1. Break a tie

Name	Break tie
ID	GT_001
Description	If a tie occurs during the election, the computer will randomly flip a coin to determine the winner.
Actors	programmers, testers, and election officials
Organization Benefits	Allows for efficient, unbiased, and accurate resolution of a tie in election results, preventing the need for a re-vote.
Frequency of Use	Multiple times a year through elections
Triggers	1. No majority in Instant Runoff (IR) voting (same number of votes) 2. Two or more candidates have the same number of lowest votes in IR voting 3. Two or more parties have the same number of votes in Closed Party List (CPL) voting 4. Tie in allocating a seat in CPL voting
Preconditions	Majority winner is not determined There is a tie between two or more candidates or parties
Postconditions	The winner is determined by a coin flip The election results are updated to reflect the winner
Main Course	When a tie occurs during the election, the computer will randomly flip a coin to determine the winner. The winner is updated in the election results.
Alternate Course	If a tie doesn't occur, the winner is determined by who has the most votes.
Exceptions	If there is a clear winner with the most votes, the coin flip is not necessary. The winner is displayed and updated in the election results.

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	This use case allows the user to identify and select a file to be processed. The file may be used in different ways depending on the actor's requirements, such as running it through a program or running it through scripts on the terminal.
Actors	programmers, testers, and election officials
Organization Benefits	Enable different actors to access and process the file as needed, which can help improve the efficiency and accuracy of election-related tasks.
Frequency of Use	Multiple times a year through elections
Triggers	The user initiates the process of identifying and selecting the file.
Preconditions	The file exists and is stored in a location that is accessible to the user.
Postconditions	The program or script is started, and the selected file is processed.
Main Course	- The user launches the program or script. - The user selects the option to open a file. - The system displays a command prompt where the user can browse or navigate to the location where the file is stored. - The user selects the file to be processed. - The system verifies that the file is in the correct format and can be processed. - If the file is in the correct format, the system opens the file and processes it through the program or script.
Alternate Course	If the user wants to run the file through scripts on the terminal, the following steps are taken: - The user navigates to the directory where the file is located using the command prompt. - The user enters the command to run the file through the script, and the system processes the file accordingly.
Exceptions	- If the file does not exist, the system will display an error message and prompt the user to select a valid file. - If the file is in the wrong format, the system will display an error message and prompt the user to select a file in the correct format. - If the user encounters any technical issues while selecting or processing the file, the system should provide troubleshooting options or technical support contact information.

5 - Read In file:

Name	Read in the file
ID	GT_005
Description	This use case describes the process of reading an election file and extracting the necessary details about the election, such as the candidate, parties, and votes. The extracted information is then used by the system to run the correct algorithm and record the election data.
Actors	programmers, testers, and election officials
Organization Benefits	Efficient reading and processing of election files, which reduces the chances of errors.
Frequency of Use	Multiple times a year through elections
Triggers	File is inputted in system to be read
Preconditions	- The file containing the election details exists. - The file is formatted properly, meaning that it follows a specific format that the system can read. - The file is the correct file type, meaning that it is in a format that the system can understand.
Postconditions	- The system successfully reads and records the election data in the file. - The extracted information is used by the system to run the correct algorithm and record the election data.
Main Course	- The system prompts the user to input the file containing the election details. - The system checks that the file exists and is formatted properly. - The system reads the file and extracts the relevant information, such as the candidate, parties, and votes. - The system uses the extracted information to run the correct algorithm and record the election data.
Alternate Course	File is empty and no election information is recorded on the system
Exceptions	If there is no data in the file, the system displays a message saying there is no data If the file is not formatted properly or is not the correct file type, the system notifies the user that the file cannot be read.

6 - Prompting user input

Name	Prompting user input
ID	GT_006
Description	How the user will be prompted to enter 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 a 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 the current process being done
Main Course	● The system prompts the user to enter input via the terminal. ● The user enters the required input (e.g. ballot file, instructions to see results, request to view the current process). ● The system stores the input in the appropriate place for further processing.
Alternate Course	● The system presents a graphical user interface (GUI) to the user. ● The user inputs the required information via the GUI. ● The system stores the input in the appropriate variables for further processing.
Exceptions	User input is not needed

7 - IR implementation

Name	Seat allocation and algorithm implementation for CPL
ID	GT_007
Description	This use case describes the process of implementing Instant Runoff (IR) voting in the election system. The system will allow users to select IR as the election method and will calculate the winner of the election based on the ballots received.
Actors	programmers, testers, and election officials
Organization Benefits	IR voting method provide a more accurate and representative election result. It allows a voter to rank their preferred candidates, resulting in a winner who has majority support.
Frequency of Use	multiple times a year through elections
Triggers	User selects IR as the election method and uploads a CSV file with the ballots.
Preconditions	Votes were cast in an election and ballots were collected in a CSV file.
Postconditions	Seats based off district size is allocated to each party A screen displays the winner of the IR election.
Main Course	- User launches the election program and selects IR as the election method. - The system reads the CSV file and extracts the ballots for the IR voting. - The system calculates the winner of the election using the IR algorithm. - The winner of the election is displayed on the screen.
Alternate Course	- User launches the election program and selects IR as the election method. - The CSV file does not contain the ballots for the IR voting, but for the CPL voting instead. - The system will prompt the user to upload a new CSV file with IR ballots or select a different election method.
Exceptions	- CPI voting is given - The election method is not specified in the CSV file. - The CSV file does not contain any ballots for the election. - The system encounters errors in processing the CSV file.

8 - CPL Election Implementation

Name	CPL Algorithm
ID	GT_008
Description	This use case describes the process of determining how many seats each party should be allocated based on their voting percentage in a given election. This is done using the CPL voting method, which is used to allocate seats based on the proportion of votes a party receives.
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 CPL on top of CSV file
Preconditions	CPL must be the given voting method.
Postconditions	A screen detailing the winner of the IR election.
Main Course	- The total number of votes cast in the election is determined. - For each party, the number of votes they received is divided by the total number of votes cast, giving their percentage of the total vote. - The percentage is then multiplied by the total number of seats available to give the number of seats the party should be allocated. - The allocated seats are distributed to each party in ranked order, with the leading candidate receiving the first seat, and so on.
Alternate Course	- A tie could result when determining the allocated seats. - The tie is resolved using a predetermined method, such as a coin flip or a revote between the tied parties. - The allocated seats are then determined based on the resolved tie.
Exceptions	If Instant-Runoff (IR) voting is given instead of CPL, the seat allocation algorithm will be different, and a different use case will be used.

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	This use case describes the process of determining and displaying the winner of an election on the user's screen. The winner is determined based on the number of votes cast for each candidate.
Actors	Voters, testers, election officials
Organization Benefits	Allows election officials to easily verify the winner, which ensures that the results are accurate and valid.
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	- The vote is cast and recorded in the system. - The system counts the number of votes cast for each candidate. - The system determines the candidate with the highest number of votes as the winner. - The system displays the winner on the user's screen.
Alternate Course	- The vote is cast and recorded in the system. - There is a tie between the top candidates. - The system resolves the tie by a predetermined method, such as a coin flip or a revote between the tied candidates. - The system determines the winner based on the resolved tie. - The system displays the winner on the user's screen.
Exceptions	If there are currently no votes in the system, the system notifies the user that there is currently no 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