Website - Vulnerability Assessment and Penetration Testing

Thesis Submitted in partial fulfillment
of the Requirements of the Degree of

Master In Science with Specialization in

Cybersecurity

by

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Roll Number – 05

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Under the Supervision of

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April 2023

Nagindas Khandwala College (Autonomous)

Malad, Mumbai 400064

CERTIFICATE

This is to certify that the dissertation titled, **"Website - Vulnerability Assessment and Penetration Testing"**, is bonafied work of **"SAGAR KHANVILKAR"** (**Roll No: 05** and **G.R. No: 3511470**) submitted to the Nagindas Khandwala College (Autonomous), Mumbai in partial fulfillment of the requirements for the award of degree of **"Masters In Science with Specialization in Cybersecurity".**

(Prof. Sagar Mehta)

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I, ***Sagar Khanvilkar*, *Roll No: 05*** *and* ***G.R. No: 3511470***, hereby declare that this dissertation entitled **"Website - Vulnerability Assessment and Penetration Testing"** presents my original work carried out as a Master Student of Nagindas Khandwala College (Autonomous), Mumbai 400064. To the best of my knowledge, this dissertation contains no material previously published or written by another person, nor any material presented by me for the award of any degree or diploma of Nagindas Khandwala College (Autonomous), Mumbai or any other institution. Any contribution made to this research by others, with whom I have worked at Nagindas Khandwala College (Autonomous), Mumbai or elsewhere, is explicitly acknowledged in the dissertation. Works of other authors cited in this dissertation have been duly acknowledged under the sections "Reference" or "Bibliography". I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I am fully aware that in case of any non-compliance detected in future, the Academic Council of Nagindas Khandwala College (Autonomous), Mumbai may withdraw the degree awarded to me on the basis of the present dissertation.

Date: 11-April-2023

Place: Malad, Mumbai 400064

Sagar Khanvilkar

Sagar Khanvilkar| Everymedia Internship Offer Letter

Dipika Bhalekar <dipikab@everymedia.world> Thu, 24 Nov 2022, 17:27

to me, HR

Hi Sagar,

Congratulations!

With reference to your application and subsequent interview you had with us, we are pleased to take you on board at our Mumbai office as a **"Tester - Intern"** on the following terms and conditions:

Date of Joining – 5th December '22
Period – 3 month
Stipend -- Rs. 5,000/- month
Address -- Everymedia Technologies Pvt. Ltd.
2nd Floor, Stanford Building, CTS No. 554, Junction of S.V. Road and Juhu Lane,
Andheri (West), Mumbai 400 058. Landmark- Above Mahindra showroom.

Any extension of the joining date will require written approval from the Organization failing which the Offer will be deemed canceled.

Please consider this email as a Formal Offer from us. You may proceed ahead with the formalities at your end.

On your joining you are required to submit the photocopies of the below-given documents:
• Educational certificates: 10th, 12th, Graduation, Post Graduation
• Pan card (2 copies)
• Address proof (Aadhar card- mandatory, passport - Copy)

Kindly reply to this mail as an acceptance by today so that we can start with the formalities.

We look forward to welcoming you to Everymedia!

Please let us know if we can help you with anything else.

Thanks & Regards,
Dipika Bhalekar
Sr. Associate - Human Resource

ABSTRACT

Online voting website designed for use in democratic processes. The website provides a platform for registered voters to cast their ballots and for election officials to manage the voting process. The website has several features, including a user-friendly interface, secure login, and real-time vote counting. The system also includes measures to prevent fraud, such as voter authentication and encryption of sensitive data. The website is designed to be salable , allowing it to handle large numbers of users and voting data. This basic online voting website aims to provide a convenient and secure way for citizens to exercise their right to vote and participate in democratic processes.

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CHAPTER 1 : INTRODUCTION

A world is full of technologies starting from morning to brush with Electric toothbrush to sleeping in night under cooler. For Customers- Satisfaction and passion there are a lot of People who were very passionate , about doing things online. Online voting websites are a form of digital platforms that allow users to cast their votes and express their opinions on various topics or issues. Online voting websites can be an essential tool for collecting data and opinions from a large number of people quickly and easily. The Website Known as **"Website - VAPT"** is a type of a website which provide a convenient and efficient way for people to participate in voting processes, without the need to physically visit a polling station or fill out a paper ballot.

The Online Voting Website where the user can login or Register themself at the same time. User can also check all the ballot information on the user panel and select which person they want to vote. We also performed brute force attack on our online voting website to gather the credential of a admin user.

1.1. Problem Statement of Thesis

The use of online voting websites has become increasingly popular in recent years due to their convenience and accessibility. However, despite the potential benefits, there are still several challenges that must be addressed in order to ensure the security and reliability of the online voting process. One of the key issues is the need to balance the ease of use and accessibility of the website with the need for security and accuracy in the voting results. In addition, there is also a need to ensure that the website is user-friendly and accessible to a wide range of users, including those with disabilities or limited technical skills.

However, the implementation of online voting systems is still not widespread due to concerns regarding security, reliability, and accessibility. In our Online voting website the problem faced were like randomly user create an voter ID and can vote candidate more than one.

1.2. Existing System

Online voting has emerged as a popular method of voting, especially in large organizations and government elections.

System Overview:

The basic online voting website system consists of three main components: the user interface, the database, and the server. The user interface provides a platform for voters to cast their votes, while the database stores the voting data.

User Interface:

The user interface is designed to be simple and easy to use. Voters log in using their unique voter ID and password. The user interface displays the list of candidates and allows voters to select their preferred candidate.

Database:

The database stores all the voting data, including voter ID, password, candidate selection, and time of vote. The database is designed to be secure, with access restricted to authorized personnel only. The database is backed up regularly to ensure that no data is lost in case of a system failure.

Server:

We have create a local host server that is Xampp server our online voting website and also phpmyadmin to store the databases.

1.3. Objective Of Project

The **"Website - VAPT"** to design and develop a user-friendly, with a focus on transparency and accuracy of results and efficient online voting website that allows registered users to participate in the polls, and enables Admin to collect and analyze data in a timely and accurate manner. The website should provide a convenient platform for participants to access the voting system, submit their responses. It also include features such as aadhar card number, admin can make voters active or inactive.

We also created VAPT testing using a tool called Burp suite. In this tool we have performed brute force attack. Using the tool we attach the payloads and capture all the requests from the website. The objective is to create an online voting website that is accessible, reliable, and valuable for the Users. One of the key benefits of an online voting website is that it allows for remote voting, which can increase voter turnout and accessibility, particularly for individuals who may have difficulty physically accessing polling stations, such as people with disabilities, the elderly, or those living in remote areas.

1.4. Proposed System

The emergence of the internet has revolutionized many aspects of life, including the way people vote. Online voting has become increasingly popular due to its convenience, speed, and accessibility. This research paper proposes a basic online voting system that can be used for small-scale elections.

System Design:

The proposed online voting system consists of two main components: the user interface and the back-end database. The user interface is designed to be simple and easy to use. It should allow users to register, log in, and cast their votes. The back-end database will store user information and vote tallies.

User Registration:

To participate in the online voting process, users must first register on the website. The registration process will collect basic user information such as name, last name, Aadhar No., Aadhar proof and password. Once registered the admin verify it from there end so the user can log in to the system and access the voting page.

Voting Process:

The voting process will be divided into three stages: candidate selection, confirmation, and submission. In the candidate selection stage, users will be presented with a list of candidates to choose from. User select the particular candidate and click on submit to vote.

Security Measures:

To ensure the security of the voting process, several measures will be implemented. We have also implemented VAPT testing our website and find what security measures can be implemented

CHAPTER 2: LITERATURE SURVEY

1. Electronic Voting Literature Review

Computer scientists who have done work in, or are interested in, electronic voting all seem to agree on two things:

- Internet voting does not meet the requirements for public elections.
- Currently widely-deployed voting systems need improvement.

Voting on the Internet using everyday PC's offers only weak security, but its main disadvantages are in the areas of anonymity and protection against coercion and/or vote selling. It's such a truly bad idea that there seems to be no credible academic effort to deploy it at all. The Presidential elections of 2000 brought national attention to problems with current American methods of casting and counting votes in public elections. Most people believe that the current system should be changed; there is much disagreement on how such changes should be made.

Other researchers have done work in electronic voting; while they may not explicitly mention voting from remote poll sites, their work is nonetheless relevant to any effort at designing or implementing a remote poll site voting system. Lorrie Cranor could be classified, like the Caltech/MIT researchers, as a cautious optimist. She acknowledges the problems inherent in each kind of voting apparatus, but doesn't make an recommendation on her site for one technology over the rest.

2. Review on smart voting system:

As we know that India is called the world's largest democracy. In such a democratic country, voting plays a key role in electing government officials and reflects our vision of how a governing body should be formed.

Raspberry Pi and image processing based on Electronic Voting Machine (EVM) , provides a small computer capable of image processing and controls the entire voting system. A photo of the national ID card of citizens is taken with the help of a camera which indicates a valid voter of that zone. If the person is legitimate and has not voted, the person will be allowed to cast his or her ballot. Each voting machine is locked with a module of fingerprint access.

The Impressive Smart Card Based Electronic Voting System, introduces a voting system that gives voters confidence in elections by using fingerprint methods and providing a smart card to every user to promise diversity in the voting system and reduce the work of the Indian election committee.

An Electronic Voting Machine that uses Biometric Fingerprint and Aadhar Card Verification, has a voting system that uses biometric fingerprints with Aadhar certification. In this program, the aadhar number is stored on a small ARM7 micro controller that verifies based on the available information. This will be used to take fingerprints of Indian citizens. If that person is eligible to vote they are entitled to submit their votes.

3. Voters' Evaluations of Electronic Voting Systems:

Electronic voting systems were developed, in part, to make voting easier and to boost voters' confidence in the election process. Using three new approaches to studying electronic voting systems—focusing on a large-scale field study of the usability of a representative set of systems.

Recent research related to voting systems has consisted mainly of aggregate studies of residual votes (which combine over votes, under votes, and spoiled ballots into a single measure). Initial studies have provided important foundational work by showing that voter errors vary by location according to whether traditional paper ballot optical scan voting systems, mechanical lever systems.

More recent studies relying on the residual vote have explored the effects of precinct-based versus central optical scan systems and various aspects of ballot formats (Bullock & Hood, 2002; Kimball & Kropf, 2005, 2006). Another focus has been on the effects of education, race, and other demographic factors on voter errors. Most of the research reports that precincts comprising members of traditionally under represent groups tend to produce more residual votes than do others.

They are all based on the residual vote (or some portion of that measure), which captures only a portion of the kinds of problems voters can have. Most gloss over significant differences among voting interfaces that affect how citizens actually cast their ballots, and because most rely on aggregate data, they cannot measure some aspects of individual behavior that could be the source of the voting errors they report.

CHAPTER 3: METHEDOLOGY

3.1 INTRODUCTION

Online voting websites are online platforms that allow users to vote for various purposes, such as electing candidates in an election, making decisions in a survey. Designing an online voting website requires careful planning and execution to ensure that the voting process is secure, transparent, and efficient.Here are some important considerations and information regarding online voting websites:

Determine the type of online voting system: Next, decide what type of online voting system you want to use. There are several types of online voting systems, including simple majority voting, preferential voting, and weighted voting. Consider the nature of your research and the type of data you want to collect to determine which voting system will be most appropriate.

Select a suitable online voting platform: There are many online voting platforms available, including free and paid options. Research and compare different platforms to determine which one will best meet your needs and budget. Some key factors to consider include ease of use, security, and customization options.

Design the online voting system: Once you have selected an online voting platform, you can begin designing your voting system. Consider the following elements: the number of options to vote for, the criteria for selecting options, the number of votes per user, and the time frame for voting.

Analyze the voting data: After the voting period has ended, analyze the data collected through the online voting website. Depending on the objectives of your research, you may need to perform additional analysis, such as comparing results across different demographic groups.

Verification: Online voting websites should have a mechanism for verifying the identity

of voters to ensure that each vote is cast by an eligible voter. This can include using unique identifiers such as email addresses, phone numbers, or national ID numbers.

Accessibility: Online voting websites should be accessible to all eligible voters, including those with disabilities. This may require the use of assistive technologies such as screen readers or special keyboards.

Transparency: Online voting websites should be transparent in their operations, including how votes are collected, counted, and tabulated. This can help to ensure that the voting process is fair and impartial.

VAPT Testing:

VAPT (Vulnerability Assessment and Penetration Testing) is a type of security testing that evaluates the security posture of a system by identifying vulnerabilities and testing them to determine if they can be exploited by attackers. Steps are as follows

Scoping: Defining the scope of the assessment, including the systems, networks, and applications to be tested.

Reconnaissance: Gathering information about the target system, network, or application to identify potential vulnerabilities.

Vulnerability Assessment: Conducting a systematic review of the target system, network, or application to identify vulnerabilities.

Penetration Testing: Attempting to exploit identified vulnerabilities to determine the potential impact of an attack.

Reporting: Documenting the findings and recommendations for remediation.

The Vulnerability Assessment and Penetration Testing (VAPT) methodology is a systematic process of identifying, assessing, and exploiting vulnerabilities in a network, system, or application. This methodology is often used by organizations to proactively identify and mitigate security risks. In this research paper, we will outline a methodology for conducting VAPT, which can be used as a guide for organizations looking to improve their cybersecurity posture.

VAPT is a process to ensure the security of computer systems, networks, and applications. If you are writing a research paper on VAPT, you will need to describe your methodology in detail to provide insight into your research process.

In conclusion, the VAPT methodology provides a structured approach for identifying and mitigating security risks. By following this methodology, organizations can improve their cyber security posture and protect their critical assets from potential threats.

3.2 REQUIREMNETS

3.2.1 Hardware Used:-

Processor : 64-bit, 4 cores (minimum), 1.4 GHz minimum per core

RAM : 8 GB(minimum) for developer and evaluation use

Hard Disk Drive: 512 GB

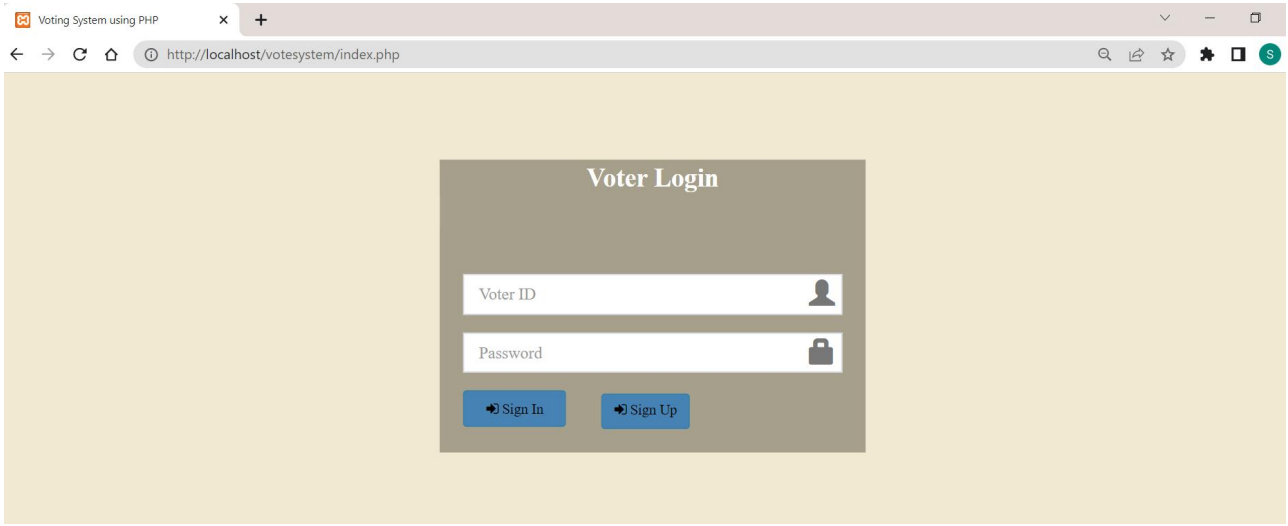
3.2.2 Software and Tools Used:-

HTML
CSS
JAVA SCRIPT
PHP
VS Code
Xampp
MySql
Burp suite

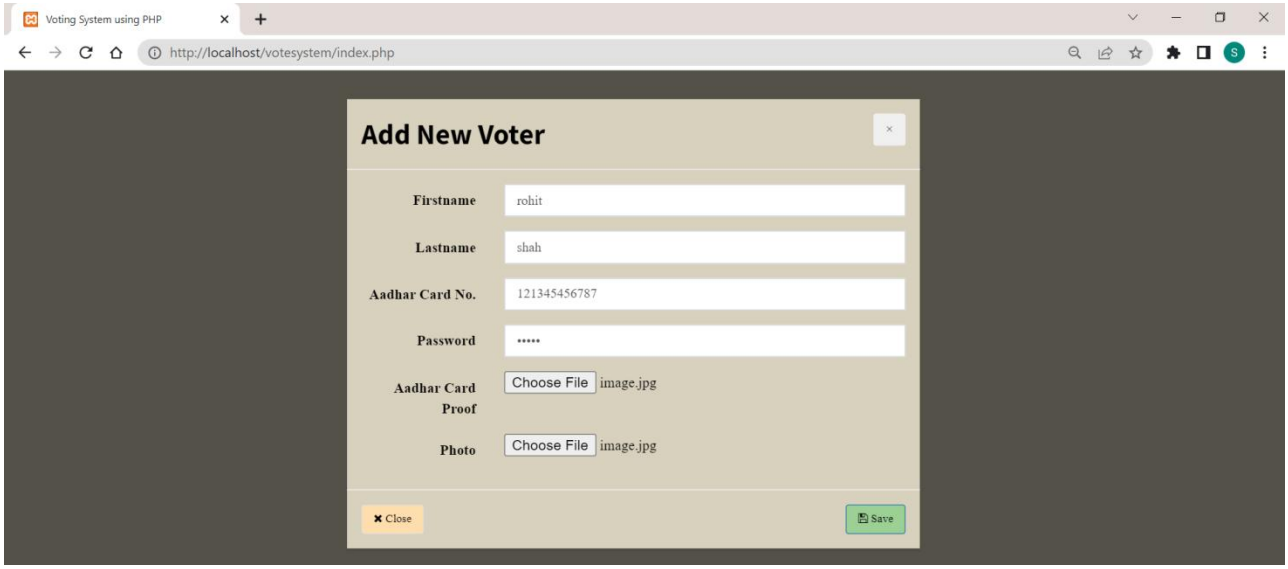
3.3 RESULTS AND SCREENSHOTS

An **Online voting website** where the user can login or sign up at same time to votes a particular candidate. Also created admin panel where the admin can have access to update, edit or delete a candidate.
Admin also have the access who will be able to login by active and inactive method. We have also used burp suite tool to demonstrate the brute force attack.

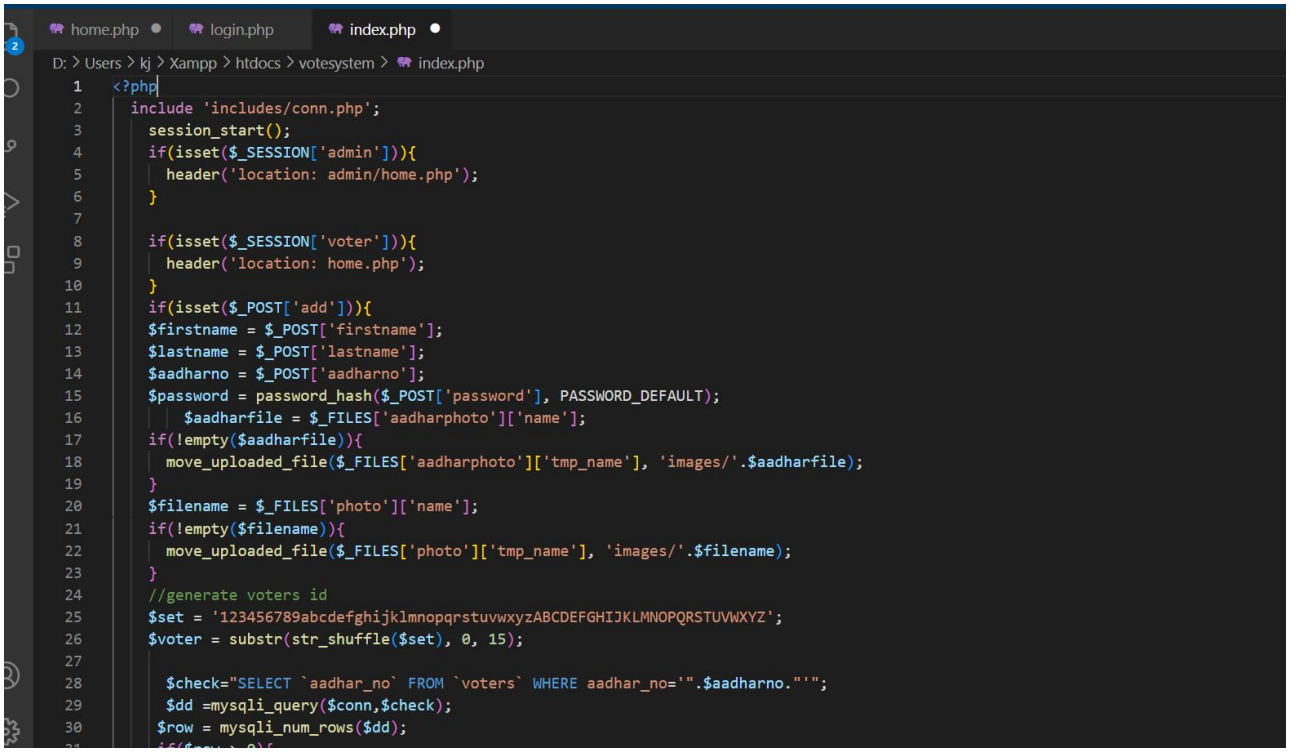
- Voter's can login on this panel also can sign up



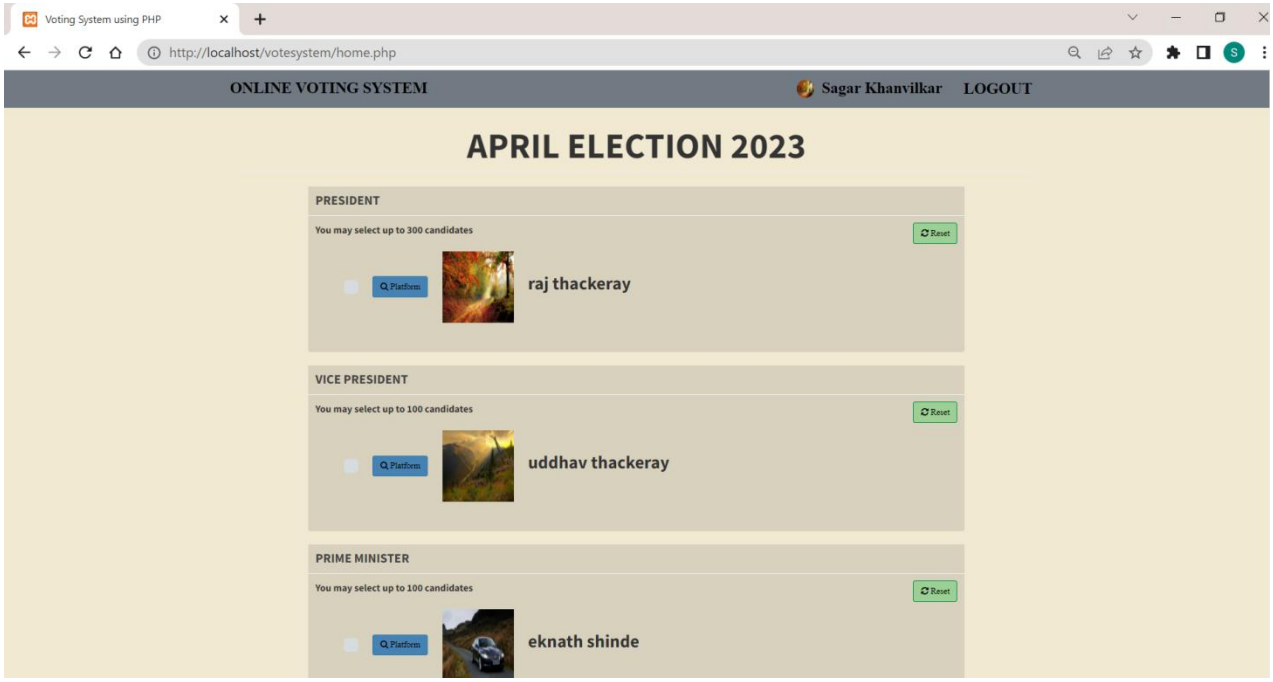
- Voter Sign up popup page



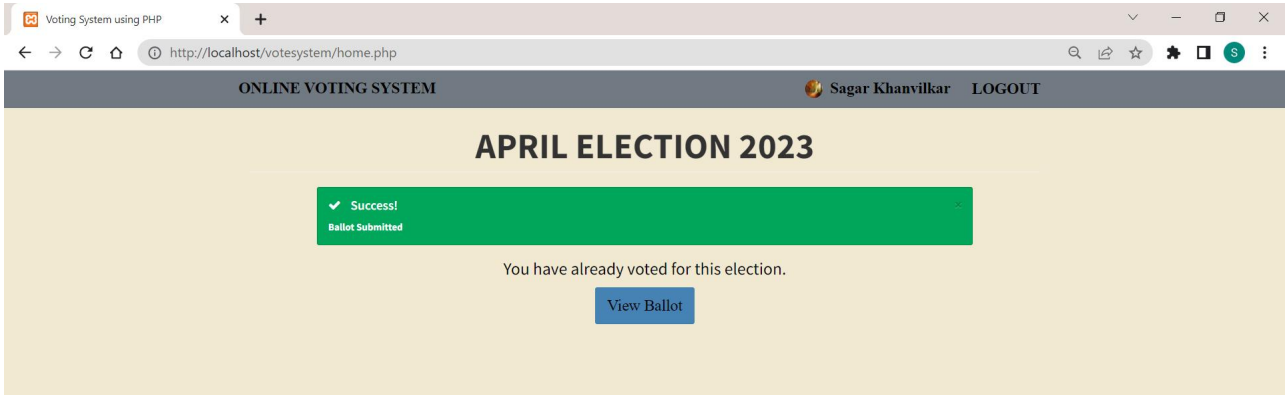
- Signup.php code



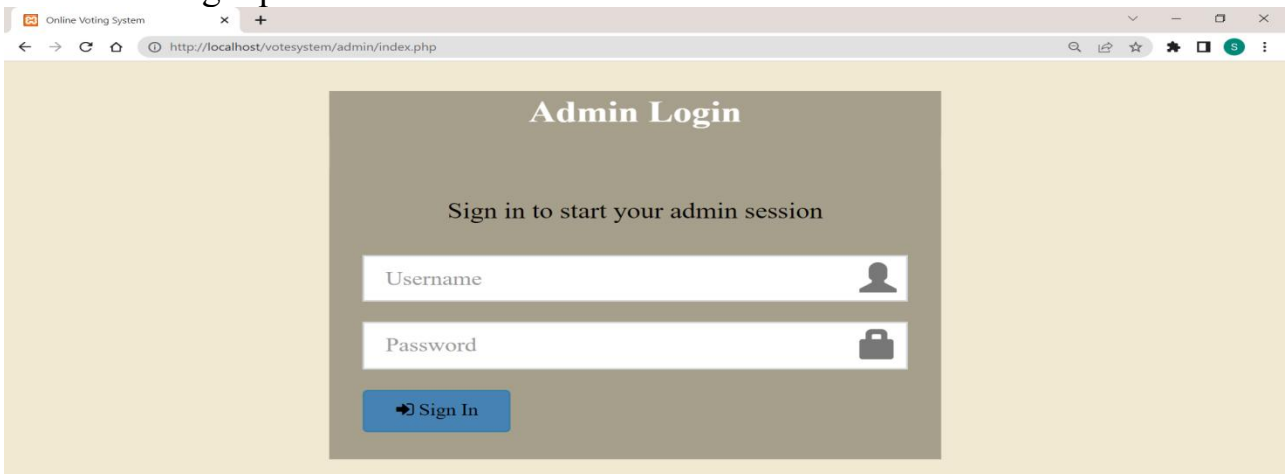
- Voter voting panel where voter can select an candidate to vote



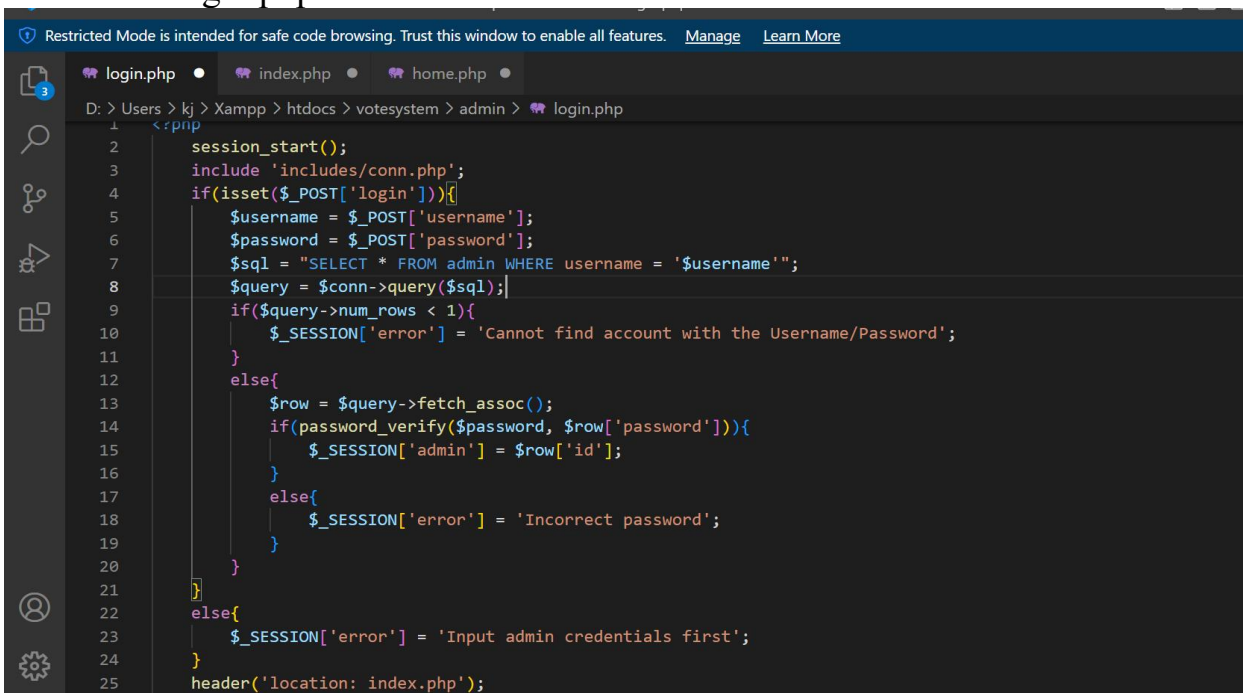
- When you select an candidate and click on submit then it will show that “Ballot submitted”



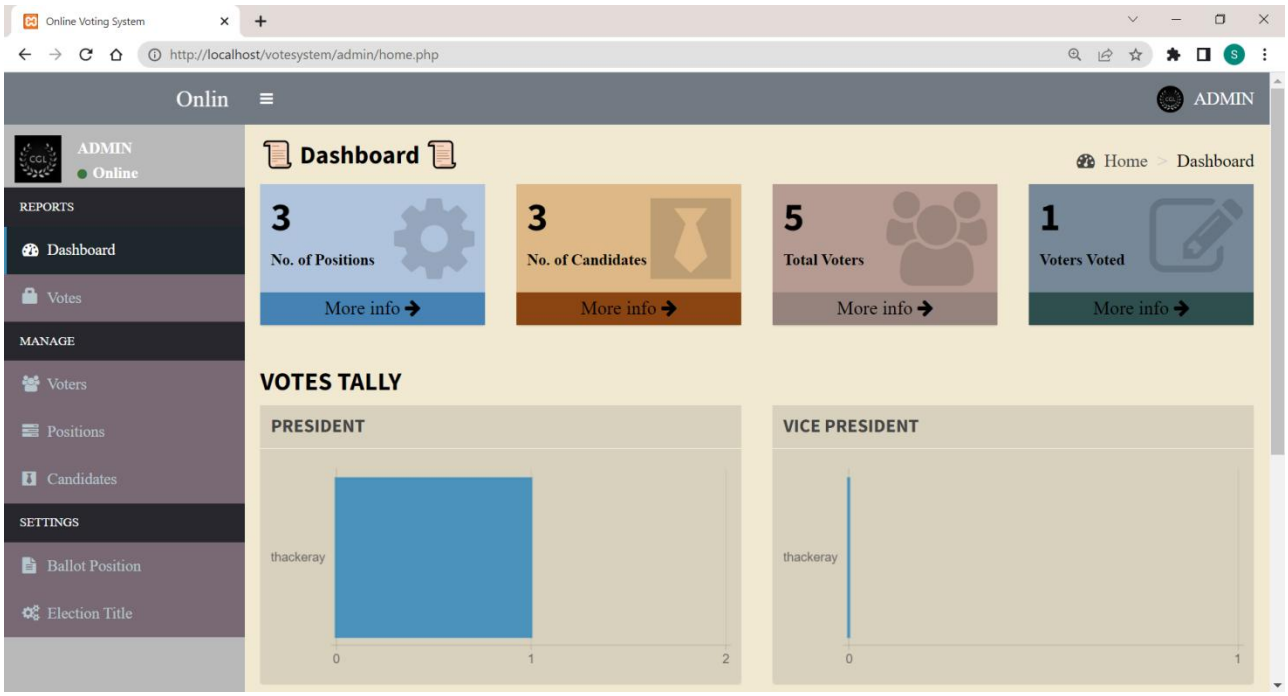
- Admin login panel



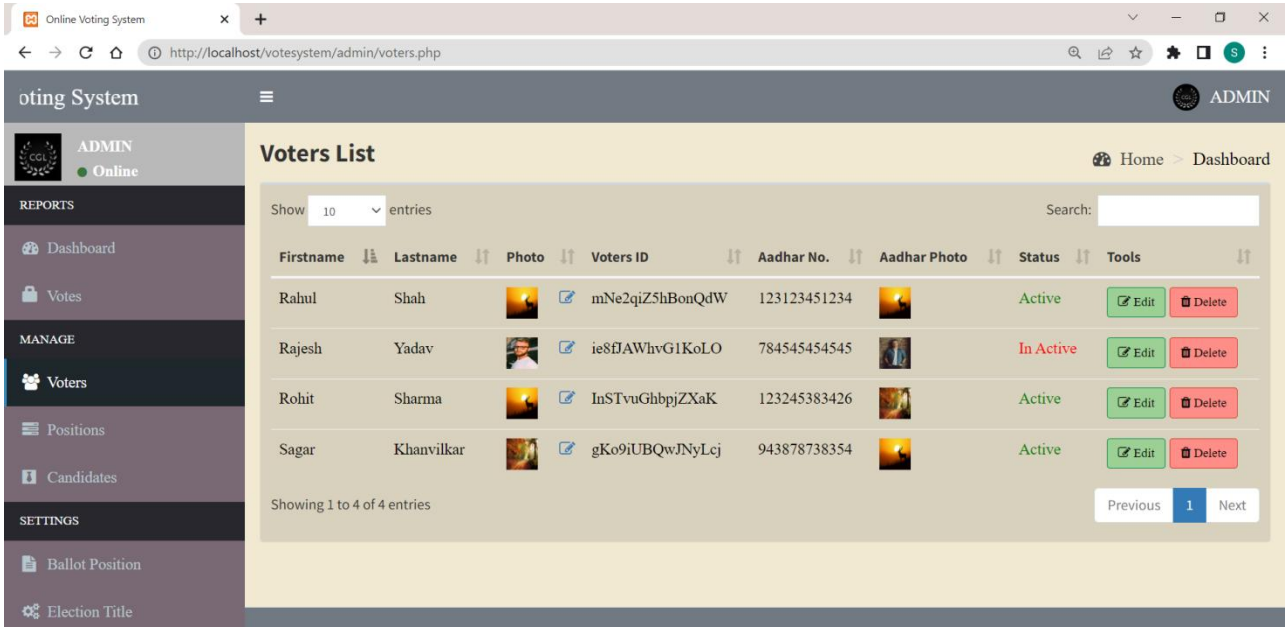
- Admin login.php code



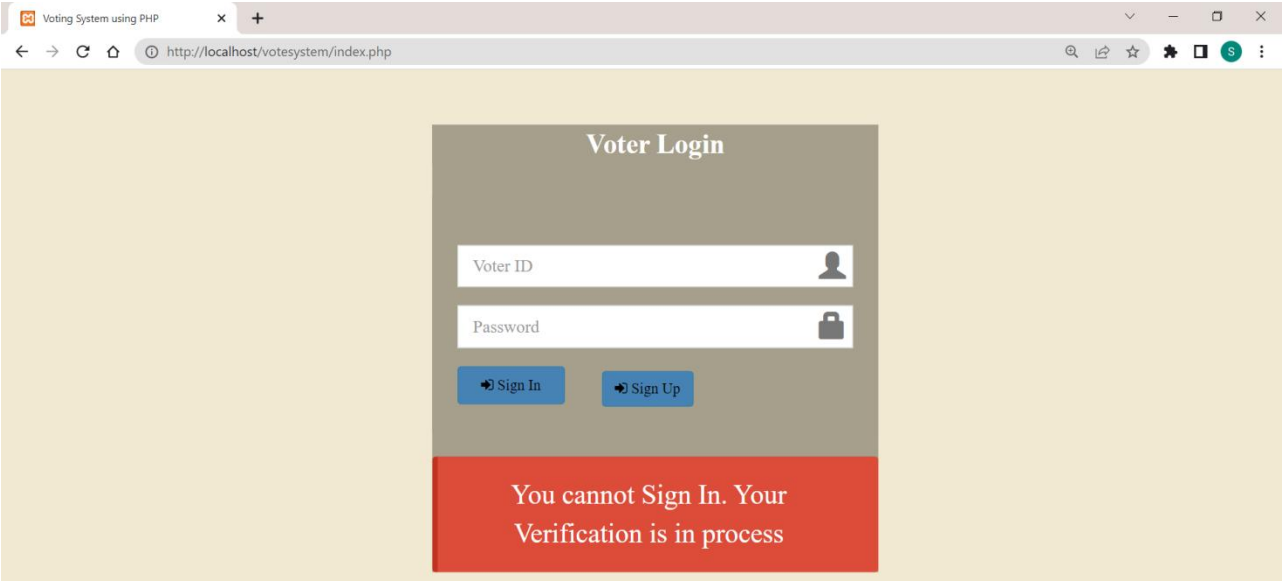
- Admin dashboard panel



- Here the admin verify the voters Aadhar card No. is valid or not only then the voter can be able login and vote the particular candidate.



➢ User only able to vote when admin activate the user's voting login

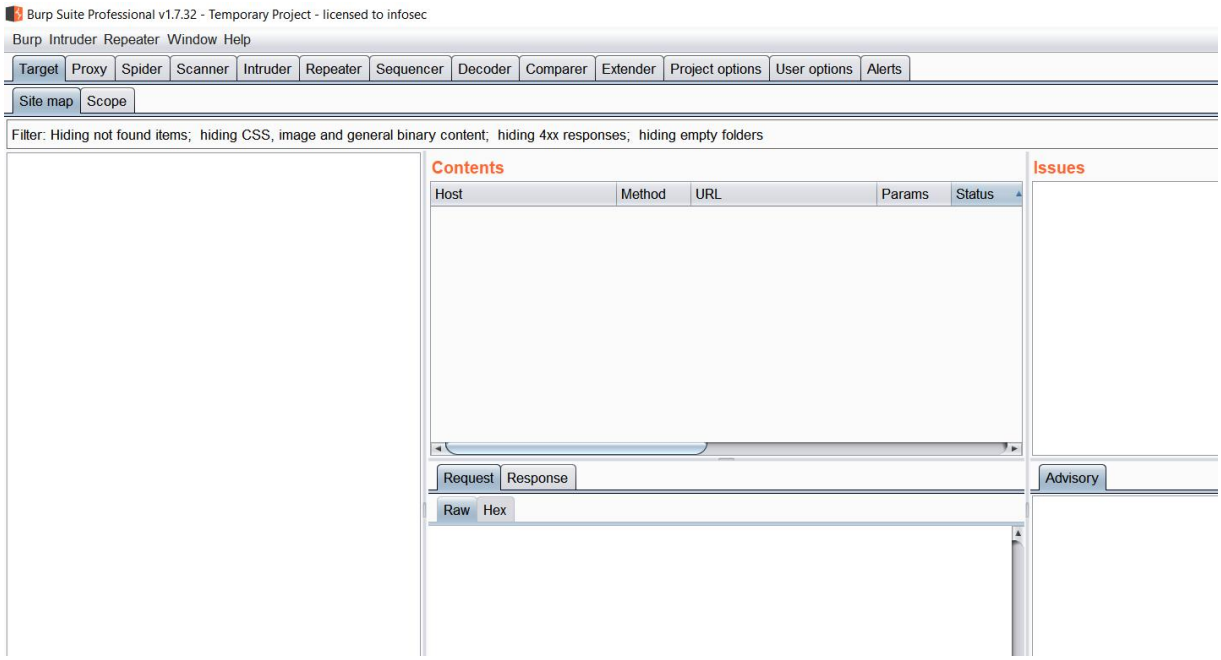


➢ Voter's validation login.php Code

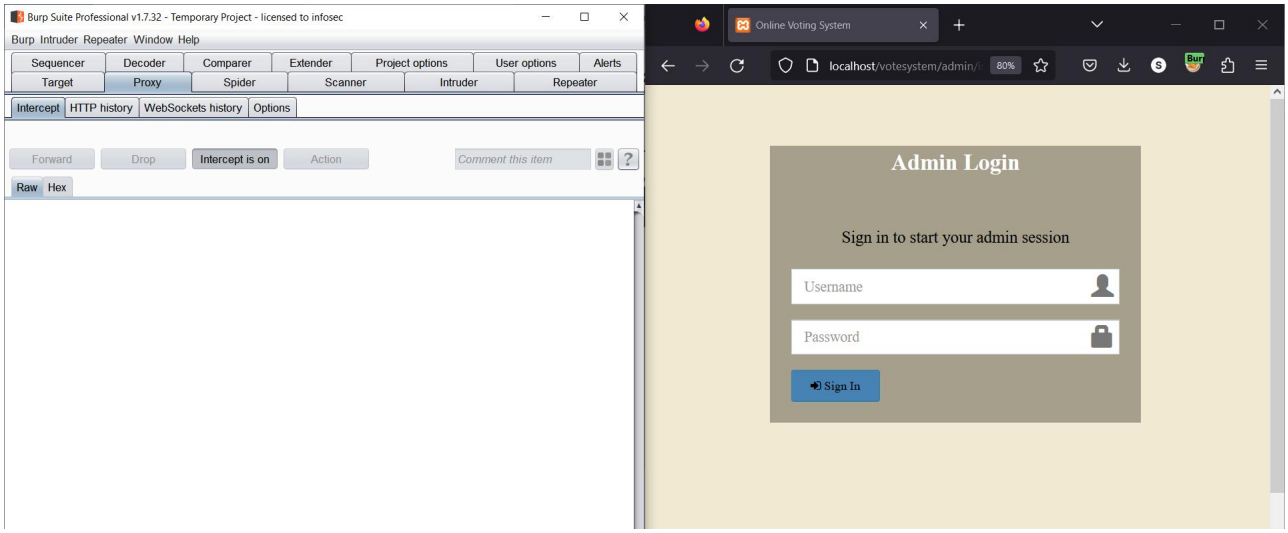
```php
<?php
    session_start();
    include 'includes/conn.php';

    if(isset($_POST['login'])){
        $voter = $_POST['voter'];
        $password = $_POST['password'];

  $sql = "SELECT * FROM voters WHERE status='1' AND voters_id = '$voter'";
        $query = $conn->query($sql);

        if($query->num_rows < 1){
            $_SESSION['error'] = 'You cannot Sign In.                                    Your Verification is in process';
        }
        else{
            $row = $query->fetch_assoc();
            if(password_verify($password, $row['password'])){
                $_SESSION['voter'] = $row['id'];
            }
            else{
                $_SESSION['error'] = 'Incorrect password';
            }
        }

    }
    else{
        $_SESSION['error'] = 'Input voter credentials first';
    }

    header('location: index.php');
```

Now demonstrating the brute force attack on the Online voting website

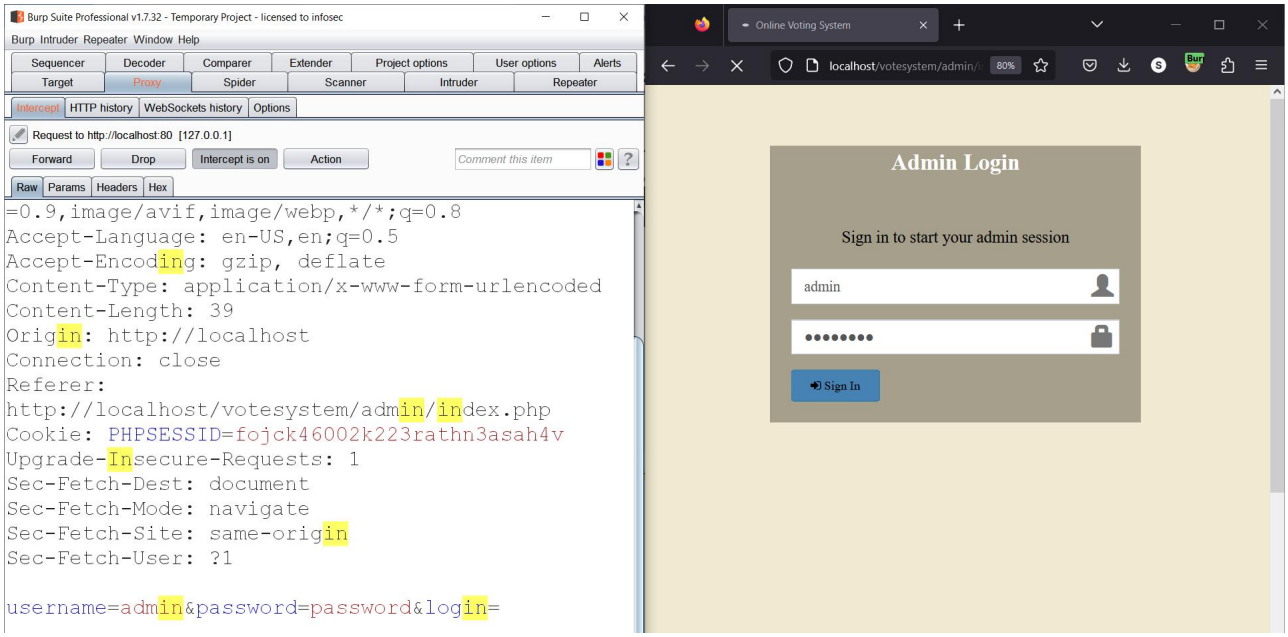
- Firstly,we will start the burp suite tool and fire fox website where perform are demonstration.



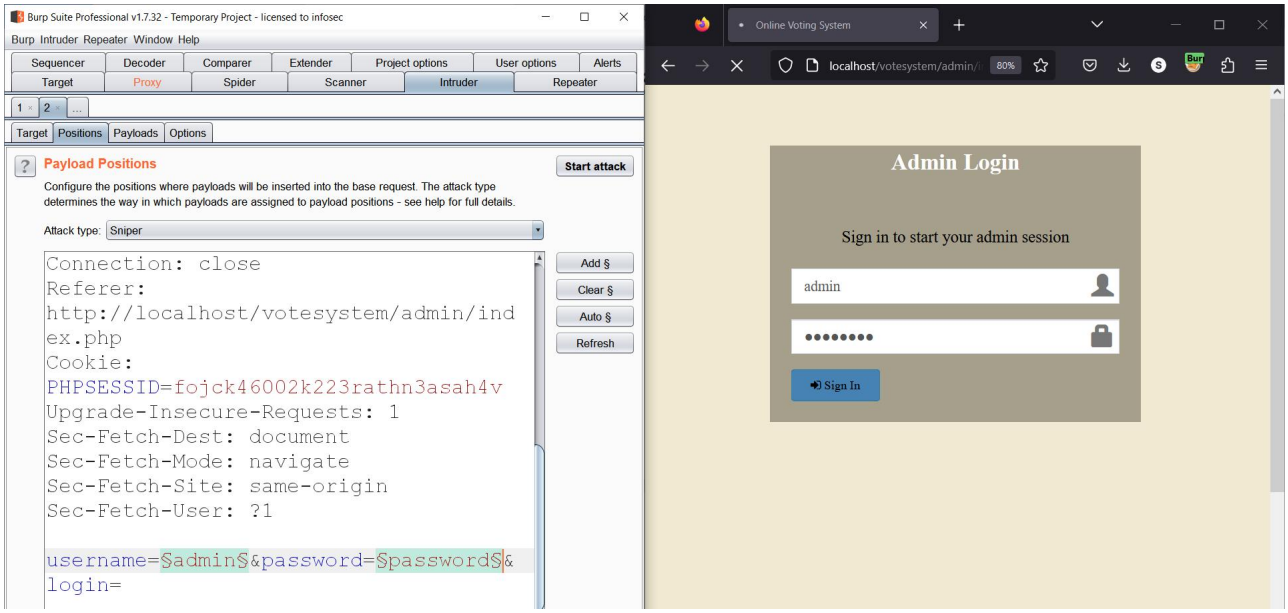
- Now we turn on the intercept and proxy connections from both burpsuite and fire fox website.



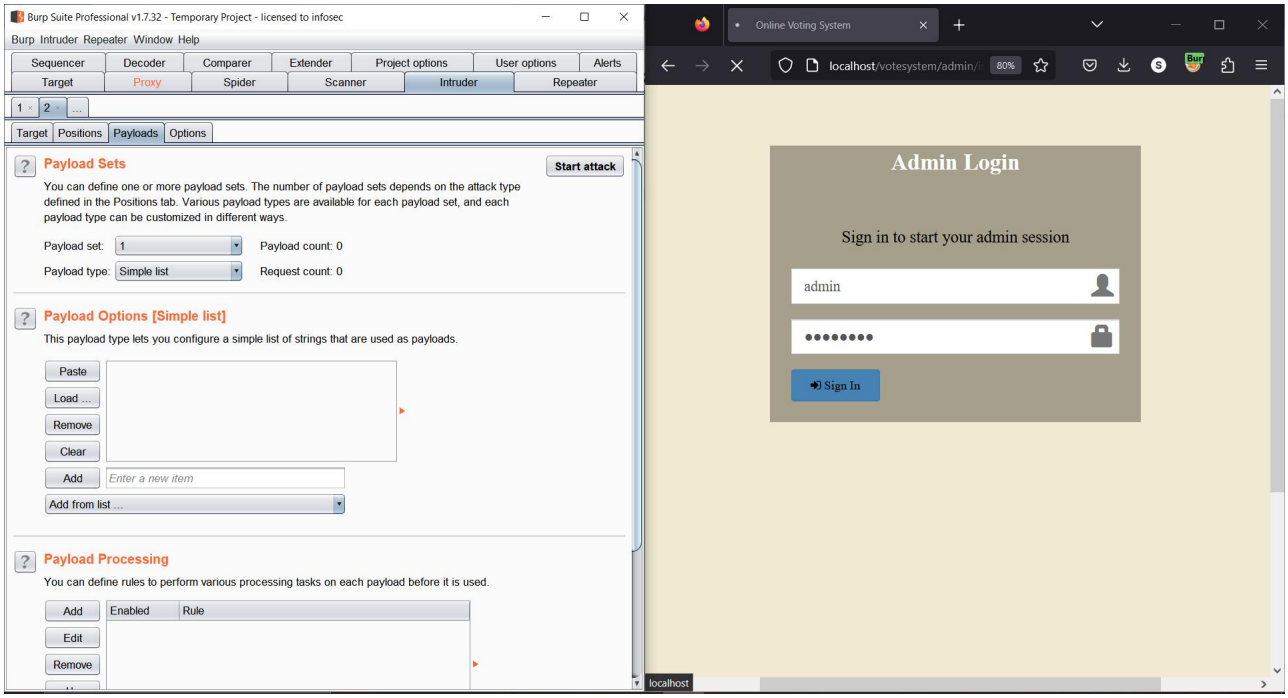
➢ Now when try to add details and click on login all the request will be capture in the burp suite tool like username and password as shown below.



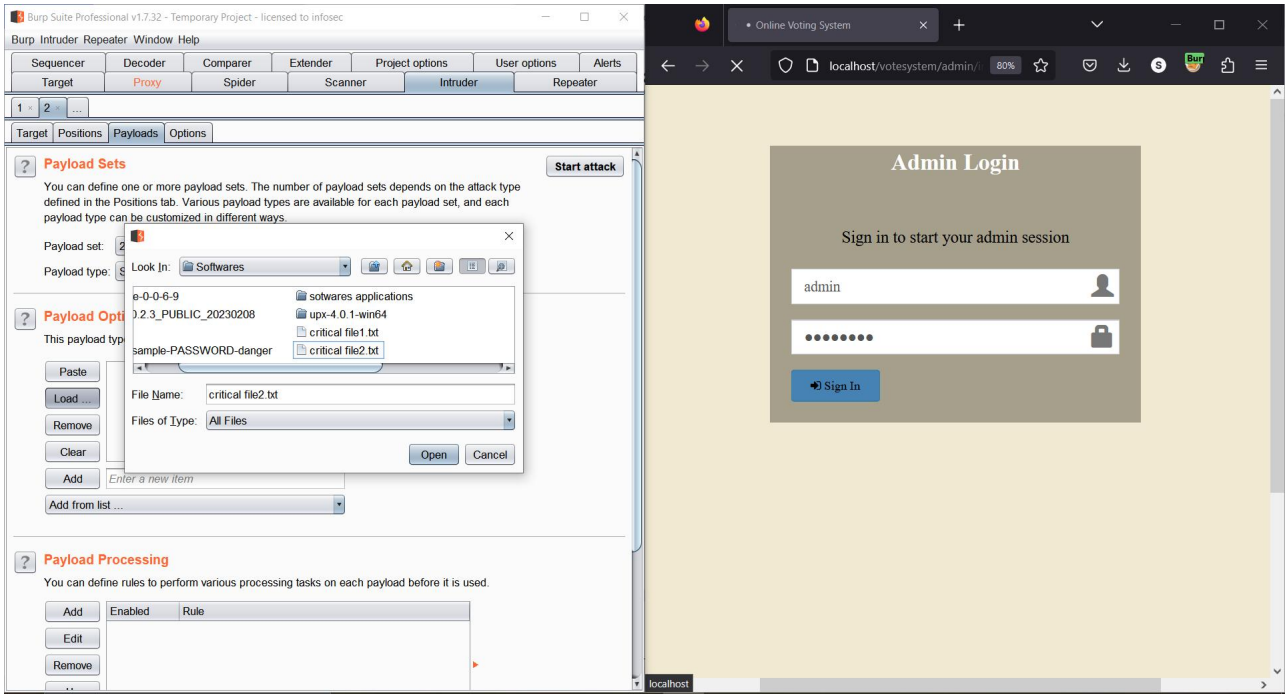
➢ Now to have click on the requests and forward it to the Intruder Section Also we parameters where we want to add payloads and able to login.



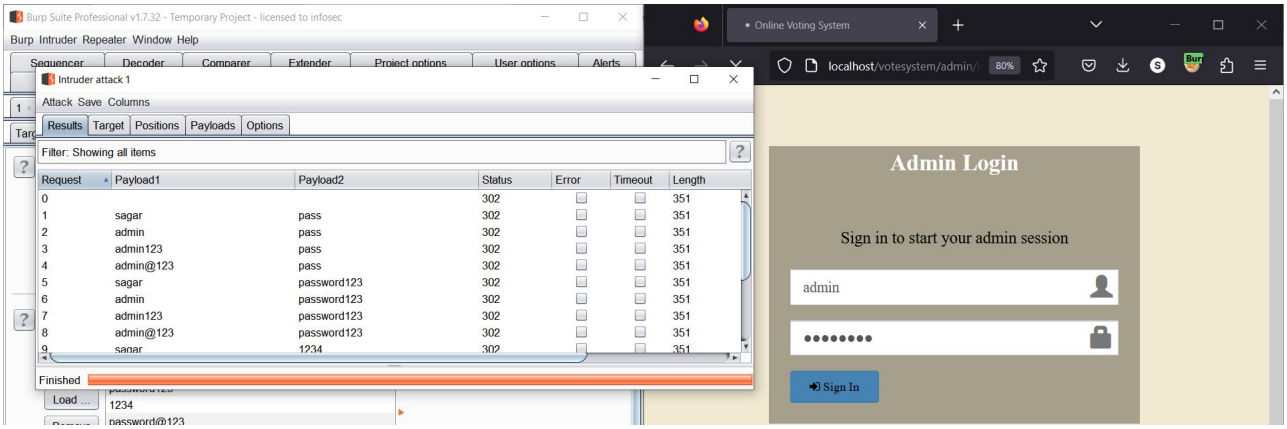
- Now in the intruder section there is payload section to add payloads. We use cluster bomb to use more than 1 payloads.



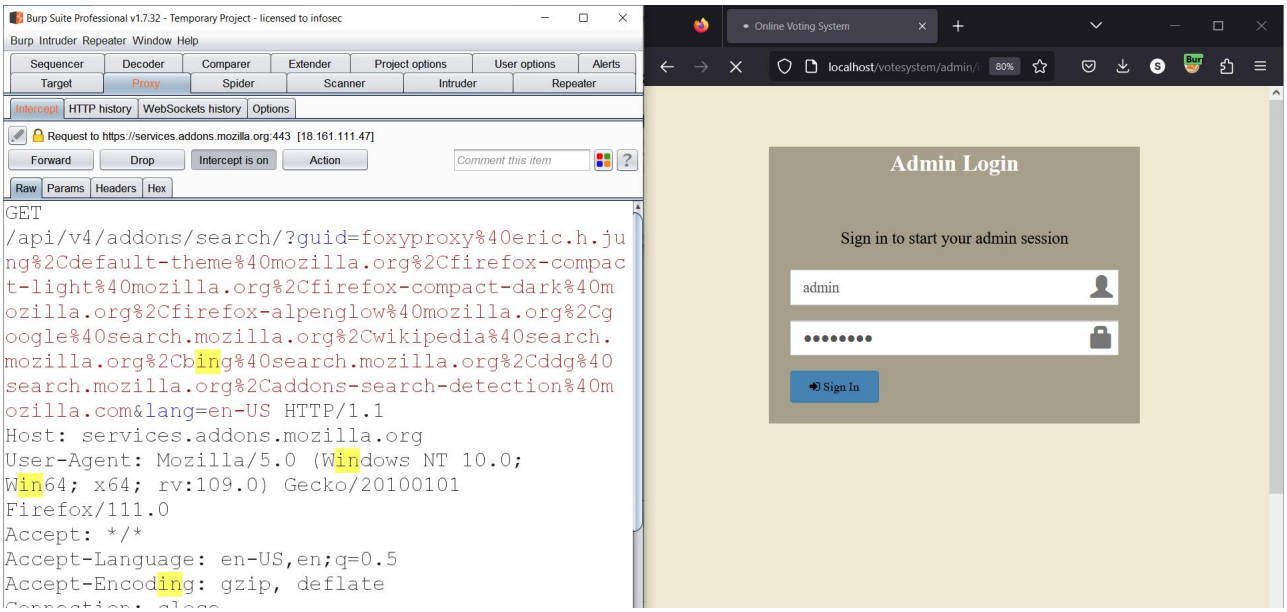
- Now we browse and add the payload files and click on attack.



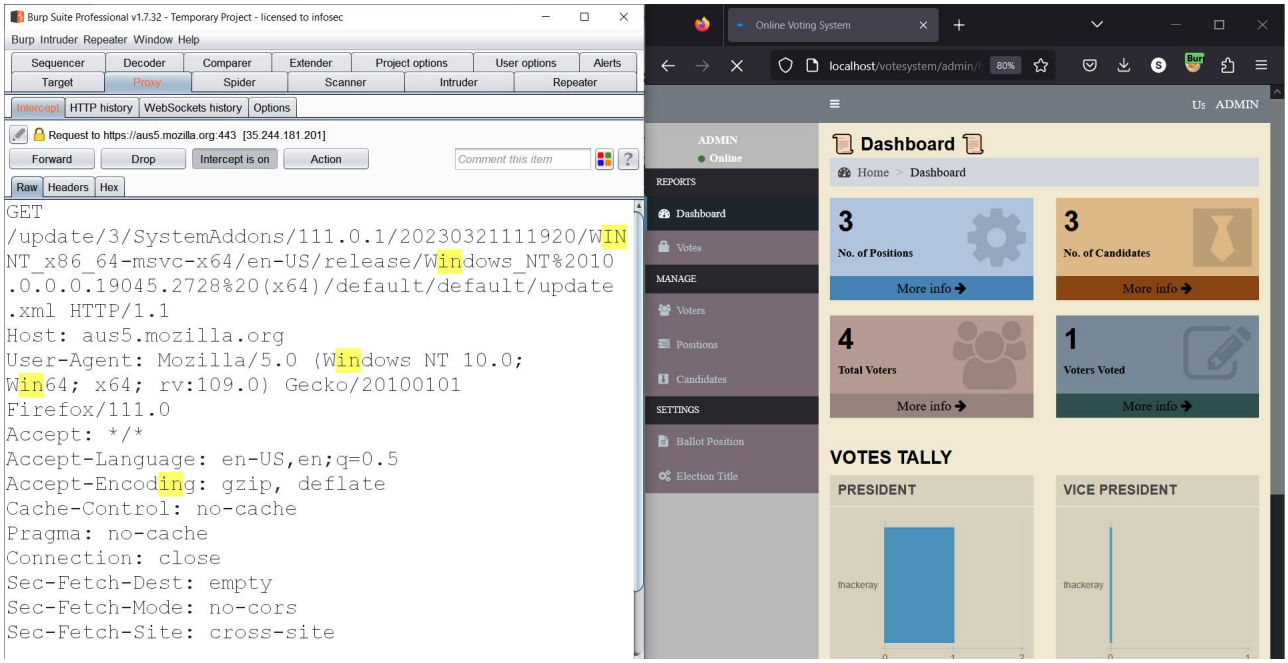
➢ Here you can the attack has been finished and ready to forward all the request.



➢ Now when you go to the proxy and one by one forward the request.



- After Forwarding all the request you will be able to see that admin has logged in Successfully.



CHAPTER 4 : CONCLUSION

In Conclusion, The voting system proposed by us is far more secure and efficient than the traditional voting system. Delays in results and vote manipulation are easily avoided in this system. A brute force attack is a hacking technique that involves trying every possible combination of characters or passwords until the correct one is found. he most notable aspect of our project is the use of two-factor authentication, which allows for easier and more precise voter verification. There are several methods that can be taken to make online voting more secure from brute force attacks like Using Strong Passwords: Require voters to use strong passwords that are at least 8 characters long and include a mix of upper and lower case letters, numbers, and symbols. This will make it harder for hackers to guess or crack passwords. Implement Two-Factor Authentication: Require voters to authenticate using two-factor authentication, such as sending a code to their mobile device or email address, to prevent unauthorized access to their account. Use CAPTCHAs: Use CAPTCHAs to prevent automated attacks by requiring voters to prove that they are human by solving a visual or audio puzzle.

CHAPTER 5 : REFERENCES

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