



# American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

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Section: A

Software Quality Assurance and Testing

## Digital Online Electronic Voting App

A Report submitted

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# Software Test Plan

for

<Online Electronic Voting System>

Version 1.0 approved

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## Revision History

[illegible]

## 1. TEST PLAN IDENTIFIER:RS-MTP01.3

## 2. REFERENCES

- Software Requirement Specification (SRS) Document (Google Search)

## 3. INTRODUCTION

### Background to the Problem

A public election system constitutes the backbone of a democracy where the people has to elect their state's leader. As we all know that Election uses a manual election system, which causes several kinds of problems. Due to this paper ballot based election system, some problems are faced by voters before or during elections and others are faced by the administration before and after the voting.

Many e-voting solutions lack transparency for voters and even for election administrators. If not carefully planned and designed, the introduction of e-voting can undermine confidence in the whole electoral process. So, to avoid this circumstance, we are organizing to open arrangeapps in an internet system, which includes methods like registration of voters, vote casting, vote counting, and pronouncing results etc would constitute a great arrangement to replace current system. So electronic voting technology intends to speed the counting of votes, decrease the cost of paying staff to count votes physically and can provide progressed availability for disabled voters. Moreover Results can be detailed and distributed quicker.

### Solution to the Problem

We are going to introduce a web or mobile-based online electronic voting app which will able to process data with computer software and record voting data. In this app voter can easily cast his vote. Due to the requirement, Admin can manage all those thing like manage voter, voter authentication, add manager and staffs, add election etc. For the secrecy of the vote, Admin will avoid any connection between the voter's identity and the vote cast in this app. In this way, This app can more secure for all users. This online voting app can increase accessibility, for example with internet voting as well for housebound voters and voters from abroad. In this way, This online voting app can Reduce the spoilt of ballot papers, can warn

voters about any invalid votes and voter can cast vote only for one time. To Compared to postal voting, Internet voting can reduce the incidence of vote-selling and family voting by allowing multiple voting. So our main goal is to create a high quality and user friendly online voting app where voters can easily cast his vote from wherever there is an Internet connection.

## 4. REQUIREMENT SPECIFICATION

### 4.1 System Features

#### **Panel from voter:**

#### **1. System Registration**

##### Functional Requirements

1.1 Any Voter can register into the system at any time.

1.2 The registering voter will give at least minimum information for registering into the account like their NID number and clear color photo.

1.3 The registering voter should be able to register only through phone number, NID and password

Priority Level: High

Precondition: the user has a valid phone, NID and password

#### **2. System Login**

##### Functional Requirements

2.1 Login voter account with phone number and password.

2.1 If the inserted phone or password has been wrong for more than five times, the verification code will be generated by the system to retry login.

2.2 If the number of login attempt exceeds its limit (7 times), the system will block the voter account.

Priority Level: High

Precondition: the user has a valid phone number and password.

### *Panel from Candidates:*

## 3. System Login

### Functional Requirements

3.1 Login candidate account with username and password which given from the admin panel, once candidate nominated.

3.1 If the inserted username or password has been wrong for more than five times, the verification code will be generated by the system to retry login.

3.2 If the number of login attempt exceed its limit (7 times), the system will block the voter account.

Priority Level: High

Precondition: the user has a valid username and password.

## 4.2 System Quality Attributes

**Compliance:** Our application complies with software standards, it's less likely to contain bugs, security weaknesses, and design flaws.

**Privacy:** Privacy software can built to protect the privacy of its users. The software typically works in conjunction with Internet usage to control or limit the amount of information made available to third parties. The software can apply encryption or filtering of various kinds.

**Quality:** It's very important factor for a software. It helps identify errors and flaws in the software code and design throughout the development process to prevent loss of time and money.

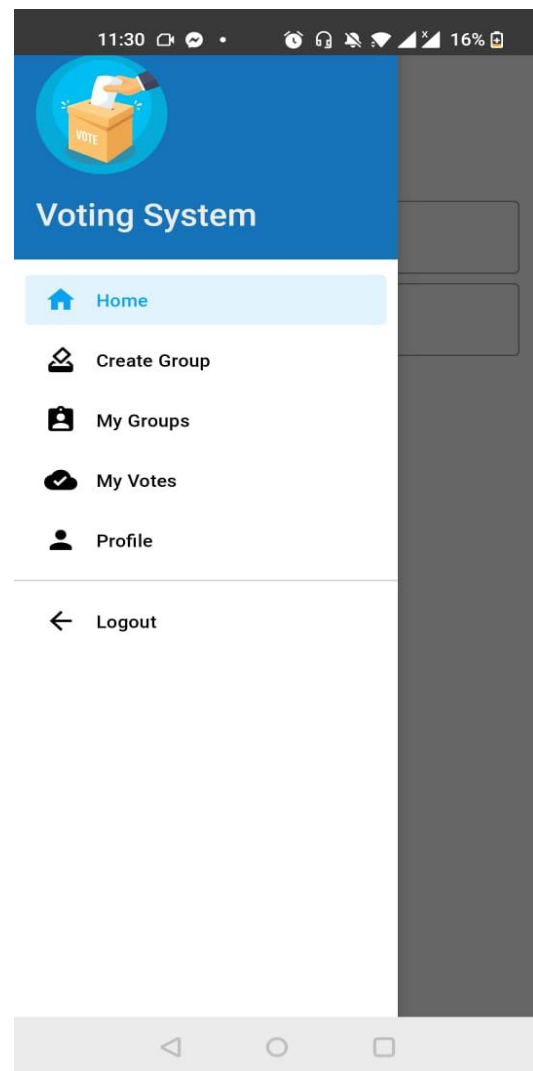
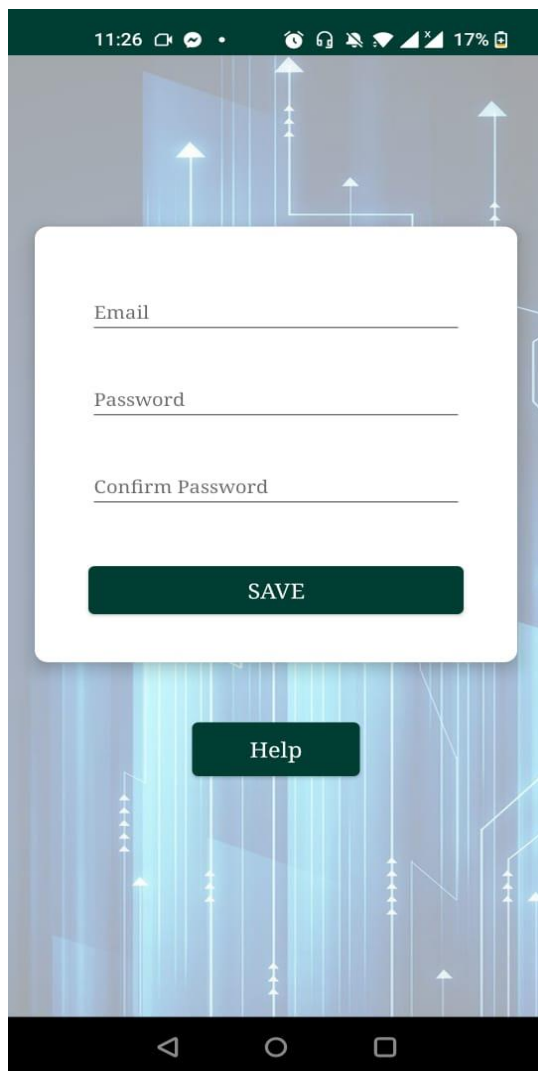
**Reliability:** It is an important non-functional requirement for most software. It is usually defined as the probability that our software will operate without failure for a specified number of uses (transactions) or for a specified period of time

**Response time:** It refers to the amount of time Application Server takes to return the results of a request to the user. System good and fast response is most important for software. We will try to keep the response time very fast.

**Scalability:** Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands. It is a very important requirement for a software system.

**Stability:** It means a state or quality of being stable. We will do stability testing in our software which involves ascertaining a software application's capacity to execute or accomplish tasks within defined conditions or duration. We will measure the system stability by analyzing the impact of change in a software system for every element of the system.

### 4.3 System Interface



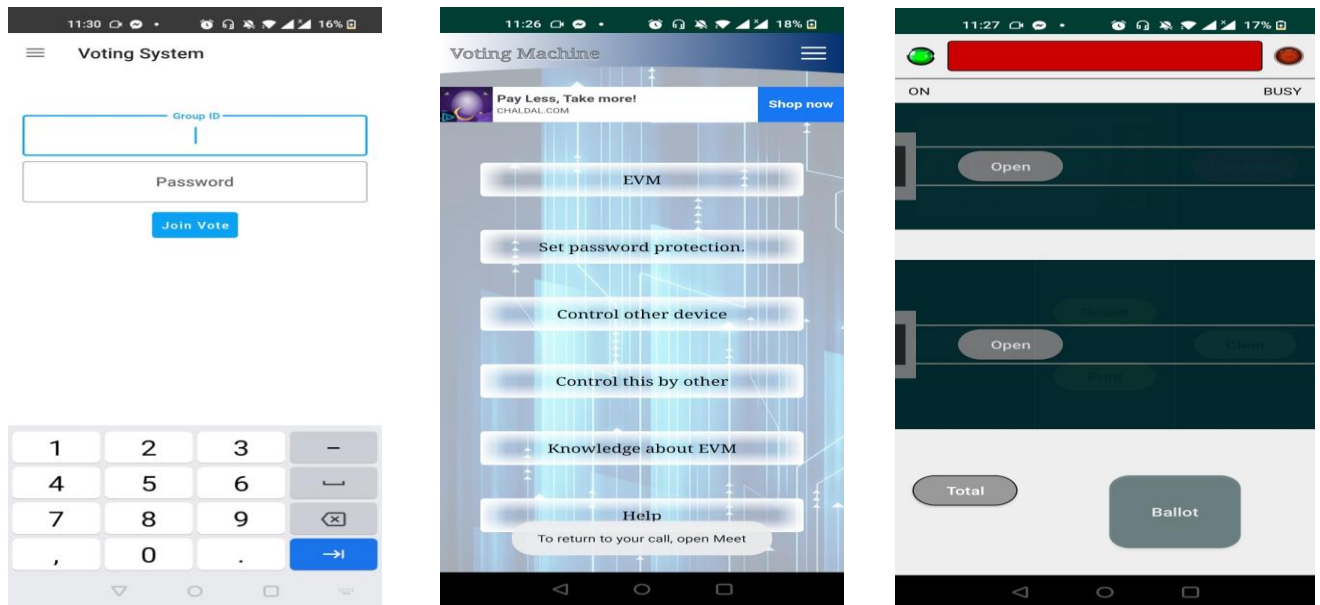


Fig 1: Demo User Interface

## 4.4 Project Requirements

### Project Estimation

In this project Constructive Cost Model will be used for calculation estimation. Our system is Complete software, no hardware. So Coefficient: 2.4, Project complexity P: 1.05 , SLOC dependent coefficient T: 0.38 Source line of code (guessed) SLOC:3000

#### Effort Estimation Formulas:

$$\text{Effort} = \text{PM} = \text{Coefficient} * (\text{SLOC}/1000)$$

$$^{\wedge}P \text{ Development Time} = \text{DM} = 2.50 *$$

$$(\text{PM}) ^{\wedge}T \text{ Required number of people} =$$

$$\text{ST} = \text{PM}/\text{DM} \text{ Using these formulas,}$$

we get,

$$\text{Effort} = \text{PM} = 2.4 * (3000/1000) ^{\wedge}1.05 = 7.61 \text{ person-days needed for the project (labor working hours)}$$



Development Time = DM =  $2.50 * (7.61)^{0.38} = 5.41$  Weeks (week-days) Required number of people = ST =  $7.61 / 5.41 = 1.41 \approx 2$

Cost: Labour cost :  $2 * 20,000 = 40,000$ /= Taka (Approximately) Service cost:  $10000 = 10000$ /=  $50,000$ /= Taka (Approximately) or \$591(Approximately)

## 5. FEATURES NOT TO BE TESTED

Product delivery service because the Government will completely responsible in it. After confirmation the approved from the government we will deliver the product in time as they committed. So, depends on the government how many days they need to deliver the product.

## 6. TESTING APPROACH

### 6.1 Testing Levels

Unit testing, Integration/system testing, and Acceptance testing will all be used in the e-voting app's testing. Each of the three main user roles voter, candidate and administrator will be tested. We'll be able to test all of the application's user interface screens and collect feedback from a variety of users this way.

**Unit Testing:** A unit test is a method of testing a unit, which is the smallest amount of code in a system that can be logically separated. The development team will perform unit testing in the e-voting app. Each unit of software code is tested to ensure it operates as planned. When the developers do it during the creation of an application. Before unit testing can be accepted and handed on to the tester, the programmer must present proof of unit testing to the team leader.

**System/Integration Testing:** System/ Integration Testing is characterized as a sort of computer program testing carried out in and coordinates equipment and computer program environment to confirm the behavior of the total system. In the e-voting app we applied integration testing process .System Testing will be performed by a testing group that's free of the improvement group that makes a difference to test the quality of the framework unbiased. We test the plan and behavior of the framework additionally the desires of the client. It is

performed to test the system past the bounds specified within the Program Prerequisites Details.

**Acceptance Testing:** Acceptance testing could be a test conducted to decide on the off chance that the necessities of a detail or contract are met. It may include chemical tests, physical tests, or execution tests. It is the foremost imperative stage of testing as this chooses whether the client favors the application/software or not. It may include functionality, usability, execution of the application. It is the ultimate arrangement of the software's testing cycle and regularly happens some time recently a client or client acknowledges the modern application.

## 6.2 Test Tools

**Selenium:** Selenium is an open-source tool that automates web browsers. It provides a single interface that lets you write test scripts in programming languages like Ruby, Java, Node JS, PHP, Perl, Python, and C#, among others.

Process:

- Create a Web Driver instance.
- Navigate to a webpage.
- Locate a web element on the webpage via locators in selenium.
- Perform one or more user actions on the element.
- Preload the expected output/browser response to the action.
- Run test.

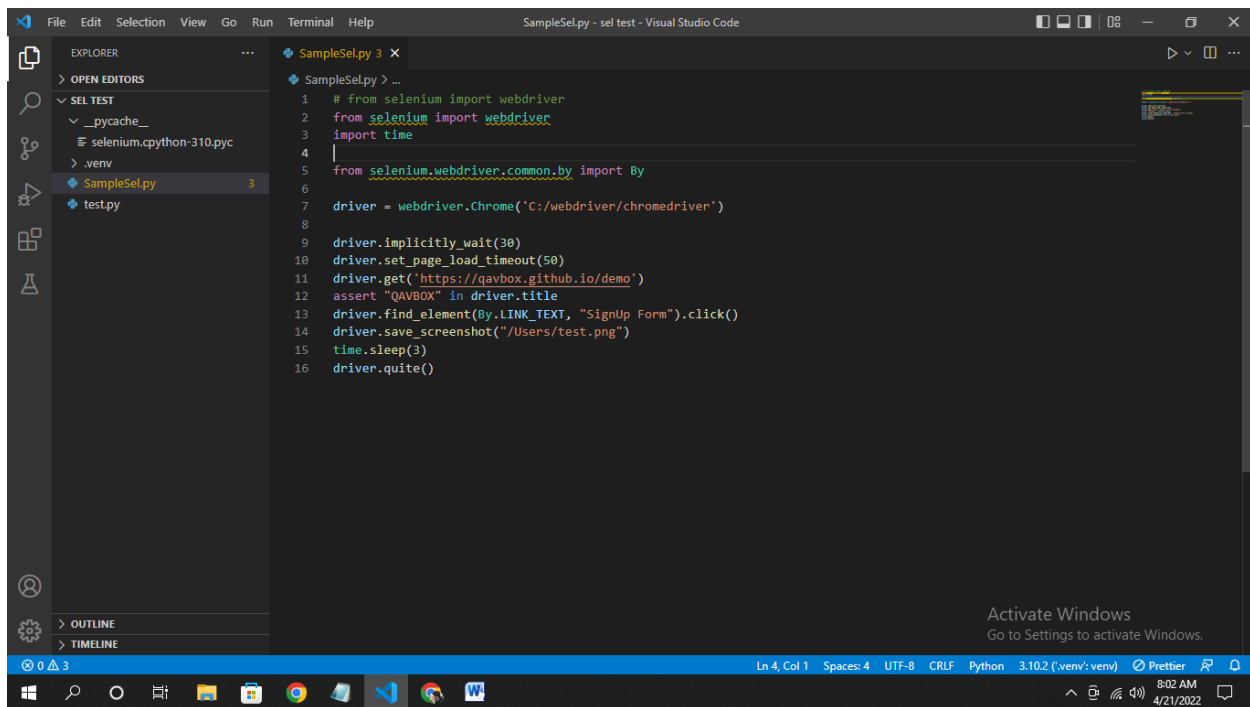


Fig 2: Setup selenium and webdriver for automated testing

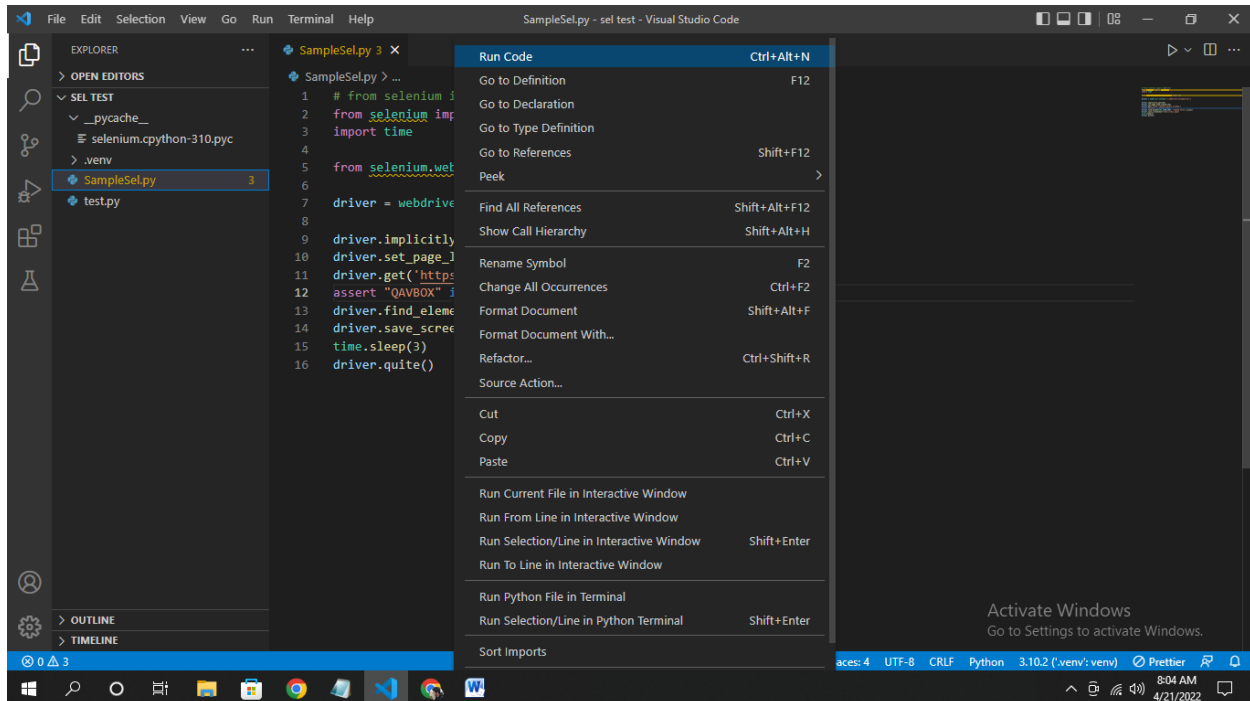


Fig 3: Run the code for testing

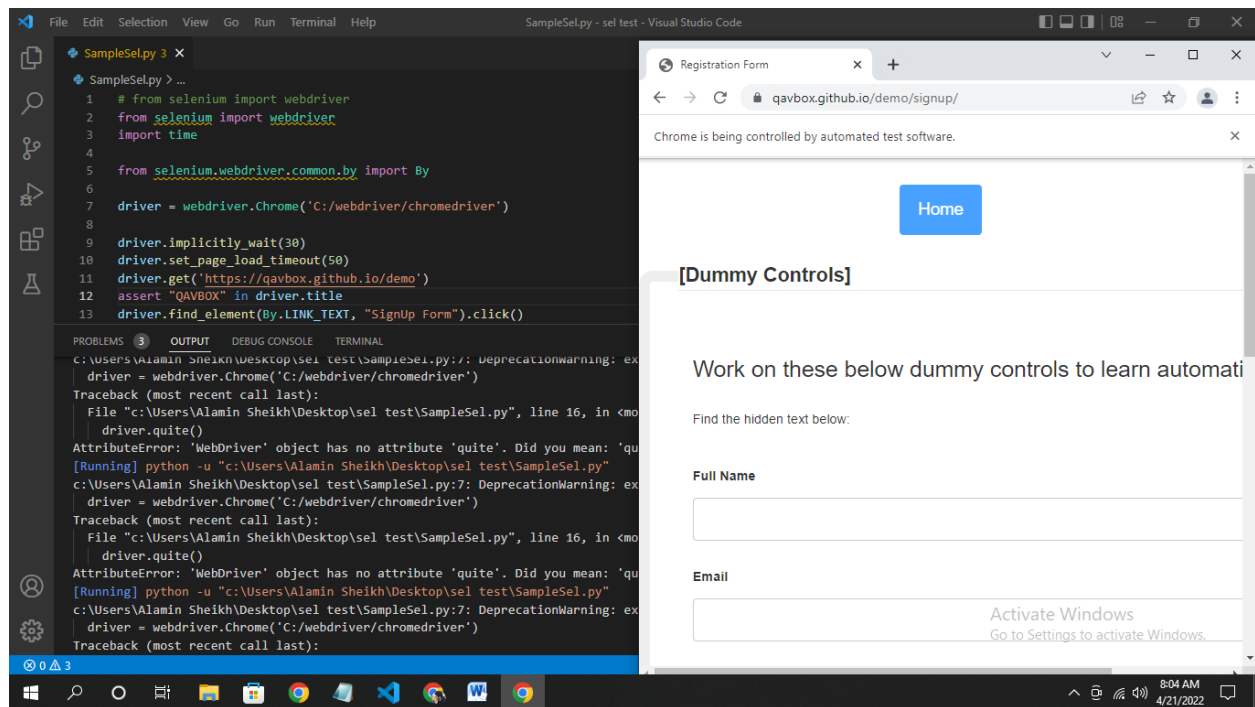


Fig 4: Successfully SignUp form run with automated software

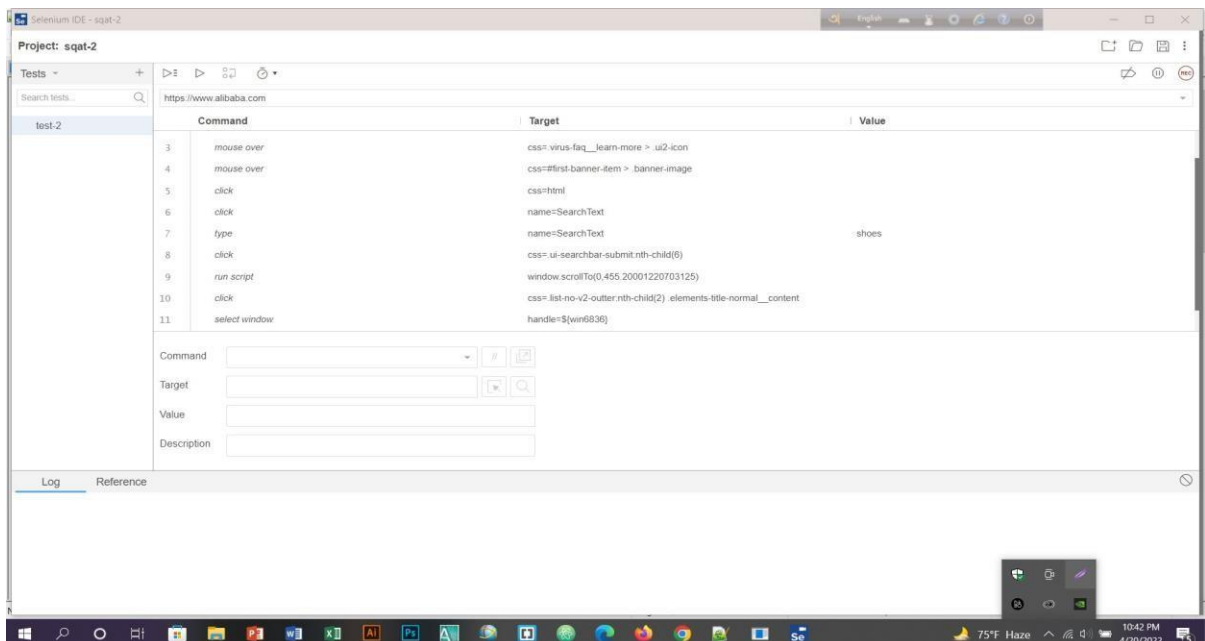


Fig 5: Selenium IDE setup

**Selenium IDE:** Selenium Record and Playback tool for ease of getting acquainted with Selenium Web Driver. The new Selenium IDE is designed to record your interactions with websites to help you generate and maintain site automation, tests, and remove the need to manually step through repetitive tasks

### 6.3 Meetings

The test team will meet once every day to evaluate progress to date and to identify error trends and problems as early as possible. The test team leader will meet with development and the project manager once every day as well. Additional meetings can be called as required for emergency situations.

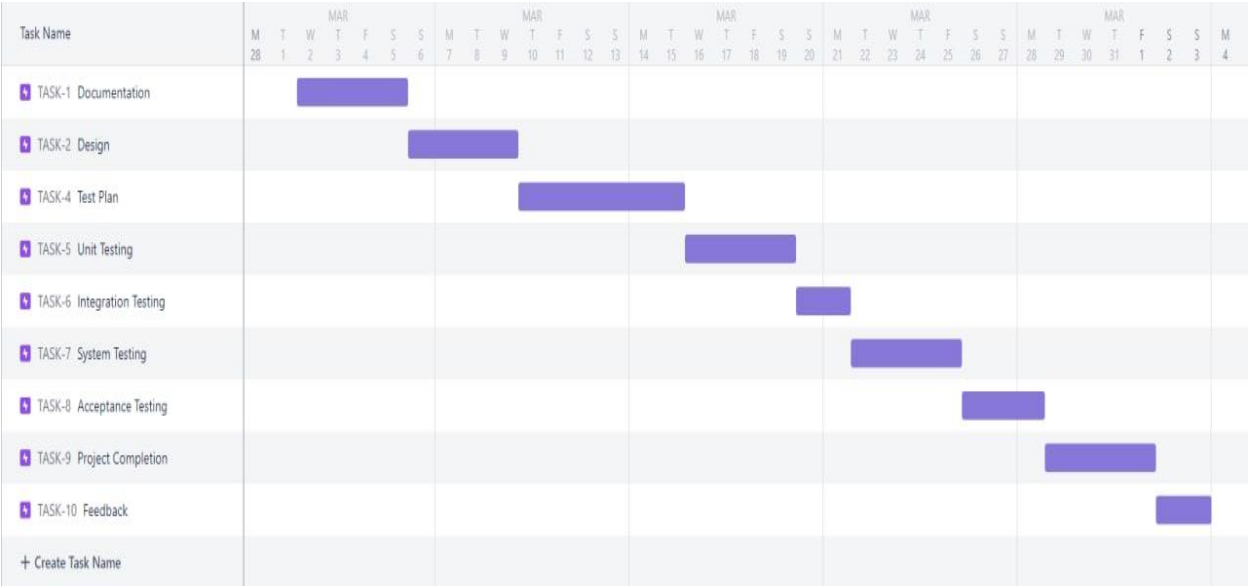


Fig 6: meeting schedule

## 7. TEST CASES/TEST ITEMS

Project Name: Online Electronic Voting System		Test Designed by: Alamin Ahmed		
Test Case ID: FR_4		Test Designed date: 19.04.2022		
Test Priority (Low, Medium, High): High		Test Executed by: Mahmud Ahmed		
Module Name: Login Session		Test Execution date: 20.04.2022		
Test Title: verify login with valid username and password				
Description: Test web application login page				
Precondition (If any): User must have valid username and password				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Enter username 3. Enter password 4. Click submit	Username: 987654321  Password: 123456789	User should login into the application	As expected,	Pass
Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database.				

Project Name: Online Electronic Voting System		Test Designed by: Antor Ahmed		
Test Case ID: FR_3		Test Designed date: 19.04.2022		
Test Priority (Low, Medium, High): High		Test Executed by: Nafiz Ahmed		
Module Name: Registration Session		Test Execution date: 20.04.2022		
Test Title: verify registration with valid email and password				
Description: Test web application for registration				
Precondition (If any): User must have valid email and password				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Enter email 3. Enter password 4. Re-enter password 5. Click submit	Username: afridi10@gmail.com  Password: afridi100	User should login into the application after register into the system	As expected,	Pass
Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database.				

Project Name: Online Electronic Voting System		Test Designed by: Mahrez Ahmed		
Test Case ID: FR_3		Test Designed date: 29.03.2022		
Test Priority (Low, Medium, High): High		Test Executed by: Miraz Ahmed		
Module Name: Login for Candidates Session		Test Execution date: 03.04.2022		
Test Title: verify login for Candidates with valid username and password				
Description: Test web application for Candidates login page				
Precondition (If any): User must have valid username and password				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Enter username 3. Enter password 4. Click submit	Username: Sabbir Ahmed  Password: Sabbir400	User should login into the application for Candidates	As expected,	Pass
Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database.				



## 8. ITEM PASS/FAIL CRITERIA

The testing procedure will be completed after the first set of test cases has been created in Selenium Webdriver. All of the test cases are written in such a manner that they must all be passed in order for the system to be finished. So, since the software hasn't been finished yet, the preceding criteria for pass/fail can be used.

## 9. TEST DELIVERABLES

- ✓ **Test specification document:** The summary of the scenarios that are going to be tested
- ✓ **Test Plan:** The blueprint carries testing process, sequence.
- ✓ **Test Strategy:** The high-level document defines the testing approach defined by Test Lead
- ✓ **Test Scenario:** To ensure every process flow is tested thoroughly.
- ✓ **Test Designs:** Formally defined way to ensure design of test.
- ✓ **Test Cases:** Enlists various combination of input and output to decide further rectification
- ✓ **Test Logs:** Complete list of series of test execution activities and running the tests.
- ✓ **Bug report:** Defect report of a component
- ✓ **Test Summary Report:** Summary of testing. Overall opinions, percentages of test pass/ Fail
- ✓ **Test data:** The data or input provided to the application with intent of fetching results.
- ✓ **Test Status report:** Track the progress of the application.
- ✓ **Test Scripts:** To Define steps and instructions for the test team that will ensure validation of functionality

## 10. STAFFING AND TRAINING NEEDS

One full time tester has been assigned for testing each of the units as soon as they get done. In addition to that, all the time the tester also tested the integration capability of each unit.

The developers required training in order to comprehend the entire UI/UX integration process with the app, as well as for productivity. They used a project management tool to facilitate communication among the project participants, and they will require training in order to conduct the project using the tool in a more efficient manner. As a result, all project team members have received the appropriate training.

## 11. RESPONSIBILITIES

	TM	PM	Dev Team	Test team	Client
Supervise all testing activities	X			X	
Schedule testing activities, create budget for testing and prepare test effort estimations.	X	X			
Develop the test specifications, conduct the test and record the results for the different items of the software	X			X	
Acceptance Test Documentation and Execution	X	X		X	X
Manages the overall project budget to ensure that scope is properly distributed		X		X	
Prepare the status report of testing activities	X	X			
Day-to-day point of contact for the	X	X			

client					
Screen and report prototypes Review			X	X	X
Change control and regression testing	X	X	X	X	X
Defect Report Reviews	X	X			
Status report of testing activities	X				
Schedule testing activities, create budget for testing and prepare test effort estimations	X	X		X	
Read all the documents and understand what needs to be tested	X	X		X	
Everything of design reviews	X	X	X	X	
Analyzing the testing and submit observation	X			X	X
Beta test execution				X	X
Execute all the test case and report defects			X	X	

Fig 7: Responsible from all department

## 12. TESTING SCHEDULE

Time has been allocated within the project plan for the following testing activities. The specific dates and times for each activity are defined in the project plan timeline. The persons required for each process are detailed in the project timeline and plan as well. Coordination of the personnel required for each task, test team,

development team, management and customer will be handled by the project manager in conjunction with the development and test team leaders.

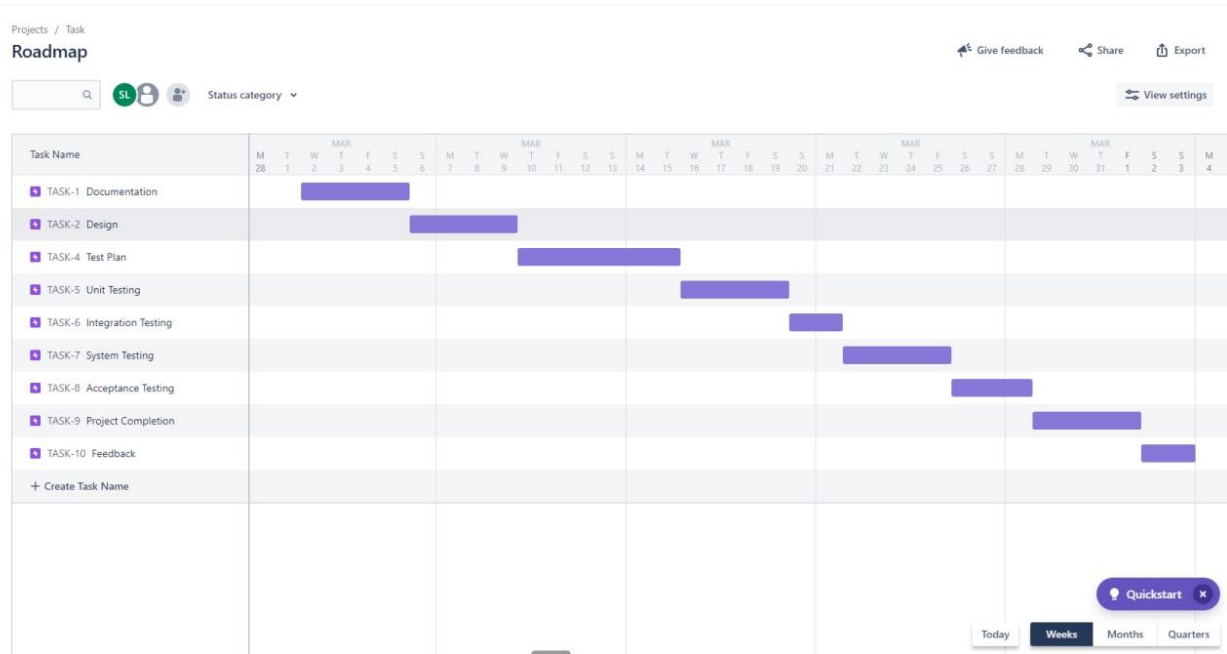


Fig 8: Testing Schedule

## 13. PLANNING RISKS AND CONTINGENCIES

**Risk management is a crucial concept that an organization's manager must address to minimize future losses; it is hard to predict the unknowns accurately. A corporate manager can assist decrease risk by using a proactive thinking style.**

Risk Management Process includes:

- **Identify the risk:** The first step in risk management is to identify the risk. It was done by analyzing diverse options, processes, functions, and operations involved in constructing a school project.
- **Analyze the risk:** Analysis was done to find the root cause of the problems that will arise in the future, which might cause problems in the successful completion of the project.
- **Evaluate the risk:** Evaluation of risk is done by prioritizing the tasks or duties; this process involves the ranking of threats from the higher level to the lower level. The activities on which a higher risk is applied must be considered first and then following the order by lower-level risk activities.

- **Treat the risk:** Treating the risk involves implementing the solutions or changes we have manipulated in a risk management process (in the stages mentioned above).
- **Monitor or review the risk:** Monitoring the project by looking at all the critical points allowed us to ultimately review the whole document or project to increase quality ultimately.

### **Types of risks**

Risks are identified, classified and managed before actual execution of program. These risks are classified in different categories. Schedule Risk, Budget Risk, Categories of risks, Operational Risks, Technical risks, Programmatic Risks.

### **Schedule Risk**

The project timetable slips when project tasks and schedule release risks are not managed appropriately. The appropriate number of days will push the test and development schedules back. Schedule risks have the most significant impact on the project and, ultimately, the company's economics and can result in project failure.

Some reasons for Schedule risks –

- Time is not precisely calculated
- Frequent project scope expansion
- Misallocation of resources

### **Operational Risk**

Operational risk is a term that refers to procedural risks that occur in day-to-day operational operations throughout project development as a result of incorrect process execution or external operational risks. Causes of Operational risks are –

- Insufficient resources
- No resource planning
- No communication in team
- Improper management of tasks
- Failure to resolve the responsibilities

### **Technical Risk**

Technical risks are defined as functional or performance risks, which are risks that are primarily related to the functionality of a product or the performance of a software product. Causes of technical risks are –

- Continuous changing requirements
- Product is complex to implement
- Modules are not properly integrated

- No advanced technology available or the existing technology is in initial stages

### External Risks

These are the external risks beyond the operational limits. These are all uncertain risks are outside the control of the program. Causes of external risks are –

- Running out of fund.
- Changing customer product strategy and priority
- Market development
- Government rule changes.

If all the possible causes above which can be created risks are adequately handled, the total risk will not be gone, but at least the risk will be minimal for the project.

## 14. APROVALS

Personnel	System Approved
Project Manager	All test cases, System test
Design Manager	UI/UX Design
Development Manager	Unit testing
Test Manager	System testing
Quality Assurance Manager	QA tester
Marketing Manager	Functional testing
Client	Acceptance testing, Beta testing

