

## Week 1

1. Bring in multiple files into the election system - Effort: S 1 hours
2. Process multiple files into the IRV election system - Effort: S 2 hours
3. Process multiple files into the CPL election system - Effort: S 2 hours
4. A table that shows each round of the IRV - Effort: M 4 hours
5. View what votes are added and what votes are decreased - Effort S: 2 hours

## Week 2

6. Process multiple files into the PO election system - Effort: S 2 hours
7. Candidate votes are accounted for - Effort: S 2 hours
8. IRV ballots to have at least half the candidates ranked for it to be valid - Effort: S 2 hours
9. A new file containing all of the invalidated votes - Effort: S 1 hour
10. The PO election determines a single winner when there are no ties - Effort: M 4 hours
11. An unbiased system to break ties for PO election - Effort: M 3 hours
12. The PO election winner and stats displayed on the screen - Effort: S 1 hours
13. Run the entire PO election - Effort: S 2 hours
14. A GUI to select files - Effort: M 4 hours

\*Note: Week 2 PBIs are not yet listed according to priority

## **User Stories:**

ID: 001
As an election official, I want to be able to bring in multiple files, so that I can bring in different files from different locations.
Acceptance Criteria: <ul style="list-style-type: none"><li>- The user is able to provide multiple voting files for one election by a GUI</li><li>- The user is able to provide multiple voting files for one election by a command line</li></ul>
Definition of Done: <ul style="list-style-type: none"><li>- File names match what the user selected as files</li><li>- Multiple files are able to be selected</li><li>- Files selected exist in current directory</li><li>- Code Passes all tests (unit testing, integration testing)</li><li>- Documentation is complete</li></ul>
Effort: Small - 1 hour
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 002
As an election official, I want the IRV files to be processed, so that the IRV election can be run.
Acceptance Criteria: <ul style="list-style-type: none"><li>- The files provided from the election official are able to be processed with no error</li><li>- The data in each file is stored and assigned properly</li><li>- The ballots for each file is given to its respective candidate</li><li>- The ballot count in each file is added to an overall ballot count</li><li>- Display error if a file is unable to be processed</li><li>- The IRV election can run properly with the processed files</li></ul>
Definition of Done: <ul style="list-style-type: none"><li>- Files can be opened properly with error checking</li><li>- Each file is correctly denoted as IRV</li><li>- Ballots from each file are accounted for each candidate and the total number of ballots is increased with each file</li><li>- Data (Ballot and candidate objects) is populated. Correctly matching the data in the file read in (this will be determined through testing)</li><li>- The accumulation of all ballots from each file equals the correct total number of ballots</li><li>- Errors are thrown when file format is incorrect or file can't open</li></ul>

<ul style="list-style-type: none"> <li>- Code Passes all tests (unit testing, integration testing)</li> <li>- Documentation is complete</li> </ul>
Effort: Small - 2 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 003
As an election official, I want the CPL files to be processed, so that the CPL election can be run.
<p>Acceptance Criteria:</p> <ul style="list-style-type: none"> <li>- The files provided from the election official are able to be processed with no error</li> <li>- The data in each file is stored and assigned properly</li> <li>- The ballots for each file is given to its respective party</li> <li>- The ballot count in each file is added to an overall ballot count</li> <li>- Display error if a file is unable to be processed</li> <li>- The CPL election can run properly with the processed files</li> </ul>
<p>Definition of Done:</p> <ul style="list-style-type: none"> <li>- Files can be opened properly with error checking</li> <li>- Each file is correctly denoted as CPL</li> <li>- Ballots from each file are accounted for each candidate and the total number of ballots is increased with each file</li> <li>- Data (Ballot, Candidate, and Party objects) is populated. Correctly matching the data in the file read in (this will be determined through testing)</li> <li>- The accumulation of all ballots from each file equals the correct total number of ballots</li> <li>- Errors are thrown when file format is incorrect or file can't open</li> <li>- Code Passes all tests (unit testing, integration testing)</li> <li>- Documentation is complete</li> </ul>
Effort: Small - 2 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 004
As an election official, I want to see a table that shows each round of the IRV, so that the election results are understood.
<p>Acceptance Criteria:</p> <ul style="list-style-type: none"> <li>- A table is displayed with the results of each round of the IRV election</li> </ul>

<ul style="list-style-type: none"> <li>- The table is easy to understand</li> <li>- The table is displayed to the terminal</li> </ul>
<p>Definition of Done:</p> <ul style="list-style-type: none"> <li>- Table is properly formatted</li> <li>- Table correctly displays each round of IRV and the correct stats for each round</li> <li>- Table is displayed at the end of the election</li> <li>- Table displays the changes in votes (additions and subtractions) of each candidate in each round</li> <li>- Code Passes all tests (unit testing, integration testing)</li> <li>- Documentation is complete</li> </ul>
Effort: Medium - 4 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 005
As an election official, I want to view what votes are added and what votes are subtracted for the IRV election, so that I can see the election process.
<p>Acceptance Criteria:</p> <ul style="list-style-type: none"> <li>- Vote counts are properly tracked during the election</li> <li>- Vote counts calculated for each candidate for each round</li> <li>- A candidate's total votes are adjusted accordingly</li> <li>- Vote changes can be viewed by the election official</li> </ul>
<p>Definition of Done:</p> <ul style="list-style-type: none"> <li>- The IRV table at the end of the election displays the correct ballots before and after changes, and the correct number of ballots changed.</li> <li>- Showing votes being added or decreased in the election</li> <li>- Code Passes all tests (unit testing, integration testing)</li> </ul>
Effort: Medium - 3 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 006
As an election official, I want the files to be processed, so that the PO election can be run.
Acceptance Criteria:

<ul style="list-style-type: none"> <li>- The files provided from the election official are able to be processed with no error</li> <li>- The data in each file is stored and assigned properly</li> <li>- The ballots for each file is given to its respective party</li> <li>- The ballot count in each file is added to an overall ballot count</li> <li>- Display error if a file is unable to be processed</li> <li>- The PO election can run properly with the processed files</li> </ul>
<p>Definition of Done:</p> <ul style="list-style-type: none"> <li>- Files can be opened properly with error checking</li> <li>- Each file is correctly denoted as PO</li> <li>- Ballots from each file are accounted for each candidate and the total number of ballots is increased with each file</li> <li>- Data (Ballot, Candidateobjects) is populated. Correctly matching the data in the file read in (this will be determined through testing)</li> <li>- The accumulation of all ballots from each file equals the correct total number of ballots</li> <li>- Errors are thrown when file format is incorrect or file can't open</li> <li>- Code Passes all tests (unit testing, integration testing)</li> <li>- Documentation is complete is increased with each file</li> </ul>
Effort: Small - 2 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 007
As an election official, I want candidates' votes to be accounted for so that the integrity of the election holds.
<p>Acceptance Criteria:</p> <ul style="list-style-type: none"> <li>- At least works in a 2 or more candidate election</li> <li>- Votes received match votes listed on ballots</li> </ul>
<p>Definition of Done:</p> <ul style="list-style-type: none"> <li>- Candidates are assigned their ballots correctly</li> <li>- Total number of ballots has not been altered during assignment of ballots</li> <li>- Any invalid ballots are accounted for and properly handled</li> <li>- Documentation is complete</li> <li>- Code Passes all tests (unit testing, integration testing)</li> </ul>
Effort: Small - 2 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 008

As an election official, I want IRV ballots to have at least half the candidates ranked for it to be valid, so that the election maintains its validity.

Acceptance Criteria:

- The ballots with less than half the candidates ranked are invalid
- The ballots with at least half the candidates ranked are valid, where half the candidates are at least the .5 point or above
- The ballots will not be invalidated during the collection process
- The invalid ballots will be removed from the election before the election progresses
- Invalid ballots will be stored in a file for audit purposes

Definition of Done:

- Each ballot is checked for number of rankings, if this number is less than half of the number of candidates, it is marked invalid
- Invalid ballots are written to a file
- Invalidated ballot file is created before any invalid ballots are found
- Invalidation of ballots occurs during the processing of the files
- Invalid ballots are removed from the election ballots, total ballots is decreased by 1, and the ballot is removed from the candidate or party
- Documentation is complete
- Code Passes all tests (unit testing, integration testing)

Effort: Small - 2 hours

PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 009

As an election official, I want to see a new file containing all of the invalidated votes after an IRV election completes, so that even unused ballots are accounted for.

Acceptance Criteria:

- A file is created for the invalid ballots
- All invalidated ballots through the election are found in the file
- Invalid ballots are properly labeled to ensure accountability

Definition of Done:

- A file is created in the correct directory and properly named
- When processing a file, each invalid ballot is stored in the file
- Invalidated ballots found during processing match the ballots listed in the file
- The invalidation file is for IRV elections only
- Documentation is complete
- Code Passes all tests (unit testing, integration testing)

Effort: Small - 1 hour
------------------------

PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.
---

ID: 010
---------

As an election official, I want the PO election to determine a single winner when there are no ties, so I can announce a winner.
--

Acceptance Criteria:
----------------------

- |   |
|---|
| <ul style="list-style-type: none"><li>- There is no ties</li><li>- There is only one winner at the end of the election</li><li>- The winner is determined by the rules of popularity vote</li></ul> |
|---|

Definition of Done:
---------------------

- |  |
|--|
| <ul style="list-style-type: none"><li>- A single winner is selected</li><li>- The PO election rules (popularity vote) are adhered to when determining a winner</li><li>- The winner will have the highest percentage of votes</li><li>- The election does not calculate any other values after the winner has been determined</li><li>- There is no tie(s) in the election</li><li>- Documentation is complete</li><li>- Code Passes all tests (unit testing, integration testing)</li></ul> |
|--|

Effort: Medium - 4 hours
--------------------------

PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.
---

ID: 011
---------

As an election official, I want an unbiased system to break ties for a PO election, so that election integrity is maintained.
---

Acceptance Criteria:
----------------------

- |   |
|---|
| <ul style="list-style-type: none"><li>- There is a tie or ties</li><li>- The winner should be chosen using an unbiased and fair strategy</li><li>- The winner chosen for multiple runs of the same election ballots show the election integrity is maintained</li></ul> |
|---|

Definition of Done:
---------------------

- |  |
|--|
| <ul style="list-style-type: none"><li>- A single winner is selected at the end of the election</li><li>- The unbiased mechanism will be the fair coin toss and is implemented correctly to</li></ul> |
|--|

<p>ensure fairness</p> <ul style="list-style-type: none"> <li>- A tie(s) occurred that triggered the fair coin toss</li> <li>- The winner will have the highest percentage of votes</li> <li>- Once a winner is determined, the election does not calculate any other value or attempt to select another winner</li> <li>- Documentation is complete</li> <li>- Code Passes all tests (unit testing, integration testing)</li> </ul>
Effort: Medium - 3 hours
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 012
As an election official, I want to see the PO election winner and stats displayed on the screen at the end of the election, so that I can see the results.
<p>Acceptance Criteria:</p> <ul style="list-style-type: none"> <li>- The PO stats are displayed on the screen at the end of the election with the correct information</li> <li>- The percentage of votes each candidate received is shown so constituents who voted know how well their candidate did</li> <li>- The PO winner is clearly shown as the winner</li> <li>- The format of the stats are easy to understand</li> </ul>
<p>Definition of Done:</p> <ul style="list-style-type: none"> <li>- The correct election winner is displayed on the screen and is clearly labeled as the winner</li> <li>- The correct PO stats types are used</li> <li>- The PO stats display the correct information</li> <li>- The election has fully finished</li> <li>- The percentage of votes for each candidate is displayed</li> <li>- The format is simple and easy to read and understand</li> <li>- Documentation is complete</li> <li>- Code Passes all tests (unit testing, integration testing)</li> </ul>
Effort: Small - 1 hour
PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.



ID: 013

As an election official, I want the PO election to run correctly, so that a winner can be decided

Acceptance Criteria:

- Show results of the PO election accurately
- A winner is chosen if there is a tie by a fair and random tie breaker
- A winner is chosen by popularity vote
- Multiple files can be brought in and each is processed correctly
- Display errors if system can't processed

Definition of Done:

- Files can be opened properly with error checking
- File(s) of correct format are read in correctly
- Multiple files can be selected by the user (PBI ID: 001 and ID: 014)
- Calling PO election algorithm executes correctly
- PO election results are calculated correctly and displayed to the screen (PBI ID: 013)
- PO election determines a winner by popularity vote if there is no tie (PBI ID: 011)
- PO election determines a winner by fair coin toss if there is a tie (PBI ID: 012)
- Errors are thrown when file format is incorrect or a non election files is selected
- Code Passes all tests (unit testing, integration testing)

Effort: Small - 2 hours

PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.

ID: 014

As an election official, I want to use a pop-up (GUI) window to select files for processing, so that I can choose the right file(s) for each election.

Acceptance Criteria:

- Election officials are able to select files by clicking on them
- Election officials are able to select multiple files for processing
- Files in the directory are listed out
- Files the election official selects are the files that are used in the election
- From a directory, where the window appears at the start of the program and allows me to type in a file name or search for file(s) on disk using my mouse or arrow keys

Definition of Done:

- The GUI for selecting files appears to the user when the program starts
- Lists the correct files
- User can select multiple files
- Files selected are the files used in the election
- GUI displays to user properly
- Documentation is complete
- Code Passes all tests (unit testing, integration testing)

Effort: Medium - 4 hours

PBI Author(s): Sidney N., Chiemeka N., Theodore C., Phuong L.