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Name	Read in a file
ID	UC_001
Description	Voters express their preference for a particular candidate and a party or only a particular party. Their decision will be stored in a CSV file. After the election ends and the information for each voting is stored in a file, the user will then read in a file.
Actors	Election Officials
Organizational Benefits	After the file is read into the program, the program can run the exact algorithm to generate the result for the election based on the first line of the type. Since there are many voters, it can be easier to get the election results.
Frequency of use	100% of users will use this function to read in a file.
Triggers	The user selects an option to read in a file.
Preconditions	The election ends. The ballots are recorded in the comma separated values file where each row is separated by a newline.
Postconditions	The election result will be recorded in an audit file. The election result will be displayed to the screens the winners and information about the election. The results of the election will be shared with media personnel.
Main course	1.User logs in. (See AC1) 2.The system prompts users. 3.The user reads in a file. (See EX1)
Alternate courses	AC1.User logs off. 1.Return to main course 1
Exceptions	EX1.The user fails to read in a file. 1.The system notifies users that an error has occurred. 2.Return to main course 3

Name	Click to begin the election
ID	UC_002
Description	After the file is read in, select a button to begin the election.
Actors	Election officials
Organizational Benefits	This part is required to begin the election algorithm.
Frequency of use	100% of users use this functionality to begin the election.
Triggers	The user selects an option to begin the election.
Preconditions	The election ends. The ballots are recorded in the comma separated values file where each row is separated by a newline. The file is successfully read in.
Postconditions	The system is run to generate the election results.
Main course	1. Read in file. 2.The user selects a button to begin the election. (see EX1 and AC1)
Alternate courses	AC1. The file is already read in. 1. Return to main course 2.
Exceptions	EX1.The system fails to begin the election. 1.The system notifies users that an error has occurred. 2.Return to main course 2

Name	Produce an audit file
ID	UC_003
Description	An audit includes the election information at the time. The information includes the type of voting, the number of candidates, the candidates, the number of ballots, etc.
Actors	Election Officials
Organizational Benefits	The audit file is produced to include the election information at the

	time. The information includes the type of voting, the number of candidates, the candidates, the number of ballots, etc. This file is stored if there is future use.
Frequency of use	100% of users will use this function to produce an audit file.
Triggers	The user selects an option to produce an audit file.
Preconditions	The election ends and the basic result has been shown.
Postconditions	The results of the election will be shared with media personnel. The audit file is saved.
Main course	1. User logs in and execution finished already. (See AC1) 2. The user clicks a button to produce an audit file. (See EX1)
Alternate courses	AC1.User logs off. 1.Return to main course 1
Exceptions	EX1.The user fails to produce an audit file. 1.The system notifies users that an error has occurred. 2.Return to main course 2

Name	Display election information to screen
ID	UC_004
Description	Produce a summary of election, show the type of election, the number of seats, the number of ballots cast, the winners and the stats for everyone or the party, such as the number of votes received.
Actors	Election officials
Organizational Benefits	Have a clear overview about the election and let users know the result and collected data of the election.
Frequency of use	100% of users need to use this function to show election information.
Triggers	The user selects an option to display it to the screen.
Preconditions	The election ends. The file is read by the program. The result of the election is generated by the system. Users get the winners of the election, and download the audit file.

Postconditions	Users can see the overview and data of the election. They could share or publish the results according to laws and regulations.
Main course	1.User generates the election information with the election results and other data information. (see AC1) 2.User saves the information. (see EX1) 3.User connects the system with a screen and displays the information. (see EX2)
Alternate courses	AC1. Election information has been generated. 1. Return to main course 1
Exceptions	EX1. System fails to save the information. 1.The system notifies users that an error has occurred. 2.Return to Main course step 2. EX2. System fails to display the information. 1.The system notifies users that an error has occurred. 2.Check the connection between screen and system. 3.Return main course step 3.

Name	List the winners
ID	UC_005
Description	Generate the results about the winners of this election/seats for each party.
Actors	Election officials
Organizational Benefits	Have a clear and basic final results of the election.
Frequency of use	100% of users will use this functionality.
Triggers	User selects an option to see the list of winners.
Preconditions	The election algorithm is finished and the result is generated.
Postconditions	Users can see the results, and then display the overview of the election to screen to let everyone see these election information.
Main course	1. Upload a file. (See AC1, EX1) 2. System generates the results of the election. (see AC2, EX2) 3. Choose a button to see the list of winners.
Alternate courses	AC1. The file is already uploaded.

	1. Return to main course 1. AC2. The election results have been generated. 1. Return to main course 2
Exceptions	EX1. Upload fails. 1.System notifies the error “the format of the input file is wrong”. 2. Return to main course step 1. EX2. Generation fails. 1.System notifies the error “over time”. 2.Return to main course step 2.

Name	Break tie
ID	UC_006
Description	When at least two candidates are elected to be tied, the users randomly select the winner in a fair coin toss.
Actors	Election Officials
Organizational Benefits	Ensure that there is no tie
Frequency of use	Hardly, as long as there is a tie, the user should use this functionality for one time.
Triggers	When there is a tie, user selects an option to break the tie
Preconditions	There is at least one tie in the result.
Postconditions	The tie is broken and no people have the same ranking.
Main course	1. User views the directory of the program. 2. User selects the correct ballot information file. (see EX1) 3. User confirms the action to use the program to toss a coin to decide the winner. (see EX2)
Alternate courses	None
Exceptions	EX1. Correct ballot information file missing. 1.User does not find the file he/she wants. 2.Cancel and obtain correct ballot information files from other sources. 3. Return to main course step 2 EX2. Ballot information file error. 1.System notifies the user that an error occurs: “the format of the input file is wrong”.

	2.Return to main course step 3
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Name	Polish and share the results with media personnel
ID	UC_007
Description	The user shares the summarized reports with media personnel.
Actors	Election Officials
Organizational Benefits	Media personnel can have the summarized reports written by election officials, and the results are published to the public to be widely known
Frequency of use	Only one election official needs to use this functionality
Triggers	User selects an option to share the results
Preconditions	The results are final and ready to be shared
Postconditions	The summarized reports are shared with media personnel and are known by the public.
Main course	<ol style="list-style-type: none"> 1. User views the directory of the program. 2. User selects the correct ballot information file. (see EX1, AC1) 3. User confirms the action to share final files with media personnel.(see EX2, EX3)
Alternate courses	AC1.Share all result without select relevant ballot file <ol style="list-style-type: none"> 1. Send all election results stored in the current program to media personnel 2. Return to main course 1.
Exceptions	EX1. Correct ballot information file missing. <ol style="list-style-type: none"> 1.User does not find the file he/she wants. 2.Cancel and obtain correct ballot information files from other sources. 3.Return to main course step 2 EX2. Ballot information file error. <ol style="list-style-type: none"> 1.System notifies the user that an error occurs: “the format of the input file is wrong”. 2.Return to main course step 3 EX3. The action to share the file with media personnel fails <ol style="list-style-type: none"> 1.System notifies the user that an error occurs: “fail to share the files with media personnel”

	2.Return to main course step 3
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Name	Prompt user to choose
ID	UC_008
Description	Before running the election ranking algorithm, the system should prompt the user to provide the filename of the election information file.
Actors	Election officials
Organizational Benefits	Remind users to choose the information file if they forgot to do so. Also make sure the ranking algorithm has input files.
Frequency of use	50%. Users may forget to choose the input file when they are busy.
Triggers	If the users do not manually select the ballot information file and they try to run the ranking algorithm.
Preconditions	User does not manually select the ballot information file and the ranking algorithm has not been executed.
Postconditions	Input file has been chosen.
Main course	1. User views the directory of the program. 2. User selects the correct ballot information file. (see EX1) 3. Confirm to prompt users. (see EX2)
Alternate courses	AC1.Do not prompt users if users select ballot information file 1. Return to main course 1
Exceptions	EX1. Correct ballot information file missing. 1.User does not find the file he/she wants. 2.Cancel and obtain correct ballot information files from other sources. 3.Return to main course step 2 EX2. Ballot information file error. 1.System notifies the error “the format of the input file is wrong”. 2.Return to main course step 3

Name	Ranking algorithm from OPL
ID	UC_009

Description	Ranking algorithm for Open Party List Ballot
Actors	Election officials
Organizational Benefits	Ranking is inevitable. It is the most essential function of this system.
Frequency of use	100%. Every time of voting needs to run the ranking algorithm.
Triggers	Users taps “start ranking” button.
Preconditions	Correct ballot information file has been selected.
Postconditions	Show the results of the actual allocation of seats to the parties.
Main course	<ol style="list-style-type: none"> 1. Make sure ballot information file exists, if not ask user to upload 2. check input file type 3. Running the OPL algorithm(see AC1, EX1) 4. Show the results of the actual allocation of seats to the parties
Alternate courses	AC1. The algorithm produces unsatisfactory result <ol style="list-style-type: none"> 1. Return to main course 3
Exceptions	EX1. Run time error”over time” <ol style="list-style-type: none"> 1.System notifies the error “over time”(running algorithm more than 5 minutes). 2.Return to main course step 3

Name	Ranking algorithm from CPL
ID	UC_010
Description	Ranking algorithm for Closed Party List Ballot
Actors	Election officials
Organizational Benefits	Ranking is inevitable. It is the most essential function of this system.
Frequency of use	100%. Every time of voting needs to run the ranking algorithm.
Triggers	Users taps “Start ranking” button.
Preconditions	Correct ballot information file has been selected.
Postconditions	Show the results of the actual Candidate ranking

Main course	<ol style="list-style-type: none"> 1. Make sure ballot information file exists, if not ask user to upload 2. check input file type 3. Running the CPL algorithm(see AC1, EX1) 4. Show the results of the actual Candidate ranking
Alternate courses	AC1. The algorithm produces unsatisfactory result <ol style="list-style-type: none"> 1. Return to main course 3
Exceptions	EX1. Run time error"over time" <ol style="list-style-type: none"> 1.System notifies the error "over time"(running algorithm more than 5 minutes). 2.Return to main course step 3