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| **Project Name: Project 1: Voting System Team# 14** | |
| **Test Stage: Unit x\_\_ System \_\_** | **Test Date: 11/4/18** |
| **Test Case ID#: 1** | **Name(s) of Testers: Meghann** |
| **Test Description:** This unit test tests the methods of the IRV ballot class after instantiating and initializing a known IRV ballot. Additionally, since the IRV ballot class extends the ballot class, methods from that class are also verified. | |
| **Automated: yes \_x\_ no \_\_\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  Stored in: Project1/src/test/votingsystems/TestIRVBallot.java  Functions: testIsExhausted(), testGetNextVote(), testGetID()  Helper Functions: testBallotInitialize() |
| **Results: Pass \_x\_\_ Fail\_\_\_\_\_\_\_\_** |  |
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| **Preconditions for Test:**   * An IRV Ballot is initialized with votes and an id | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | testBallotInitialize – a ballot used for testing is initialized | Arraylist of votes, ID | IRVBallot is initialized | IRV Ballot is initialized | Method called before each test |
| 2 | Test getNextVote | IRV ballot | 1 / testVotes.get(0) | 1 | pass |
| 3 | Test isExhausted | Irv ballot | False | False | Pass |
| 4 | Test getID – tests if ID of ballot is retrieved | IRV Ballot | 4 | 4 | Pass |

**Post condition(s) for Test:**

The correct vote is provided and saved as an int and a Boolean is returned showing if the number of votes is exhausted

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| **Project Name: Project 1: Voting System Team# 14** | |
| **Test Stage: Unit x\_\_ System \_\_** | **Test Date: 11/4/18** |
| **Test Case ID#: 2** | **Name(s) of Testers: Meghann** |
| **Test Description:**  This unit test tests the methods of the IRV candidate class after instantiating and initializing a known IRV ballot and candidate. Additionally, since the IRV candidate class extends the candidate class, methods from that class are also verified. | |
| **Automated: yes x\_\_\_ no \_\_\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  Stored in: Project1/src/test/votingsystems/TestIRVCandidate.java  Functions: testAddBallot(), testEliminate(), testIsEliminated(), testGetNumVotes()  Helper Functions: initializeTestBallot() |
| **Results: Pass x\_\_\_ Fail\_\_\_\_\_\_\_\_** |  |
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| **Preconditions for Test:**   * testBallot and Candidate are initialized with dummy data | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | initalizeTestBallot – adds votes to a vote arraylist and initializes IRVballot | Arraylist of votes, irv ballot | Initialized IRVBallot with votes and id | Initialized IRVBallot | Initializer |
| 2 | testAddBallot – tests the add ballot function of IRVCandidate | IRV Ballot, IRV Candidate, ArrayList for eliminated candidate’s ballot | Ballot added == ballot added to eliminated ballots | Equivalence holds true | Pass |
| 3 | testEliminate – test eliminate function of IRV Candidate | Irv ballot, IRV Candidate, array of IRVBallots | Array of ballots added == array of ballots eliminated | For one ballot, result is equivalent | Pass; may need to expand to test for multiple ballots |
| 4 | testIsEliminated – tests if candidate reflects eliminated after being eliminated | IRV Ballot, IRV Candidate | testCandidate.isEliminated() == true | testCandidate.isEliminated() == true | pass |
| 5 | testGetName – tests method from candidate.java | IRV candidate | “Jenny” | “Jenny” | pass |
| 6 | testGetNumVotes – tests method from candidate class | IRV Ballot and candidate | 1 | 1 | pass |

**Post condition(s) for Test:**

After test is run, each public method of IRVCandidate class and Candidate class are verified to work for at least one ballot.

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| **Project Name: Project 1: Voting System Team# 14** | |
| **Test Stage: Unit x\_\_ System \_\_** | **Test Date: 11/4/18** |
| **Test Case ID#: 3** | **Name(s) of Testers: Meghann** |
| **Test Description:**  This unit test tests the methods of the IRV class through creating mock election files and known audit file results. | |
| **Automated: yes x\_\_\_ no \_\_\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  *Stored in:* Project1/src/test/votingsystems/TestIRV.java  *Functions:* testIRVRandomWinner(), testRunElectionEfficiency(), testIRVMajorityPopularVote(), testIRVTenThousandVotes(), testIRVOneVote(), testIRVOneCandidate(), testIRVNoMajorityPopularVote(), testIRVConsequentialTieTwoCandidates()  *Helper Functions:* testFileAuditPair(), testFileAuditPairRandomMsg() |
| **Results: Pass x\_\_\_ Fail\_\_\_\_\_\_\_\_** |  |
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| **Preconditions for Test:**   * The election files for each specific case of an election are created and stored in the testing directory * The expected audit files for each specific case are created and stored in the testing directory | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | testRunElectionEfficiency – tests the time it takes to run the election for 100,000 votes in milliseconds | Test time in milliseconds | Test time is < 8 minutes | Test time < 8 minutes | 8 minutes = 480,000 milliseconds  Pass |
| 2 | testIRVRandomWinner – test if the election outputs the correct audit file when a winner is chosen at random | randomWinner.txt – election file for a random winner | The election winner is one of the three expected candidates  This string is expected in the audit file: "NOTE: This elimination was the result of a random toss due to a consequential tie in least amount of votes.” | The election winner is one of the three expected candidates  The expected string was found in the audit file | Pass |
| 3 | testIRVMajorityPopularVote – test if the election outputs the correct audit file when there is a winner by majority popular vote | majorityPopularVote.txt – election file for a winner by majority vote  majorityPopularVoteAudit.txt – expected audit file to be produced | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 4 | testIRVTenThousandVotes – test if the election outputs the correct audit file when there is 10,000 ballots | tenThousandVotes.txt – election file with 10,000 ballots  tenThousandVotesAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 5 | testIRVOneVote() – test if the election outputs the correct audit file when there is only one ballot | oneVote.txt – election file with one ballot and multiple candidates  oneVoteAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 6 | testIRVOneCandidate() – test if the election outputs the correct audit file when there is only one candidate | oneCandidate.txt – election file with one candidate  oneCandidateAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 7 | testIRVNoMajorityPopularVote() – test if the election outputs the correct audit file when there is no winner | noMajorityPopularVote – election file with no winner by majority popular vote  noMajorityPopularVoteAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 8 | testIRVConsequentialTieTwoCandidates() – test if the election outputs the correct audit file when there is a Tie between two candidates | consequentialTieTwoCandidates.txt – election file with a tie between two candidates  consequentialTieTwoCandidatesAudit.txt – an expected audit file | The election winner is one of the two expected candidates  This string is expected in the audit file: "NOTE: This elimination was the result of a random toss due to a consequential tie in least amount of votes.” | The election winner is one of the two expected candidates  This string is expected in the audit file: "NOTE: This elimination was the result of a random toss due to a consequential tie in least amount of votes.” | Pass |

**Post condition(s) for Test:**

After test is run, audit files are produced for each method testing a certain type of election.

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| **Project Name: Project 1: Voting System Team#14** | |
| **Test Stage: Unit x\_\_ System \_\_** | **Test Date: 11/11/18** |
| **Test Case ID#: 4** | **Name(s) of Testers: Jake Nippert** |
| **Test Description:**  **The Mariah File Chooser GUI allows the user to select a file or open a file by name manually and initializes the processing of this election file.** |  |
| **Automated: yes\_\_\_ no \_x\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  **Project1/testing/MariahGUI/FileChooser\***  **Project1/testing/MariahGUI/ManualEntry\***  **Project1/testing/MariahGUI/Snow\***  **Project1/testing/MariahGUI/NoGUI\*** |
| **Results: Pass \_\_x\_\_ Fail\_\_\_\_\_\_\_\_** |  |
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| **Preconditions for Test: No command line arguments are passed in to MariahEP when running main.** | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | Run java MariahEP | N/A | Opens GUI and with system file chooser and a manual entry | Opens GUI and with system file chooser and a manual entry | Pass |
| 2 | Open file from system file chooser | Election File | Processes election file in main | Processes election file | Pass |
| 3 | Open file from manual file name entry | Election File | Processes election file in main | Processes election file | Pass |
| 4 | Click snow button on header label (Repeat 2-3 with expected outputs) | Election File | Snows in background and processes election file in main | Snows in background and processes election file in main | Pass |
| 5 | NoGUI command line | N/A | No GUI is displayed | No GUI is displayed | PASS |

**Post condition(s) for Test:**

Election file is not changed. State of system is changed as an Audit file will have been produced and the election results GUI will be displayed.

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| **Project Name: Project 1: Voting System Team#14** | |
| **Test Stage: Unit x\_\_ System \_\_** | **Test Date: 11/11/18** |
| **Test Case ID#: 5** | **Name(s) of Testers: Jake Nippert** |
| **Test Description:**  **The Mariah Election Results GUI allows the user to view the immediate results of the election as well as open the audit file that was produced.** |  |
| **Automated: yes\_\_\_ no \_x\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  **Project1/testing/MariahGUI/ElectionResults\*** |
| **Results: Pass \_\_x\_\_ Fail\_\_\_\_\_\_\_\_** |  |
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| **Preconditions for Test: The command line argument “NoGUI” was NOT passed in to MariahEP when running main.** | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | Run java MariahEP | Election File | Results are placed in the GUI Election Results | Results are placed in the GUI Election Results | Pass |
| 2 | Clicking Open Audit File makes a system call open of the audit file | N/A | Opens the correct Audit File | Opens the correct Audit File | Pass |
| 3 | Exiting returns the user to the File Chooser GUI to restart the process | N/A | User returns to File Chooser GUI | User returns to File Chooser GUI | Pass |
| 4 | Repeat Unit Test Case ID #8 | N/A | Passes all Test ID #4 Use Cases | Passes all Test ID #4 Use Cases | Pass |

**Post condition(s) for Test:**

Election file is not changed. State of system is changed as an Audit file will have been produced and the election results GUI will be displayed.

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| **Project Name: Project 1: Voting System Team#14** | |
| **Test Stage: Unit x\_\_ System \_\_** | **Test Date: 11/12/18** |
| **Test Case ID#: 6** | **Name(s) of Testers: Christine Tsai** |
| **Test Description:**  These unit tests ensure that the Auditor is correctly initialized and appends strings to the correct parts of the auditor file. It also makes sure that the audit file created contains the correct information. |  |
| **Automated: yes\_x\_\_ no \_\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  Project1/testing/Auditor/TestAuditor.java  testAuditProcess(), testAuditResult(), testAuditSetup(), testAuditStructure(), testCreateAuditFile() |
| **Results: Pass \_\_x\_\_ Fail\_\_\_\_\_\_\_\_** |  |
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| **Preconditions for Test:** No preconditions**.** | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | initializeTestAuditor() – initializes an Auditor object for testing | Arraylist of random test strings | The Auditor object used for testing is initialized | The Auditor object used for testing is initialized |  |
| 2 | Test auditProcess | Arraylist of random test strings | Only audit process is present in audit file | Only audit process is present in audit file | Pass |
| 3 | Test auditResult | Arraylist of random test strings | Only audit result is present in audit file | Only audit result is present in audit file | Pass |
| 4 | Test auditSetup | Arraylist of random test strings | Only audit setup is present in audit file | Only audit setup is present in audit file | Pass |
| 5 | Test auditStructure | Arraylist of random test strings | Process, result and setup are present in correct order and separated properly | Process, result and setup are present in correct order and separated properly | Pass |
| 6 | Test createAuditFile | Arraylist of random test strings | Audit file is created on system | Audit file is created on system | Pass |
| 7 | testAuditStructureSPR – test audit structure with set up, process and results | Arraylist of random test strings | The output would be the audit’s set up, process, and string in the respective order | The output would be the audit’s set up, process, and string in the respective order | pass |
| 8 | testAuditStrucutreSP – test audit structure with set up and process | Arraylist of random test strings | The output would be the audit’s set up and process in the respective order | The output would be the audit’s set up and process in the respective order | pass |
| 9 | testAudStructureSR – test audit structure with set up and results | Arraylist of random test strings | The output would be the audit’s set up and results in the respective order | The output would be the audit’s set up and results in the respective order | pass |
| 10 | testAuditStucturePR – test audit structure process and result | Arraylist of random test strings | The output would be the audit’s process and results in the respective order | The output would be the audit’s process and results in the respective order | pass |
| 11 | testCreateAuditFile – test creating an auto file | Arraylist of random test strings | An audit file is created | An audit file is created | pass |

**Post condition(s) for Test:**

System state is unchanged because test audit files that are produced are deleted after all lines are read.

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| **Project Name: Project 1: Voting System Team# 14** | |
| **Test Stage: Unit \_\_ System \_x\_** | **Test Date: 11/4/18** |
| **Test Case ID#: 7** | **Name(s) of Testers: Meghann, Cassandra, Jake** |
| **Test Description:**  This test runs all of our unit tests and essentially tests proper functionality of the driver class. | |
| **Automated: yes x\_\_\_ no \_\_\_** | **Indicate where are you storing the tests (what file) and the name of the method/functions being used.**  *Stored in:* Project1/src/test/main/TestMariahEP.java  *Functions:* testMainIRVRandomWinner(), testMainIRVMajorityPopularVote(), testMainIRVTenThousandVotes(), testMainIRVOneVote(), testMainIRVOneCandidate(), testMainIRVNoMajorityPopularVote(), testMainIRVConsequentialTieTwoCandidates()  *Helper Functions:* testFileAuditPair(), testFileAuditPairRandomMsg() |
| **Results: Pass x\_\_\_ Fail\_\_\_\_\_\_\_\_** |  |
|  |  |
| **Preconditions for Test:**   * The election files for each specific case of an election are created and stored in the testing directory * The expected audit files for each specific case are created and stored in the testing directory | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 |  |  |  |  |  |
| 2 | testMainIRVRandomWinner – test if the election outputs the correct audit file when a winner is chosen at random | randomWinner.txt – election file for a random winner | The election winner is one of the three expected candidates  This string is expected in the audit file: "NOTE: This elimination was the result of a random toss due to a consequential tie in least amount of votes.” | The election winner is one of the three expected candidates  The expected string was found in the audit file | Pass |
| 3 | testMainIRVMajorityPopularVote – test if the election outputs the correct audit file when there is a winner by majority popular vote | majorityPopularVote.txt – election file for a winner by majority vote  majorityPopularVoteAudit.txt – expected audit file to be produced | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 4 | testMainIRVTenThousandVotes – test if the election outputs the correct audit file when there is 10,000 ballots | tenThousandVotes.txt – election file with 10,000 ballots  tenThousandVotesAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 5 | testMainIRVOneVote() – test if the election outputs the correct audit file when there is only one ballot | oneVote.txt – election file with one ballot and multiple candidates  oneVoteAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 6 | testMainIRVOneCandidate() – test if the election outputs the correct audit file when there is only one candidate | oneCandidate.txt – election file with one candidate  oneCandidateAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 7 | testMainIRVNoMajorityPopularVote() – test if the election outputs the correct audit file when there is no winner | noMajorityPopularVote – election file with no winner by majority popular vote  noMajorityPopularVoteAudit.txt – expected audit file | The audit file produced matches the expected audit file exactly | The audit file produced matches the expected audit file exactly | Pass |
| 8 | testMainIRVConsequentialTieTwoCandidates() – test if the election outputs the correct audit file when there is a Tie between two candidates | consequentialTieTwoCandidates.txt – election file with a tie between two candidates  consequentialTieTwoCandidatesAudit.txt – an expected audit file | The election winner is one of the two expected candidates  This string is expected in the audit file: "NOTE: This elimination was the result of a random toss due to a consequential tie in least amount of votes.” | The election winner is one of the two expected candidates  This string is expected in the audit file: "NOTE: This elimination was the result of a random toss due to a consequential tie in least amount of votes.” | Pass |
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| 9 | testMainOPLVOneSeatOneWinner – test an election where there is one seat and one winner with six candidates | oneSeatOneWinner election file | Naruto (Senju) | Naruto (Senju) | pass |
| 10 | testMainOPLVOneSeatOneWinnerOneVote –  test an election where there is one seat and one winner with six candidates with only one vote cast | oneSeatOneWinnerOneVote election file | Naruto (Senju) | Naruto (Senju) | pass |
| 11 | testMainOPLVSixSeatsSixCandidatesEqual – test an election where there is six seats and all candidates receive one vote | sixSeatsSixCandidatesEqual election file | All candidates win a seat | All candidates win a seat | pass |
| 12 | testMainOPLVConsequentialPartyTieTwoCandidates – test an election where there is a consequential tie between candiates on the same party | consequentialPartyTieTwoCandidates | One of the two candidates that are tied win the seat with a random flip | One of the two candidates that are tied win the seat with a random flip | pass |

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| 13 | testMainOPLVtwoSeatsFiveCandidatesTenVotes - test an election where there is two seats with five candidates and the remaining seat goes to the party with the largest remainder. | twoSeatsFiveCandidatesTen  Votes | Election Winners: Naruto (Senju)  Sakura (Akatsuki) | Election Winners: Naruto (Senju)  Sakura (Akatsuki) | pass |
| 14 | testMainOPLVtwoSeatsFiveCandidatesUnequal –  Test an election where there are two seats with five candidates and the party with the largest remainder does not have a candidate to fill seat so the seat is allocated to the next party with the next highest largest remainder. | twoSeatsFiveCandidatesUneq  ual | Election Winners: Naruto (Senju)  Sai (Anbu) | Election Winners: Naruto (Senju)  Sai (Anbu) | pass |

**Post condition(s) for Test:**

After test is run, audit files are produced for each method testing a certain type of election.