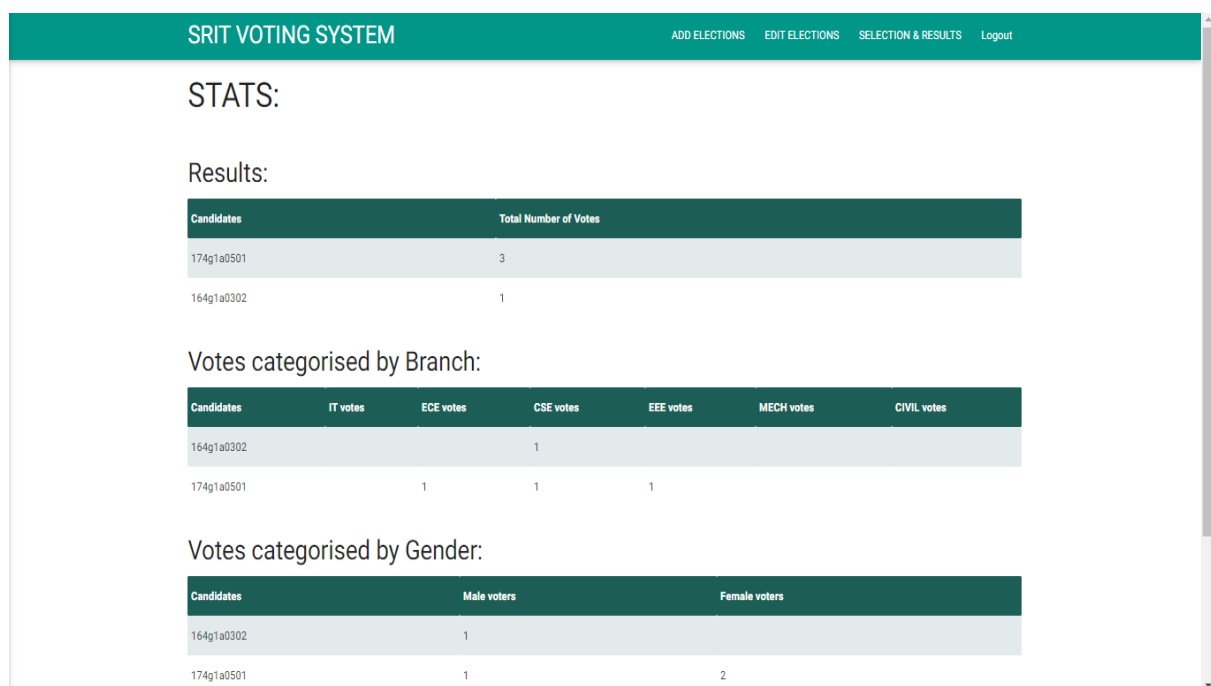


Fig: 5.8 categorizing the results

5.3 Results

After testing the application we get the following results which are available in the form of screen shots as below.

Output screen 1: It is the login page for both users (voters) and admin to do operations.

Output screen 2: Administrator login into the system for doing operation like adding candidates, adding elections, check the status of results etc.

Output screen 3: Before cast the vote voters should register for the election. After that by using username (id) and password they login into the system.

Output screen 4: In this admin adding the election.

Output screen 5: In this candidates apply for the elections by click on apply. After that admin check the details of the candidate and select them.

Output screen 6: Users (voters) login into the system and select the election and cast their vote.

Output screen 7: Before the election begins admin can edit the election if required.

Output screen 8: Check the status of the results. In this results are categorizing by branch, gender and year.

Conclusion:

Implementation and results gives explanation about the application clearly with output screens.

CHAPTER - 6

TESTING

6.1 Introduction

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product.

It is the process of exercising software with the intent of ensuring that the software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.1.1 Testing Objectives:

The main objective of testing is to uncover a host of errors, systematically and with minimum effort and time. Stating formally we can say,

Testing is a process of executing a program with the intent of finding an error.

- A successful test is one that uncovers an as yet undiscovered error.
- A good test case is one that has a high probability of finding error, if it exists.

6.1.2 Test Case Design

A test case is a set of conditions or variables under which a tester will determine whether a system under test satisfies requirements or works correctly. The process of developing test cases can also help find problems in the requirements or design of an application.

The first approach is known as Black box testing and the second approach is White box testing. In this project, we applied both the approaches as a mixed approach known as Sandwich testing. We apply white box testing techniques to ascertain the functionalities top-down and then we use black box testing techniques to demonstrate that everything runs as expected.

6.2 Types of Tests:

6.2.1 Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision

branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 Integration testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.2.3 Functional testing

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input: identified classes of valid input must be accepted.

Invalid Input: identified classes of invalid input must be rejected.

Functions: identified functions must be exercised.

Output: identified classes of application outputs must be exercised.

Systems/Procedures: Interfacing systems or procedures must be invoked Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

6.2.4 System Testing

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing

is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

White Box Testing

White Box Testing is a testing in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is used to test areas that cannot be reached from a black box level.

Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

Unit Testing:

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

Integration Testing

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects. The task of the integration test is to check that components or software applications,

e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Acceptance Testing

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Conclusion:

Testing gives the correctness of the output of the application by using some testing techniques.

CONCLUSION

By doing this project we were able to bring a new system for online voting for our college. With the advent of technology and Internet in our day to day life, we were able to offer advanced voting system to voters both in the college and outside through our Online voting system. The system offers significant cost benefits over paper elections in a vote to vote comparison. It saves an organization the cost of creating, printing and postage, since everything can be handled electronically. The Online Voting Platform consists of two levels. One is administrator level and voter level. In administrator level admin have unique username and password which can add participants and add election. After that voters can cast votes. Then the admin will declare results. Next the voters has to register before the election after that they have to login with username and password to select the desired person.

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