1. Break a tie

Name	Break tie
ID	GT_001
Description	If the election goes to a tie, then have the computer randomly flip a coin
Actors	programmers, testers, and election officials
Organization Benefits	allows unbiased determination of a tie which is more efficient and accurate then re-voting
Frequency of Use	Multiple times a year through elections
Triggers	1. No majority in IR (Same number of votes) 2. 2 people with the same number of lowest votes in IR 3. The same number of votes in CPL 4. Tie in allocating a seat in CPL
Preconditions	Majority winner is not determined.
Postconditions	The computer randomly flips a coin to decide on a winner.
Main Course	A tie happens in the election Then the computer randomly chooses a winner by flipping a winner
Alternate Course	If a tie doesn't happen, then the winner is decided by who has the most votes
Exceptions	Winner is displayed and there is no need to flip a coin

2 - Exporting the audit file

Name	Export Audit File
ID	GT_002
Description	This Usecase will be exporting the audit file once the election is results are in and the audit file is produced.
Actors	The actors for this use case are programmers, Testers, and election officials
Organization Benefits	This use case ensures that the audit file, which contains important information about the election results, is easily accessible and available for review. This can help increase transparency and accountability in the election process, which can enhance trust in the organization and its processes
Frequency of Use	This use case is likely to be used once per election cycle.
Triggers	The trigger for this use case is the completion of the election and the production of the audit file.
Preconditions	The preconditions for this use case are that the election has been completed and the audit file has been produced.
Postconditions	The postcondition for this use case is that the audit file has been successfully exported
Main Course	1-The election official or designated personnel initiates the export of the audit file. 2-The system prompts the user to select the format and destination for the exported file. 3-The user selects the desired format and destination. 4-The system exports the audit file to the selected destination in the selected format. 5-The system confirms the successful export of the audit file.
Alternate Course	If there are errors or issues with the audit file, the system may prompt the user to resolve the errors before exporting the file.
Exceptions	1-If the system encounters an error during the export process, it will prompt the user to resolve the error before continuing with the export. 2-If the user cancels the export process, the system will abort the export and return to the main menu.

3 - Checking File format

Name	Check file format
ID	GT_003
Description	This use case will determine if the file name is what the user expected
Actors	programmers, testers, and election officials
Organization Benefits	Allows for the program to be run with any errors, helps us open and read the correctly formatted file
Frequency of Use	multiple times a year through elections And the user wants to run an election
Triggers	The user inputs in a file name
Preconditions	The system is run and the user is prompted to enter a file name for the election.
Postconditions	The file that is entered in is then used to run the election, and the ballots are read from. The election process continues to go to the next stage.
Main Course	1-The user inputs a file name for the election into the system. 2-The system checks the format of the file name to ensure that it matches the expected format for the election. 3-If the format of the file name is correct, the system proceeds to read the ballots from the file and the election process continues to the next stage. 4-If the format of the file name is incorrect, the system displays an error message to the user indicating that the file name is invalid and prompts the user to enter a valid file name.
Alternate Course	If the format of the file name is incorrect, ->the system displays a warning message to the user indicating that the file name does not match the expected format, and proceeds to read the ballots from the file
Exceptions	1. If the file specified by the user does not exist, the system displays an error message indicating that the file cannot be found and prompts the user to enter a valid file name. 2. If the file specified by the user cannot be opened, the system displays an error message indicating that the file cannot be opened and prompts the user to enter a valid file name. 3. If the file specified by the user is not in the expected format, the system displays an error message indicating that the file format is invalid and prompts the user to enter a valid file name.

4 - Identify File

Name	Identifying file to process
ID	GT_004
Description	User must be able to use the file in different ways
Actors	programmers, testers, and election officials
Organization Benefits	Allows different actors to access the file as needed
Frequency of Use	Multiple times a year through elections
Triggers	User opens the file or uses terminal
Preconditions	file exists
Postconditions	The program is started/file is opened
Main Course	● File run through program ● The file is opened
Alternate Course	● File run through scripts on terminal
Exceptions	Wrong format of file

5 - Read In file:

Name	Read in the file
ID	GT_005
Description	File is read and details of election are taken
Actors	programmers, testers, and election officials
Organization Benefits	Reads the file which details the election, recording the votes, candidate and parties of the election
Frequency of Use	Multiple times a year through elections
Triggers	File is inputed in system to be read
Preconditions	● File exist ● File is formatted properly ● File is the correct file type
Postconditions	● The system records the election data in the file ● The information is then used by the system to run the correct algorithm
Main Course	File is read and election information is saved on system
Alternate Course	File is empty and no election information is recorded on the system
Exceptions	There is no data on the file

6 - Prompting user input

Name	Prompting user input
ID	GT_006
Description	How the user will be prompted to enter an input for ballots or wanting to see results/process
Actors	programmers, testers, and election officials
Organization Benefits	allows ease of access for users which reduces uncertainty and increases trust with the organization
Frequency of Use	few times each time a process is run for evaluating ballots
Triggers	ballot needs to be evaluated or process needs to be seen
Preconditions	user must have purpose to input, otherwise there is no need to prompt
Postconditions	1. enters ballot file 2. enters instructions to see results 3. enters wanting to see current process being done
Main Course	print messages through terminal and allow inputs to be stores inside variables
Alternate Course	create a GUI to assemble and organize instructions from user
Exceptions	User input is not needed

7 - CPL implementation

Name	Seat allocation and algorithm implementation for CPL
ID	GT_007
Description	Determine how many seats a party should be given based on voting amount of a given party in relation to how many seats are available
Actors	programmers, testers, and election officials
Organization Benefits	Allows for smoother processing of winning candidates and produces fairness and accuracy with regards to CPL standard voting
Frequency of Use	multiple times a year through elections
Triggers	A ballot is inputted
Preconditions	CPL must be the given voting method
Postconditions	Seats based off district size is allocated to each party
Main Course	Divide sum of a given party's votes by the total votes of the election which will give a percentage of how many votes that party received. Next, take this percentage and multiply it by the number of available seats. Lastly, take those seats and distribute them to each party in ranked order(the first seat would go to the leading candidate, and so on).
Alternate Course	Tie could result (see tiebreaker use case)
Exceptions	IR voting is given

8 - IR Election Implementation

Name	IR Algorithm
ID	GT_008
Description	User must be able to select the IR election type and receive a calculated winner based on the method selected
Actors	Voters, testers, election officials
Organization Benefits	Allows a voter to see who is winning the IR election
Frequency of Use	Multiple times a year through elections
Triggers	User launches program with IR on top of CSV file
Preconditions	Votes were cast in an election. Ballots were then collected.
Postconditions	A screen detailing the winner of the IR election.
Main Course	1. Program is run 2. IR is determined based on the CSV file
Alternate Course	1. Program is run 2. CPL is written in a CSV file, so the IR algorithm is not run.
Exceptions	No election type is stated in the CSV file.

9 - Starting the System

Name	This use case will describe the initial start-up of the Program and system
ID	GT_009
Description	When trying to run the election program, the user must first start the system and load up the program
Actors	The actors for this use case are programmers, Testers and election officials
Organization Benefits	This use will allow the user to begin the program and create the desired outcome
Frequency of Use	The frequency of use for this use case will be whenever the user decides and run an election
Triggers	The computer and machine that will be running this program must first be turned on and logged into
Preconditions	Computer is turned on
Postconditions	The user will be able to run an election or look at files.
Main Course	1- the computer must be turned on - user goes into the terminal and starts up the program 2- after this, the user can either run the program or look at CSV files of the election information
Alternate Course	The user might through and IDE and starts the system and run the program
Exceptions	The system doesn't run, and the user can run the election-> output and error saying the system can start up

10 - Display Winner

Name	Display the winner
ID	GT_010
Description	The winner must be able to be ascertained and User must be able to see the winner of the election on-screen
Actors	Voters, testers, election officials
Organization Benefits	Allows a user to see who is currently winning the election
Frequency of Use	Multiple times a year through elections
Triggers	User finishes casting vote in system
Preconditions	Votes were cast in election
Postconditions	A screen detailing the winner of the election is
Main Course	1. The vote is cast and recorded in system 2. The current winner of the election is displayed on the screen
Alternate Course	1. The vote is cast and recorded in system 2. There is a tie between top candidates so the tie is dealt with, then the winner is displayed.
Exceptions	There are currently no votes in the system for a winner to be determined

11 - Audit File

Name	Open the Audit File
ID	GT_011
Description	This use case involves opening the audit file to review the election results and ensure that they are accurate.
Actors	programmers, testers, Election officials, auditors, and designated personnel
Organization Benefits	This use case helps to increase transparency and accountability in the election process by allowing authorized personnel to access and review the audit file. This can help to build trust in the organization and its processes, as well as identify any potential issues or errors in the election results.
Frequency of Use	This use case may be used multiple times a year throughout the election cycle, as needed.
Triggers	The trigger for this use case is the User needs to review the election results and ensure their accuracy. As well as the audit file is created and produced.
Preconditions	The preconditions for this use case are that the audit file has been successfully created, exported, and is available for review.
Postconditions	The postcondition for this use case is that the audit file has been reviewed and any necessary actions have been taken.
Main Course	● The authorized user opens the application or software used to view the audit file. ● The user selects the audit file they wish to view from a list of available files. ● The application loads the audit file and displays it on the user's screen. ● The user reviews the audit file to ensure that the election results are accurate and any discrepancies are identified. ● If any issues or errors are identified, the user takes the appropriate actions to resolve them. ● Once the audit file has been reviewed and any necessary actions have been taken, the user closes the program.
Alternate Course	1. If the audit file is too large or complex to be reviewed at once, the user may choose to review it in sections or use some sort of tool to narrow down the information displayed. 2. If the audit file is not loading correctly, the user may need to troubleshoot the issue or contact technical support for assistance.
Exceptions	1. If the audit file is not available or cannot be located, the user may need to check with the appropriate personnel to ensure that the file is accessible. 2. If the audit file is corrupted or otherwise unreadable, the user may need to work with technical support to resolve the issue or obtain a new copy of the file.

12 - Processing ballots file

Name	Processing the ballots file
ID	GT_012
Description	This use case involves the system's ability to be able to read the CSV file into the program
Actors	programmers, testers, Election officials, auditors, and designated personnel
Organization Benefits	This use case allows for the main portion of the system to be accurately handled. Once the file is properly read in, the appropriate algorithm can be determined for selecting the winner
Frequency of Use	This use case may be used multiple times a year throughout the election cycle, as needed.
Triggers	The trigger for this use case is that the program is launched
Preconditions	The preconditions for this use case is that the ballots have been collected and put into a CSV file
Postconditions	The postcondition for this use case is that program is run and the correct algorithm is determined
Main Course	● The program is launched ● It reads in the file ● Determines the algorithm to go with ● Produces the winner
Alternate Course	If no file is detected, the user will be prompted of this error.
Exceptions	● File type is not correct ● File does not display election type at the top ● Ballets are incorrectly formatted