
Use Cases

for

Voting Systems

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1. Use Cases

1.1 UC_01 - File Selection

Name	File Selection
ID	UC_01
Description	File containing voting information (number of votes, number of candidates, votes, etc.) must be processed in order to determine the winner of the vote.
Actor(s)	Election officials, testers
Frequency of Use	This will occur every time the program is run. It will need an input file to process.
Trigger	An election is completed and a CSV file is created. When the user runs the executable via the command prompt
Preconditions	The user is an Election Official, and there must exist an Election File or Audit File to be processed.
Postconditions	The software can now process the file that is inputted.
Main Course	<ol style="list-style-type: none"> 1. The prompt for file processing will begin at the startup of the program 2. The program will then prompt file explorer to open up to allow the user to select the file for processing 3. Once a file has been selected the file will be read and the data processed
Alternative Course	<ol style="list-style-type: none"> 1. The user enters the terminal in the file the program is in 2. The user enters the command to activate the program as well as the filename as a command line argument 3. The program reads the file and processes its data
Exceptions	EX1) if the file is not of CSV format

	<ol style="list-style-type: none"> 1. Program will then throw an exception and alert the user that the file is not of CSV format 2. Program will then prompt user for the file again and go to Main Course #2 <p>EX2) If the file is not found</p> <ol style="list-style-type: none"> 1. The program throws an exception and alters the user the file does not exist 2. Program will then prompt user for the file again and go to Main Course #2
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1.2 UC_02 - Audit File Creation

Name	Audit File Creation
ID	UC_02
Description	An audit file containing election information will be produced describing the progression of the election (e.g. voting type, number of candidates, number of votes, ballot calculations, etc).
Actors(s)	Voting System
Organization Benefits	Creates a file that displays details about how the election progressed.
Frequency of Use	Will occur when an Election File is processed.
Trigger	The program is run with an Election File.
Precondition	An Election File must be processed in order to create a respective Audit File.
Postcondition	The Audit File is produced.
Main Course	<ol style="list-style-type: none"> 1. The user can change the default output name and destination in "Configuration" (See UC_06) 2. The Audit File is processed and placed in the default/configured directory
Alternative course	N/A
Exceptions	<p>EX1) Invalid Output Name</p> <ol style="list-style-type: none"> 1. System prompts user for a different file output name

	<ol style="list-style-type: none"> 2. If new file output name is valid, return to Main Course at #2 3. Return to EX1 at #1 if input is again invalid
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1.3 UC_03 - Media File Creation

Name	Media File Creation
ID	UC_03
Description and Priority	Media File containing general results of the election, along with all relevant statistics, must be formatted in a clear and intuitive way for public viewing.
Actor(s)	Voting System
Frequency of Use	This will occur after after the audit file has been created
Trigger	After an audit file has been created
Preconditions	An audit file must already be being processed.
Postconditions	A media file exists at the output destination, containing the desired information.
Main Course	<ol style="list-style-type: none"> 1. An audit file is being generated (See UC_02) 2. System will then go through data and generate general statistics 3. The information included in the media file will be: <ol style="list-style-type: none"> a. The type of election b. Who won the election c. The number of votes each party or candidate d. The percentages of votes for each candidate 4. User will then be prompted if they want to name the file themselves or have a default name (UC_06) 5. A media file will be outputted in the same directory as the generated audit file.

Exceptions	EX1) Invalid Output Name <ol style="list-style-type: none"> 1. System prompts user for a different file output name 2. If new file output name is valid, return to Alternative Course at #2
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1.4 UC_04 - Coin Flips

Name	Coin Flips
ID	UC_04
Description	Choose a candidate or candidates to win randomly when there is a tie for a seat or a tie for seats between more candidates then there are seats.
Actor(s)	Voting System
Organization Benefits	N/A
Frequency of Use	This will occur rarely in real elections especially for large inputs. It is unlikely with a large enough pool of voters even in a close election. It is likely to happen in testing as a tied election is a edge case people are likely to test
Trigger	During an election there's a tie for candidates not awarded seats yet among a number of candidates greater than the number of remaining seats. In a runoff election there is 1 seat.
Preconditions	The program is awarding seats for an election.
Postconditions	All the seats are awarded and the program will present the results to the user
Main Course	<ol style="list-style-type: none"> 1. The candidates tied for most seats are identified 2. Candidates identified are completely randomly chosen one at a time then awarded seats. We repeat this process until there are no seats left to award
Alternative Course	N/A

1.5 UC_05 - Election Type Selection

Name	Election Type Selection
ID	UC_05
Description	This will indicate to the program what kind of election is being processed.
Actor(s)	Voting System
Organization Benefits	N/A
Frequency of Use	This will occur when a file is selected for processing votes and creating an audit file.
Trigger	After a file has been selected from user input
Preconditions	The file should indicate whether an election is instant runoff (IR) or Open Party List (OPL)
Postconditions	Software will begin running the algorithm according to the type of election
Main Course	<ol style="list-style-type: none"> 1. Once a file has been selected, the program will then check the election type 2. Program finds the election type 3. Program indicates that it has found that the election is IR (see UC_09) or OPL (see UC_10) 4. Program will then begin running code according to the type of election
Alternative Course	N/A
Exceptions	<p>EX1) If file does not indicate the type of election</p> <ol style="list-style-type: none"> 1. Program will throw out an error stating that it cannot find the election type 2. Program will ask user to select another file as seen in UC_01 3. If the file is valid, Main Course #2 will be run

1.6 UC_06 - File Processing Configuration

Name	File Processing Configuration
ID	UC_06
Description	Configurations can be set for the output of the audit file and media file.
Actor(s)	Election officials, Testers
Organization Benefits	N/A
Frequency of Use	This will occur every time the user wishes to configure the output of the file processing to something other than the default configurations.
Trigger	“Configurations” is clicked before “Begin” is clicked.
Preconditions	The user must have already selected a file for processing, and has not yet clicked “Begin”.
Postconditions	The respective file type is output with the chosen configurations
Main Course	<ol style="list-style-type: none"> 1. Change the output destination (if desired). (See EX1) 2. Change the output name (if desired)
Alternative Course	N/A
Exceptions	EX1) Invalid Output Name <ol style="list-style-type: none"> 1. System prompts user for a different file output name 2. If new file output name is valid, return to Main Course #2.

1.7 UC_07 - Cancellation Mid-File Creation

Name	Cancellation Mid-File Creation
ID	UC_07
Description	If the program is shut down or cancelled midway through the file creation process, it will return to the main menu.
Actors(s)	Election officials, Testers
Organization Benefits	N/A
Frequency of Use	Whenever the computer or the user suspends the program.
Trigger	The program is shut down, either by the user or the system.
Precondition	A user or computer must end the voting system program.
Postcondition	The program will restart and return to the main menu.
Main Course	<ol style="list-style-type: none">1. The program is ended2. The program returns to the main menu
Alternative course	N/A
Exceptions	N/A

1.8 UC_08 - Display Results to Screen

Name	Display Results to Screen
ID	UC_08
Description	Show the results and process of the election decisions on the screen
Actors(s)	Election officials, Testers
Organization Benefits	Enables the user to view the results of the election they ran.
Frequency of Use	This will occur nearly every time the program is run for a real election and will likely happen.
Trigger	This will start as soon as the program finds the results.
Precondition	The program is creating the results of the election.
Postcondition	The results of the election are on screen
Main Course	Take the results of the election and print them
Alternative course	N/A
Exceptions	N/A

1.9 UC_09 - Instant Runoff File Processing

Name	Instant Runoff File Processing
ID	UC_09
Description	Process the election as an instant runoff
Actors(s)	Voting System
Organization Benefits	N/A
Frequency of Use	This will happen whenever the program is run and a valid file has an election type of IR
Trigger	If the system identifies the election type as IR
Precondition	File must be valid and must have a valid election type of IR
Postcondition	Program will then have run through the instant runoff algorithm
Main Course	<ol style="list-style-type: none"> 1. System identifies election as IR (UC_05) 2. System counts ballots that indicate a specific candidate as their most preferred 3. System eliminates candidate with lowest votes 4. Ballots that had the eliminated candidate will then distribute on to their next preferred candidate 5. Repeat steps 2-4 until the final candidate is selected 6. System prepares to create audit file
Alternative course	AC1) There is a tie <ol style="list-style-type: none"> 1. Program will indicate that there's been a tie between two candidates 2. Will perform coin flip (UC_04) and identifies winner of coin flip 3. After the coin flip, go back to Main Course #3
Exceptions	N/A

1.10 UC_10 - Open Party List File Processing

Name	Open Party List File Processing
ID	UC_10
Description	Process the election as an open party list
Actor(s)	Voting System
Organization Benefits	N/A
Frequency of Use	This will happen whenever the program is run and a valid file has an election type of OPL
Trigger	If the system identifies the election type as OPL
Preconditions	File must be valid and must have a valid election type of OPL
Postconditions	Program will then have run through the open party list algorithm
Main Course	<ol style="list-style-type: none"> 1. System identifies election as IR (UC_05) 2. Candidates are grouped by party (UC_11) 3. The quota is defined as dividing the total ballots by the number of seats to fill 4. System counts ballots, recording candidate votes as well as party votes 5. System assigns each party a number of seats equal to the integer division of the total party votes and the quota 6. If not all seats were assigned, the remaining seats are split among parties with the greatest remainder 7. Assign candidates to their party's seats based on their individual votes 8. System prepares to create audit file
Alternative Course	AC1) There is a tie <ol style="list-style-type: none"> 4. Program will indicate that there's been a tie between two candidates 5. Will perform coin flip (UC_04) and identifies winner of coin flip 6. After the coin flip, go back to Main Course #4, #5 or #6
Exceptions	N/A

1.11 UC_11 - Independent Party OPL Candidate

Name	Independent Party OPL Candidate
ID	UC_11
Description	Independent candidates will be grouped into a single party.
Actor(s)	Voting System
Organization Benefits	N/A
Frequency of Use	During the processing of an OPL election file.
Trigger	Candidate(s) are found in the election file that are Independent
Preconditions	Independent candidates are considered individuals
Postconditions	Any candidate that is independent will belong to the Independent party.
Main Course	<ol style="list-style-type: none">1. Election file is being processed2. Independent candidate is encountered3. Candidate is grouped with other Independent candidates4. Return to UC_10, Main Course #2
Alternative Course	N/A
Exceptions	N/A