

eVote: Electronic Voting Management System

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1. Introduction

The purpose of this system is to manage electronic voting for public office elections and issues open to be voted on by the corresponding districts. Board of elections officers will be assigned to manage the system and set up elections. They will be able to set up individual ballots with corresponding items such as candidates and issues and assign them to a single or to multiple districts.

The system allows for the electorate to create and manage their own voting profiles. They are automatically assigned to the district that corresponds with their address. When the elections officer has opened the system for voting, the electorate are able to vote on the ballots available to their assigned district. Once the system is closed and all votes are tallied, the elections officer will be able to validate and publish the results to the public.

2.1 Functional requirements

1. The elections officer should be able to login to the electronic voting system using a unique username and password. If an invalid username or password is given, he/she should be prompted to re-enter the incorrect information.
2. The elections officer should be able to logout of the electronics voting system using the logout button.
3. The elections officer should be able to create and define an elections object by specifying if an election is partisan and if it allows alternate candidates.
4. The elections officer should be able to create and define ballot items for elections and issues.
5. The elections officer should be able to create and assign an electoral district to a ballot item. Only voters with an address in the electoral district that the election is concerning can vote.
6. The elections officer should be able to create and assign candidates to a ballot item.
7. The elections officer should be able to create alternate candidates for voters to vote on.
8. The elections officer should be able to create and assign a political party to a candidate. Only one party is allowed per candidate.
9. The elections officer should be able to create and assign issue choices to a ballot item.
10. The elections officer should be able to view a ballot item.
11. The elections officer should be able to view electoral districts.
12. The elections officer should be able to view candidates.
13. The elections officer should be able to view issue choices.
14. The elections officer should be able to update or reassign candidates to a ballot item.

15. The elections officer should be able to update information about a political party.
16. The elections officer should be able to update information about a candidate.
17. The elections officer should be able to update information about choices to a ballot item.
18. The elections officer should be able to delete some information about a political party when applicable. This option should be available when he/she views the list of details about an election.
19. The elections officer should be able to delete some information about a candidate. This option should be available when he/she views the candidate of a certain election.
20. The elections officer should be able to delete information about choices to a ballot item. This option should be available when he/she views the ballots available for an election.
21. The elections officer should be able to open and close an election by specifying a time and date for the system to open and close for voting. This option should be available when he/she views the election details.
22. The elections officer should be able to preview and validate the results after voting has closed. This option should be available on the page shown after log-in.
23. The elections officer should be able to print the results of the voting session once it has closed. This option should be available on the same page as when he/she is viewing the results of that voting session.
24. The elections officer should be able to save the results of the vote. This option should be available on the same page as when he/she is viewing the results of that voting session.
25. The elections officer should be able to share the results of the voting session. This option should be available on the same page as when he/she is viewing the results of that voting session.

26. The voter should be able to assign his/her name, address, and age to the profile. This option should be available when he/she chooses to edit his/her profile from the menu.
27. The voter should be able to create a password associated with his/her profile. The password should be between 8-30 characters and have at least one uppercase letter and a special character. This option should be available two times, when the account is first created and when he/she views account information.
28. The voter should be able to delete his/her profile at any time. This option should be available when he/she chooses to edit his/her profile from the menu.
29. The voter should be able to access and update his/her profile information. This option should be available when he/she chooses to view his/her profile from the menu.
30. The voter should be able to log into and out of the system freely after his/her account has been created using a unique username and password. This option should be available on the top right hand corner of the page.
31. The voter should only be able to vote on the candidate(s) in his/her electoral district. The system should not show the candidates from other districts.
32. The voter should only be able to vote when the system is opened. He/she should be able to vote on all or some items on the ballot, but only once.
33. The voter should be able to see all candidates at any time. This option should be available after he/she logs in and choose to view all candidates from the options.
34. The voter should be able to see all alternate candidates at any time. This option should be available after he/she logs in and chooses to view all candidates from the options.

2.2 Nonfunctional requirements

2.2.1 Usability

1. Before registering in the electronic voting system, the voter should meet all state regulations to be eligible to vote using the system.
2. When setting up a username, the voter must choose a username between 8-30 characters that does not already exist.
3. When specifying a password for their account, the voter must choose a password with at least one uppercase letter, one special character, and must be between 8-30 characters long.
4. The system should check the username and password provided by the user to authenticate access to the system.
5. The user's account name and password will be used to determine the correct permissions to be provided to the user upon login.

2.2.2 Reliability

1. Crashes due to bugs in the system should not cause data corruption or loss.

2.2.3 Performance

1. The system must be able to support hundreds of voters to be logged in and voting at one time.
2. Multiple elections officers should be able to change data in the system at the same time as long as they are not modifying the same item. If they are, the system will show an error message.

2.2.4 Supportability

1. The elections officer must be able to add, update, and delete information from database without having to shut down the system.
2. If part of the system needs to be updated, only that specific module will be offline for a brief period of time.

2.2.5 Implementation

1. All users should be able to access the system with any web browser that supports JavaScript.

2.2.6 Interface

1. The system should provide an easy to use web-accessible GUI for all users.
2. The login portal for both the voters and the administrators should be the same.

2.2.7 Legal

1. Users who wish to vote using this system must comply with local state voting laws.
2. The elections officers do not have access to view an individual voter's selections.

2.3 System models

2.3.1 Scenarios

1. Mary has been informed of an upcoming election her university is having to elect a new student body, specifically replacing the student body president and his vice president. When the elections are open, Mary gets on her computer and accesses the new voting system. She sees a “sign in” and a “sign up” option, and, not having an account yet, clicks sign up. She is taken to a page that requests her first name, last name, age, and address. After filling out her personal information, Mary is then asked to create a unique username and password combination. After coming up with a username and password, she enters them into the system and is told that that username is already in use, so she must create another one. After creating a new username, she successfully registers to use the voting system and is sent to the main page. Realizing that she is uninformed on the candidates and issues, Mary decides not to vote yet, so she clicks “logout” and is sent back to the first “sign in” page.
2. Mary has better informed herself on the issues and candidates of the upcoming school body election and is now ready to cast an educated vote. She gets on her computer, loads Google Chrome, and heads back to the voting system. Since she has already registered her account, she is able to click “sign in”, enter her username and password, and login. After doing so, she decides to make sure all of her personal information is correct and up to date, as she has just moved into a new house for the new year. After clicking on the “update user info” button, she is

brought to a screen that allows her to change her address, so she does. After saving her new info, she goes back to the main screen. Noticing that there is only one ballot to vote on, she selects “University of Georgia School Body Election” and all the candidates, along with their VP choices, are formatted nicely. After selecting the most popular student running for president on the list, Mary clicks “cast vote.” A confirmation box comes up asking if she wants to vote on Tom Smith and John Doe, so she confirms. After confirming, she is again brought back to the main screen. She now notices a “view “results” button, which she clicks on, and is told that results will be disclosed after the elections are over. Content with her decision, Mary clicks “sign out,” so that no one else can use her account afterwards.

3. Karen is an election officer who is responsible for creating a voting issue for the upcoming election. She will do this by going to the elections website and log in with her credentials. After that, she will select create an issue option. She will then have to input details about the issue and choose an election from the list of elections that are present in the system to which the issue will belong. She will submit the information about the new issue. The system will then prompt her to verify that all information is correct. She will verify and the issue associating to the desired election is created.
4. Brad is an election officer who is responsible for creating an election and making sure everything about it is correct. To create an election, Brad will go to the

elections website, and signs in. He clicks on the “Create Election” button on his officer’s homepage. He will then have to verify his identify again with the system, upon success, he will be taken to a page where he will enter in the information about the new election such as: candidates, election dates, etc. After all the information has been entered, he clicks on the “submit” button on the election creation page and the system will display that the election has been successfully created.

2.3.2 Use Case Models

2.3.2.1 Voter Profile Registration

Version	Description	Changed By:	Date
1.0	First draft	Justin Pettyjohn	09/07/16
1.1	Final Draft	Justin Pettyjohn	09/08/16

Brief Description:	This use case describes the process of registration for a voter; registration will be necessary to access any part of the system.
Business Trigger:	Head architect should confirm that the software is operable for voters.
Preconditions:	Voter should have access to the internet and the database should be set up in a way to keep all pertinent information.

Basic Flow:		
Assumptions: Voter has not created a profile yet		
Line	System Actor Action	System Response
1	The voter asks the system to create a new registration.	The system asks the voter for his full name, address and age, then prompts the user to create a unique username and password.
2	The voter fills in his personal information and creates a username and password.	The system displays a registration complete flag and allows the voter to return to the main screen.
Post Condition:	The voter's profile should be created and the voter should be able to access/edit his information and vote if the system is open.	

Alternate Flow (AF1): Entering invalid information		
If at line 2 in Basic Flow the voters do not give all necessary information, or his username/password combination is incorrect (or non-unique), then:		
Line	System Actor Action	System Response
1	The voter fills in his personal information and selects a username and password.	The system alerts the voter that his information is not completely filled out or that his username/password is invalid and prompts him to edit his information.
2	The voter updates his information or creates a new username or password.	The system displays a registration complete flag and allows the voter to return to the main screen.
The use case terminates.		
Post Condition:	The voter's profile should be created and the voter should be able to access/edit his information and vote if the system is open.	

Non Functional Requirements:	
1	Maintain all information request fields on a single, easily useable document
2	Keep usernames and passwords case-sensitive

Screen Entry Exception Table:		
Field	Constraint	Response
1 Voter Full Name	30 chars max	Message: "Exceeds 30 chars max – please re-enter"
2 Voter Password	30 chars max	Message: "Exceeds 30 chars max – please re-enter"
3 Voter Username	30 chars max; unique	Message: "Exceeds 30 chars max – please re-enter", Message: "Invalid Username, please try again"

2.3.2.2 User Voting

Version	Description	Changed By:	Date
1.0	First draft	Justin Pettyjohn	09/07/16
1.1	Final Draft	Justin Pettyjohn	09/08/16

Brief Description:	This use case describes the process of voting for users.
Preconditions:	The voter should already have set up and verified an account to use the system, and an Elections Officer should have opened up voting to the public.

Basic Flow		
Assumptions: A ballot has already been created for the user to vote on and the voter lives in a correct location so as to be able to vote on that specific ballot.		
Line	System Actor Action	System Response
1	The voter asks the system to sign in.	The system prompts the voter for her username and password.
2	The voter enters her information and signs in.	The system displays the current election that can be voted on at this time within her location.
3	The voter selects that ballot by clicking it.	The system displays all ballot items necessary and allows the user to select the candidate(s) that she wants to vote on.
4	The voter votes for the candidate(s) of her choice and submits her response.	The system records only the vote that is cast and not any information about the voter (for discretion) and displays a “thank you” message.
5	The voter returns to the main screen and logs out.	The system displays a screen with a “logging out <i>username</i> ” message.
Post Condition:		The voter should not be allowed to vote again after having cast a vote. After the elections are closed, the voter should be able to see the results.

Alternate Flow (AF1): Entering invalid information		
If at line 2 in Basic Flow the elections have already closed, the voter should be able to view the results.		
Line	System Actor Action	System Response
1	The voter fills in his personal information and selects a username and password.	The system displays the results of the election.
2	The voter returns to the main screen and logs out.	The system displays a screen with a “logging out <i>username</i> ” message.
The use case terminates.		

Non Functional Requirements:	
1	maintain all information request fields on a single, easily useable document
2	keep all records, such as voting information, anonymous
3	No user should be able to vote more than one time on a given election

Screen Entry Exception Table		
Field	Constraint	Response
1 Voter Username	30 chars max	Message: “Exceeds 30 chars max – please re-enter”
2 Voter Username	Case Sensitive	Message: “Incorrect username or password”
3 Voter Password	Case Sensitive	Message: “Incorrect username or password”

2.3.2.3 Issue Creation

Version	Description	Changed By	Date
1.0	First draft issue creation	Nghia Le	9/07/16

Brief Description:	This use case describes the process of an election officer creating an issue.
Business Trigger:	The software/system should be operational.
Preconditions:	At least one election has been created. The officer is registered into the system.

Basic Flow:		
Assumptions: At least one election has to exist and there are 0 or more issues in the system. The officer has verified his/her identity.		
Line	System Actor Action	System Response
1	The officer requests the system to create a new issue.	The system prompts the officer for information and details (this includes the election that the issue will belong to) about the issue that he/she wants to create.
2	The officer enters in all the required information and submits it to the system.	The system asks the officer to review and verify that the information is correct before updating the database for all users.
3	The officer verifies and confirms that all information is correct and submits to the system.	The system updates the database for all users.
Post Condition:		The election issue has been created and updated for all users.

Alternate Flow 1 (AF1): Changing/updating information about an issue.		
If at any time in Basic Flow the officer wants to start over on the current issue creation.		
Line	System Actor Action	System Response
1	The officer asks the system to erase everything about the current issue creation process and start over.	The system clears all entries pertaining to the current issue creation. The system then prompts the officer for information and details about the issue that he/she wants to create.
The use case terminates / The use case restarts at line 2 of Basic Flow and continues on.		
Post Condition:		The election issue has been created and updated for all users.

Non Functional Requirements:	
1	Maintain all information request fields on a single, easily useable document
2	Keep usernames and passwords case-sensitive

Screen Entry Exception Table:		
Field	Constraint	Response
1 Officer Username	8 characters min, 30 characters maximum	Message: "Incorrect Username/password"
2 Officer Password	8 characters min 30 chars max: unique	Message: "Incorrect Username/password"

2.3.2.4 Election Creation

Version	Description	Changed By	Date
1.0	First draft of election creation.	Nghia Le	9/07/16

Brief Description:	This use case describes the process of an election being created by the election officer.
Business Trigger:	Head architect should confirm that the software is operable for the election officer, and an election is approaching.
Preconditions:	The election officer should have access to the internet and the database should be set up in a way to keep all pertinent information. The officer should already be registered into the system.

Basic Flow:		
Assumptions: The officer has not created an election. The officer has verified his identity with the system.		
Line	System Actor Action	System Response
1	The officer asks to view the officer page.	The system asks the officer for identification.
2	The officer enters in his/her credentials.	The system checks the database and displays any current page associated with that officer.
3	The officer asks the system to add a new election.	The system asks the officer for the new election information and creates the election.
Post Condition:	The new election is created by the system and the new update will be stored into the database which will be available for all users with the associating permissions.	

Alternate Flow 1 (AF1): Entering the wrong identification information.		
If at line 2 of Basic Flow the officer enters in invalid credentials, then:		
Line	System Actor Action	System Response
1	The officer enters in his/her credentials.	The system alerts that there is no one with that login or the username/password combination is not correct. The system then asks the user for his/her credentials.
2	The officer enters in his/her credentials.	The system checks the database and displays any current page associated with that officer.
The use case terminates / The use case restarts at line 3 in Basic Flow.		

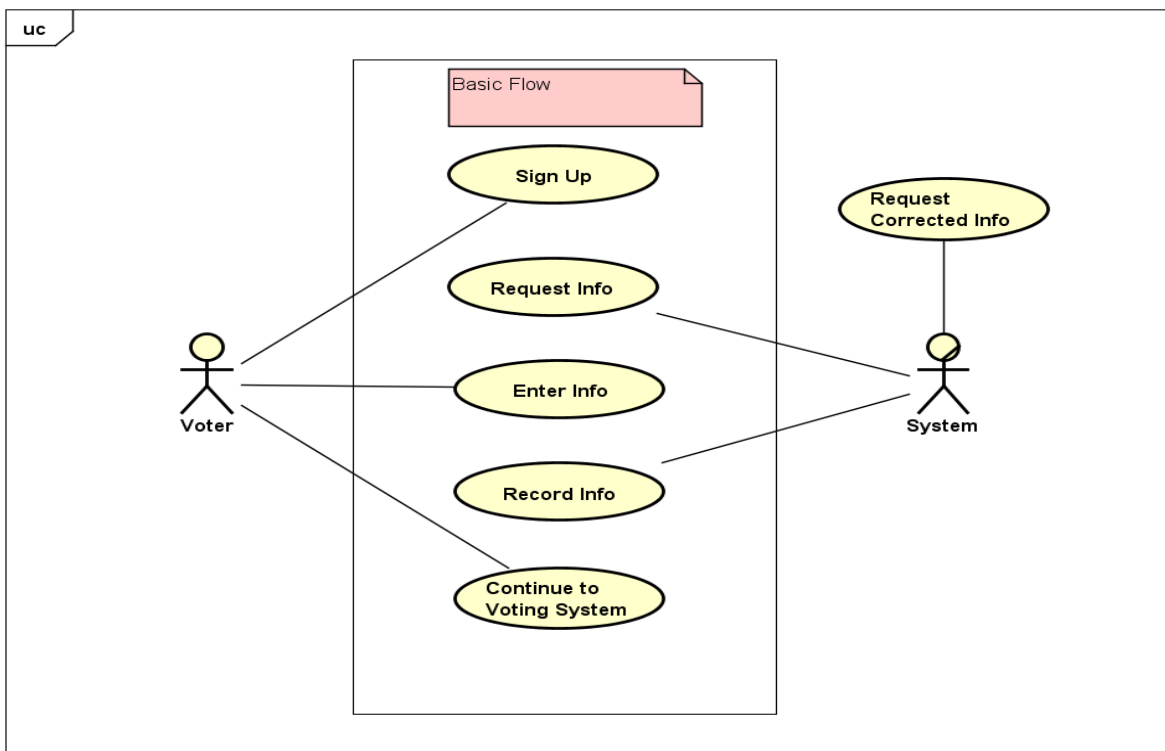
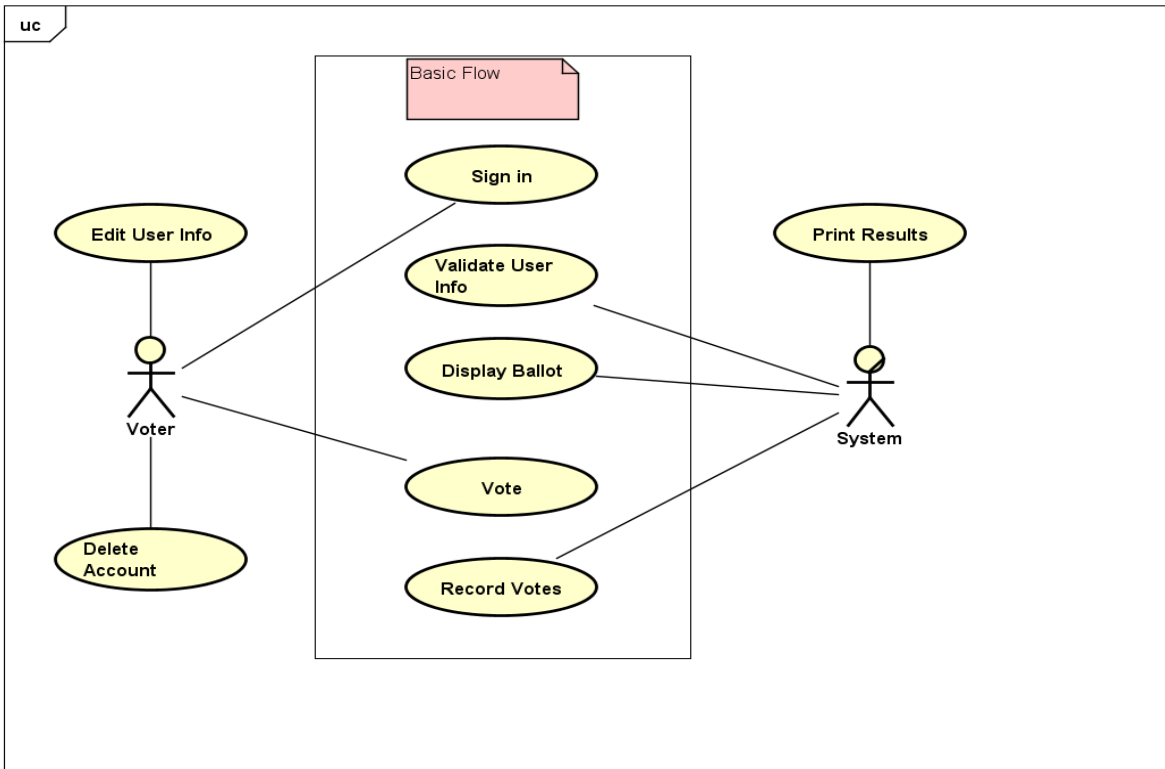
Alternate Flow 2 (AF1): Entering not enough information.
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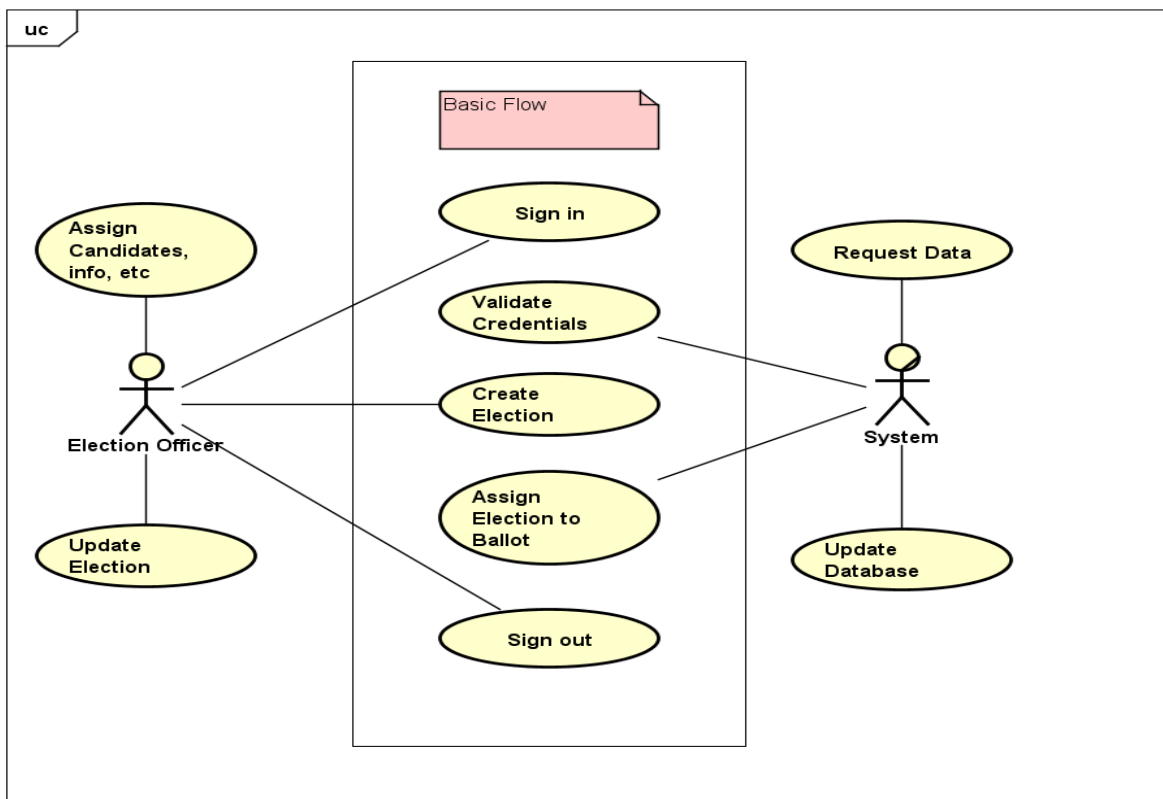
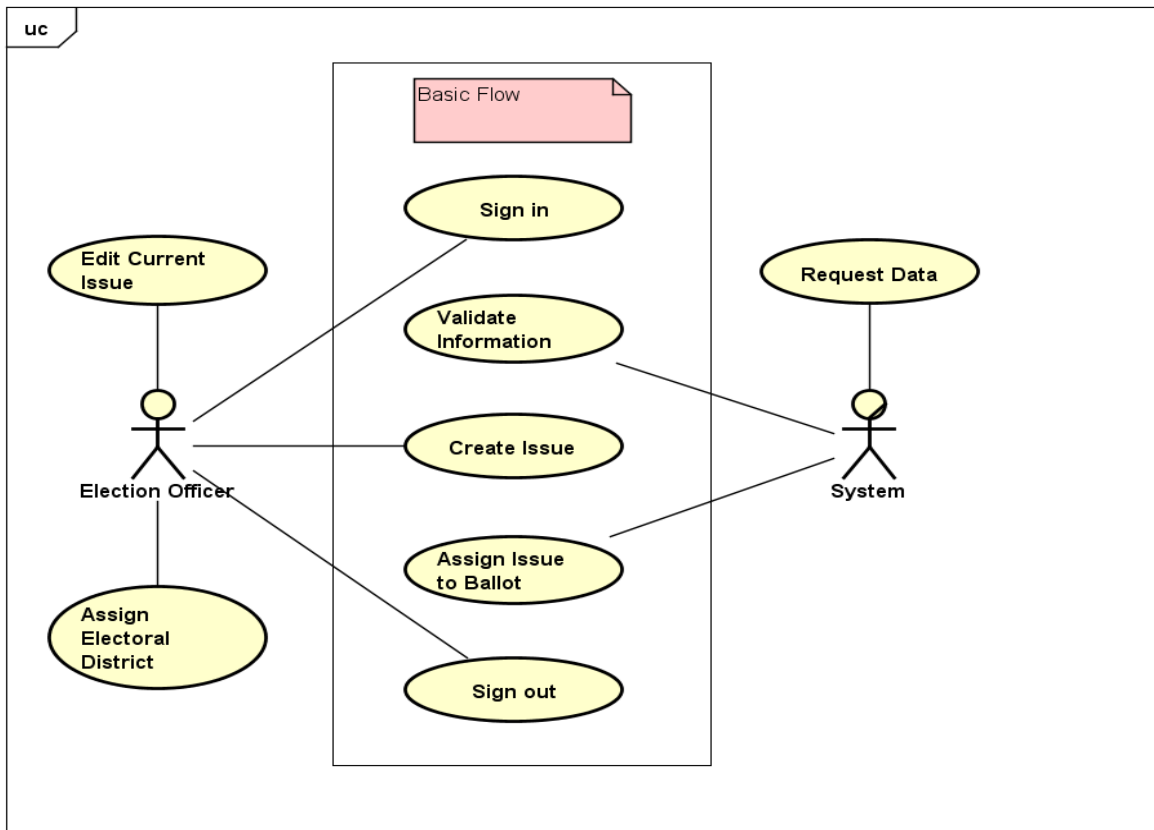
Sub-Flow: 1, where the officer did not enter in enough information about the election.		
Line	System Actor Action	System Response
1	The officer asks the system to add a new election.	The system checks if enough information is entered. If not, the system will prompt the officer for more information.
2	The officer enters in the necessary information.	The system will use that information to create the new election.
Post Condition:		The new election is created by the system and the new update will be stored into the database which will be available for all users with the associating permissions.

Non Functional Requirements:	
1	Maintain all information request fields on a single, easily useable document
2	Keep usernames and passwords case-sensitive
Data Requirements:	
1	All information is stored into a database.

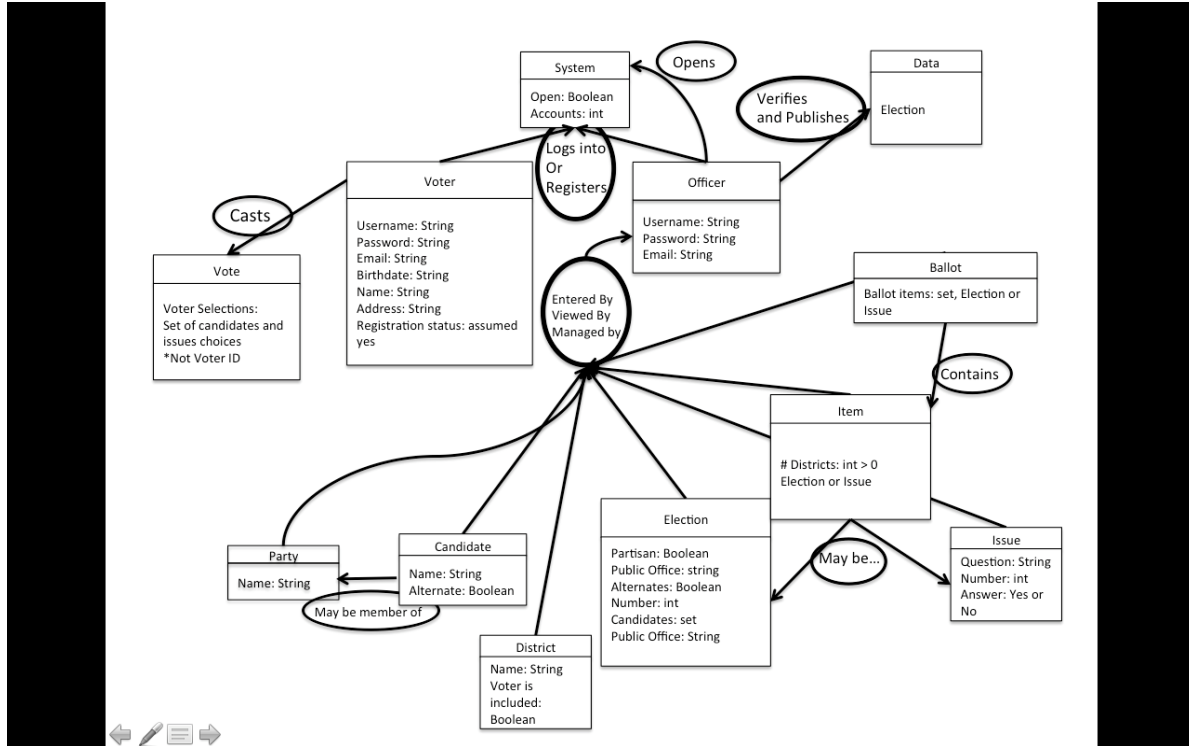
Screen Entry Exception Table:		
Field	Constraint	Response
1 Officer Username	8 characters minimum 30 characters max	Message: “Incorrect Username/password”
2 Officer Password	8 characters minimum 30 characters max: unique	Message: “Incorrect Username/password”

2.3.3 User Diagrams



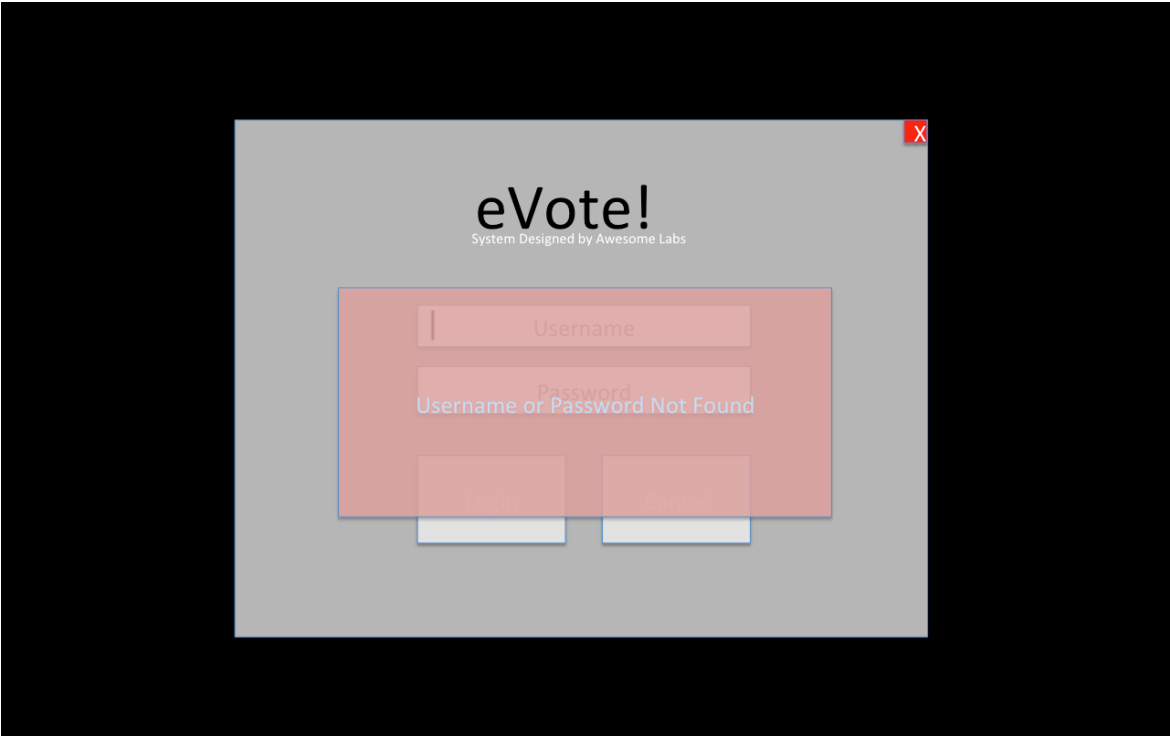
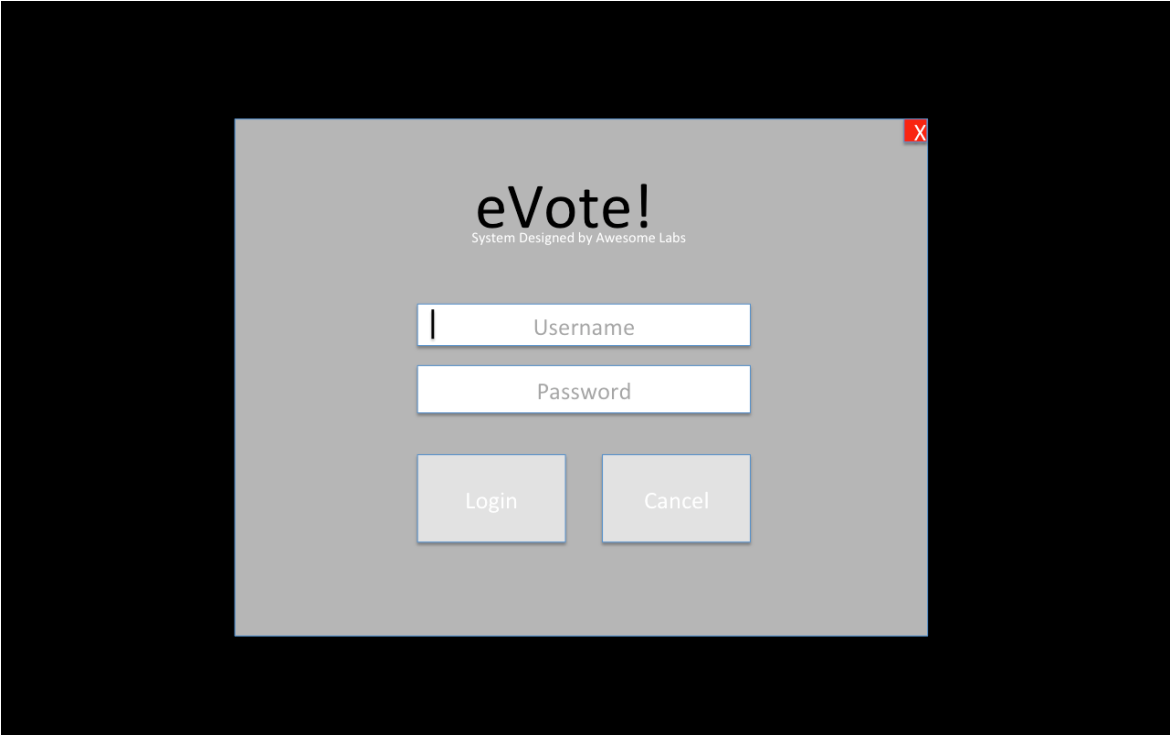


2.3.4 Domain Object Model



2.3.4 User Interface





JohnDAccount

User Information

Username: JohnD

Password: kiwi45

Full Name: John Doe

Address: 1234 Muffin Ln

DOB: 09/09/1909

Account Type: Voter

Edit Info

Vote

Logout

JohnDVote

Ballot	Details
• b11	Election, select preferred Candidates
• b12	Issue, select preferred choice
• b13	Issue, select preferred choice
• b14	Issue, select preferred choice
• b15	Election, select preferred Candidates
• ...	
• b1N	Election, select preferred Candidates

Select an Item to cast a vote for

Logout

JohnD

Vote

Ballot: b11

- Candidate1
- Candidate2
- Candidate3
- Candidate4
- Candidate5
- Candidate6

Select the preferred choice

Logout

JohnD

Edit Account Info

User Information

Username:

Password:

Full Name:

Address:

Account Type: Voter

Cancel

Done

Logout

JohnD

Edit Account Info

User Information

Username:

Password:

Full Name:

Address:

Registration Status: Registered

Account Type: Voter

Cancel

Done

Logout

Password must contain a symbol

JDiggie

Account

User Information

Username: Jdiggie

Password: knockknock6

Full Name: Jane Doe

Address: 1001 Penn Avenue

Account Type: Officer

Edit Info

Edit Ballot

Open/Close Election

View Results

Logout

JDiggleEdit Ballot

Ballot	Details
• b11	Election, select preferred Candidates
• b12	Issue, select preferred choice
• b13	Issue, select preferred choice
• b14	Issue, select preferred choice
• b15	Election, select preferred Candidates
• ...	
• b1N	Election, select preferred Candidates

Create Item

Edit Item

Cancel

Create Party

Create District

Advanced

Logout

JDiggleCreate Election

Partisan

Public Office

Candidates

Alternates

Next

Cancel

Logout

JDiggie Create Item X

Item Name

Description

Select a format

- Election
- Issue

Next Cancel

Logout

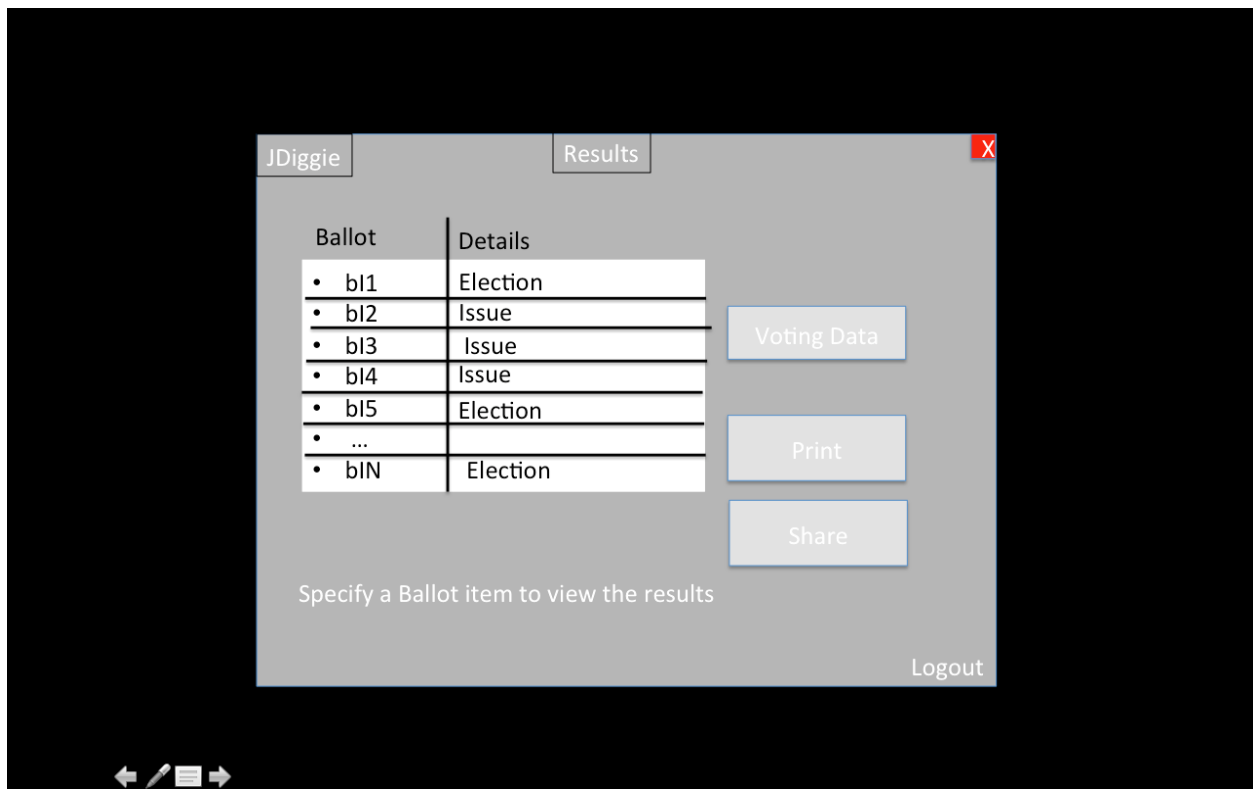
JDiggie Create Election X

Typical Election Information here

IS THIS INFORMATION
CORRECT?

Confirm Cancel

Logout



3. Glossary

Elections Officer- Board of elections officer who are able to manage and create items in the system.

Voter- A part of the electorate who is able to login in and vote on ballots and issues.

Electoral District- 52 districts available. Each voter is assigned to one of these. Ballots are able to be assigned to multiple districts.

Candidates- Ballot items. Each candidate has an assigned political party.