

---

# LEVI User Manual

by

Shawn Sullivan

---

## Table of Contents

1. File Structure.....	1
2. Running LEVI and Other Voting Interfaces.....	2
A. LEVI Interface .....	2
B. Diebold Interface .....	2
C. Sequoia Interface .....	3
D. Selecting the Ballot.....	3
3. Ballot File Format.....	3
A. Feedback Options.....	4
B. Election Descriptions .....	5
C. Candidate Descriptions .....	7
D. Example of a Correct Ballot Description File.....	7
4. Audio File Naming Conventions .....	9

---

### 1. File Structure

All voting code should be located in the file “C:\voting\voting\”. This file contains the source and class files for all code for the LEVI, Diebold, and Sequoia interfaces. It also contains appropriate graphics files for these interfaces. This directory also includes at least three subdirectories, “Audio”, “Ballots”, and “LEVIResults”. The Audio directory contains audio files for the interfaces, see section 4. The Ballots directory contains ballot description files for the interfaces, see section 3. The LEVIResults directory stores the results of sequential uses of the LEVI interface. Data files store information about what occurs during a single use of the interface, including what candidates were voted

for and how long the voter spent on each election and the ballot as a whole, in a text file. Also included in the LEVIResults file is a file called "LEVIElectionIndex.txt", stores the index of the next result file to be written to. This file automatically ensures that results files are sequenced in increasing index order. To set the value of the next results file to be used, open the "LEVIElectionIndex.txt" file, change the number stored in the file, and save it. The next results file will have this index, potentially overwriting another file with the same index. It is important never to delete the index file, because if it is not present, errors will occur, and no election data will be stored. Other results subdirectories in "C:\voting\voting\" may exist, such as "SequoiaResults" and "DieboldResults". These files have identical structure and behavior to "LEVIResults", except the name of the voting interface is changed as appropriate.

## 2. Running LEVI and Other Voting Interfaces

Each voting interface should have a file on the desktop which opens and runs that particular voting interface. These files should be called "LEVI," "Diebold," and "Sequoia," and correspond to the voting interface of the same name. These files are batch files which run two DOS commands which open the appropriate interface. The commands in the batch files may also be entered line by line at the command prompt to open the appropriate voting interface. The content of these files should be the following

### A. *LEVI Interface*

The following commands should be in the file "LEVI.bat" on the desktop. Executing these commands sequentially at the command prompt produces the same result as opening this file.

```
cd C:\voting
java voting.Ballot
```

Alternatively, entering

```
java voting.Main
```

should also run the LEVI interface from the command prompt.

### B. *Diebold Interface*

The following commands should be in the file "Diebold.bat" on the desktop. Executing these commands sequentially at the command prompt produces the same result as opening this file.

```
cd C:\voting
java voting.DieboldBallot
```

Alternatively, entering

```
java voting.Main Diebold
```

should also run the Diebold interface from the command prompt.

### **C. Sequoia Interface**

The following commands should be in the file "Sequoia.bat" on the desktop. Executing these commands sequentially at the command prompt produces the same result as opening this file.

```
cd C:\voting
java voting.SequoiaBallot
```

Alternatively, entering

```
java voting.Main Sequoia
```

should also run the Sequoia interface from the command prompt.

### **D. Selecting the Ballot**

Once the appropriate ballot has been opened, a file chooser will open to allow the ballot to be used to be selected. The default directory for storing ballots is "C:\voting\voting\Ballots." Ballots should be stored either in this directory or subdirectories of this directory. However, it is possible to locate a ballot stored anywhere on the computer by navigating the file system in the file chooser. See section ## for information on formatting individual ballot files.

After selecting the ballot, the appropriate interface will load and appear with the appropriate ballot display.

## **3. Ballot File Format**

Ballots must be stored in a specific file format. The general format is

```
<feedback options>
<election_1 description>
<candidate descriptions>

<election_2 description>
<candidate descriptions>

...

<election_n description>
<candidate descriptions>
```

where  $n$  is the number of elections on the ballot. The name of a ballot should be “<ballotname>.txt”, where <ballotname> is the name of the ballot, without angle braces, and .txt indicates that the file is a standard text file.

### **A. Feedback Options**

The first few lines of the ballot must be used to specify the forms of feedback to be provided to the voter on this ballot. Three forms of feedback are available, each with their own keywords to indicate that a particular form of feedback should be used.

To enable audio feedback to the user, the keyword `useaudio` must be included in the feedback options.

To enable contemporaneous printing feedback to the user, the keyword `usecontemp` must be included in the feedback options.

To enable a final receipt printout to be given to the user at the end of the election to be given to the user, the keyword `usepaper` must be included in the feedback options.

All feedback option keywords must be entered before the descriptions of any elections are entered, or an error will result. The feedback options may be entered in any order at the beginning of the ballot file. No empty lines should occur between keywords, or erroneous behavior may result. For example,

```
useaudio
```

```
usepaper
```

produces an error, whereas

```
useaudio
```

```
usepaper
```

does not, because the former contains an extra line between the keywords.

Extra lines may be placed between the feedback options keywords and the first election description without error.

Including no feedback options does not produce an error, but creates a system in which no feedback other than changes to ballot appearance is given to the voter.

## **B. Election Descriptions**

After feedback options have been entered, election descriptions may be entered. Each election description must be preceded by at least one empty line. Each election description must be exactly one line in the text ballot description file, but this line may be of any number of characters. An election description has the form

```
election_name - number_of_votes - errors
```

The three parts of the election description are separated by hypens, and so the three parts are `election_name`, `number_of_votes`, and `errors`. The values entered in these parts should not include hyphens.

`election_name` must be included, and should be the name of the election exactly as it is to appear on the ballot. All capitalization, punctuation, and abbreviation used in `election_name` appear on the ballot exactly as they do in `election_name`.

`number_of_votes` specifies the number of votes a voter is allowed to cast in a given election. It is an optional field in the election description as long as no errors are also specified. If `number_of_votes` is not included in the election description, the number of votes allowed by the voter is assumed to be one. It is important to note that if `errors` is to have a value, then `number_of_votes` must be specified, or an error will occur.

`errors` specifies any errors which are intentionally made on the ballot. These errors occur only in the feedback given to the voter, not in the appearance of the ballot or actual recording of the votes. There are two types of errors which may be made:

- 1) Candidate error: An error may be made such that the incorrect candidate is given as feedback to the voter when they cast a vote in this race. For example, if audio feedback is enabled, a voter may touch the screen for a particular candidate and see the screen behave as if a vote for that candidate had been cast, but the name of a different candidate will be given to them with the audio feedback. A candidate error is made by entering the full name of the candidate as it appears on the ballot in the `errors` section of the election description. As many candidate errors may be specified as the number of votes a voter is allowed to cast in an election, so that the first vote has one error, the second a different error, and so forth. Multiple errors in a multiple vote election may be specified by entering each error candidate's name as it appears on the ballot in the `errors` section, with each candidate's name separated by commas. Multiple errors are given in the order in which they are specified in the `errors` section.

- 2) Vote Omission error: An error may be created such that the voter receives feedback as if no vote was cast in an election. For example, if the final receipt printout is enabled, the receipt will show "NO VOTE" for an election with a vote omission error, even if the voter cast a vote in that election. This error may be enabled by entering "no vote" in the errors section. This error is not case sensitive. Vote omission errors may not be combined with candidate errors in the same election.

Examples of correct election descriptions and what they indicate include

President

- An election named "President" in which a voter may cast one vote and no feedback errors occur.

President - 1

- An election named "President" in which a voter may cast one vote and no feedback errors occur.

President - 1 - George W. Bush

- An election named "President" in which a voter may cast one vote and a candidate error indicating George W. Bush occurs.

President - no vote

- An election named "President" in which a voter may cast one vote and vote omission error occurs.

City Council - 3

- An election named "City Council" in which a voter may cast three votes and no feedback errors occur.

City Council - 3 - James Patrick, Arthur Richardson

- An election named "City Council" in which a voter may cast three votes and two candidate errors, first for James Patrick and then for Arthur Richardson, occur. Since no third candidate error is specified, the third vote is handled normally.

City Council - 3 - no vote

- An election named "City Council" in which a voter may cast three votes and a vote omission error occurs for all three votes.

Examples of illegal election descriptions include

President - George W. Bush

- The intent is to create a candidate error in a single vote election called "President", but the format is incorrect. The format from the third example above should be used.

President - 1 - George W. Bush, John Kerry

- Only one candidate error may be specified since only one vote may be cast, so the additional candidate error for John Kerry does not occur.

### **C. Candidate Descriptions**

Candidate descriptions should be of the form

```
<candidate_name> - <candidate_party>
```

where <candidate\_name> is the name of the candidate as it is to appear on the ballot and <candidate\_party> is the name of the party associated with the candidate as it is to appear on the ballot.

Candidate descriptions must not be preceded in the file describing the ballot by an empty line. An example of valid candidate descriptions in an election is

```
President - 1
George W. Bush - Republican
John Kerry - Democrat
Ralph Nader - Green
```

- This specifies an election named "President" where a voter is allowed one vote and the candidates are the three listed here.

An example of invalid candidate descriptions in an election is

```
President - 1
George W. Bush
John Kerry - Democrat
```

```
Ralph Nader - Green
```

- Here the description for George W. Bush is invalid because it does not include a party, and the description for Ralph Nader is invalid because it is preceded by an empty line. Both descriptions produce errors.

### **D. Example of a Correct Ballot Description File**

The following ballot description is correct.

```
useaudio
usepaper
usecontemp
PRESIDENT OF THE U.S.
Charles P. GATTY - Republican
Robert S. JONES - Democrat
Clark HANFORD - Independence
```

Tom WATERBERG - Buchanan  
Jack SPARROW - Green  
Jason VORHEES - Socialist Workers  
Harry BROWNE - Libertarian

U.S. SENATOR - 1 - no vote  
Gerald C. WUTHRFORD - Republican  
Leonard HAYES - Democrat  
Jeffrey PODHAM - Independence  
Mark J. SMITH - Green  
Jacob REYNOLDS - Socialist Workers

CITY COUNCIL - 4 - Roger RICARDO, James FORD  
Marylin ROBERTSON - Republican  
Roger RICARDO - Republican  
Clifton R. HUXLEY - Republican  
Richard MACARTHUR - Republican  
Stephen P. MONROE - Democrat  
Timothy J. JONES - Democrat  
Leslie S. LAZANBY - Democrat  
Arthur DOOSEBURY - Democrat  
James FORD - Independence  
Paul GREENBURG - Independence  
Peter RORSCHAT - Buchannan  
Theodore LOGAN - Green  
Bill S. PRESTON - Green  
Bradley AITKEN - Socialist Workers  
Luke DEFEO - Socialist Workers  
Jason BASS - Socialist Workers  
Daniel G. WALKER - Libertarian  
Ira E. PHILLIPS - Libertarian

CONGRESSIONAL REPRESENTATIVE - 1  
Brian K. MORRIS - Republican  
Oren BERNSTEIN - Democrat  
Patrick T. CALBERS - Independence  
Jon L. CALLUZZO - Green  
Joseph P. MARTORE - Socialist Workers  
Nicholas A. KNOL - Libertarian

It specifies a ballot with four elections that uses audio feedback, contemporaneous printing feedback, and a final paper receipt to be given to the voter. The first election named "PRESIDENT OF THE U.S." allows one vote and has no errors. The second election named "U.S. SENATOR" allows one vote to be cast and has a vote omission error. The third election named "CITY COUNCIL" allows four votes to be cast and contains two candidate errors, the first for "Roger RICARDO" and the second for "James FORD." The fourth

election named "CONGRESSIONAL REPRESENTATIVE" allows one vote to be cast and has no errors.

#### **4. Audio File Naming Conventions**

Audio files for audio feedback may be prerecorded. If files are not prerecorded or cannot be found by the ballot, then they are automatically generated by a text-to-speech program. If recorded files are to be used, they must be in the file

"C:\voting\voting\Audio\". Audio files should be .wav files. Audio files may be recorded for both candidate names and election names. In both cases the audio files should be the full name of the candidate or election, without punctuation, and all lower case. So, for example, a file recorded for a candidate named "George W. BUSH" should be saved as "georgewbush.wav" and a file recorded for "PRESIDENT OF THE U.S." should be saved as "presidentoftheus.wav".