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| **Project Name: Project 1: Voting System Team#08** | |
| **Test Stage: Unit \_\_ System \_\_X** | **Test Date: 3/24/2023** |
| **Test Case ID#: SystemIR\_01** | **Name(s) of Testers: Ugtakhbayar Battulga** |
| **Test Description:**Testing the whole system with an IR election input ballot “IRElectionTests\_DropTie.csv”. The csv is an instance of an IR election that has a tie for which candidate to be dropped. | When running this test all files are in the same working directory which can be found in Project1/src. The csv files can be found in Project1/testing. The csv file used in this specific test is called IRElectionTests\_DropTie.csv |
| **Automated: yes\_\_\_ no \_X\_\_** |  |
| **Results: Pass \_\_\_\_X\_ Fail\_\_\_\_\_\_\_\_** |  |
|  |  |
| **Preconditions for Test:**  An IRElection csv file is required to be in the Project1/testing directory titled “IRElectionTest\_DropTie.csv”. Makefile was called and exe files are ready to call. | |

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| **Step**  **#** | **Test Step**  **Description** | **Test**  **Data** | **Expected**  **Result** | **Actual**  **Result** | **Notes** |
| 1 | Running the system using  ./2-TypeElection.exe | N/A | N/A | N/A | Running without command line argument. |
| 2 | Entering file name when prompted. | ../testing/IRElecitonTests\_DropTie.csv | N/A | N/A | System should now have the file |
| 3 | Entering the date of the IR election in format MMDDYYYY | Date in 03262001 format | N/A | N/A | Sets the date used for the audit file. |
| 4 | Election runs. | ../testing/IRElecitonTests\_DropTie.csv | Expected results can be found below for both the terminal and the audit file | Actual results matched the expected results. Checked manually | The expected results and the actual results were manually checked and matched. Since there is a tie present there are multiple expected outputs depending on who gets dropped all expected outputs for the sudit file and the terminal output can be found below. |

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

Audit file “03262001IR.txt” is created and results of the Election are printed to the terminal.

Test Passed

expectedResult1 for audit file:

      "IRElection\n"

      "Number of Candidates: 5\n"

      "Candidate 1: A\n"

      "Candidate 2: B\n"

      "Candidate 3: C\n"

      "Candidate 4: D\n"

      "Candidate 5: E\n"

      "Number of ballots: 12\n"

      "Ballot ID: 1 Ballot Info: 1,,3,2,\n"

      "Ballot ID: 2 Ballot Info: ,,1,2,3\n"

      "Ballot ID: 3 Ballot Info: 2,1,,3,4\n"

      "Ballot ID: 4 Ballot Info: ,2,,1,\n"

      "Ballot ID: 5 Ballot Info: 1,,,,\n"

      "Ballot ID: 6 Ballot Info: 2,1,,,\n"

      "Ballot ID: 7 Ballot Info: 4,3,,1,2\n"

      "Ballot ID: 8 Ballot Info: 1,,3,4,2\n"

      "Ballot ID: 9 Ballot Info: ,,1,2,\n"

      "Ballot ID: 10 Ballot Info: 3,4,5,2,1\n"

      "Ballot ID: 11 Ballot Info: 3,2,5,1,4\n"

      "Ballot ID: 12 Ballot Info: ,1,3,,2\n"

      "Counting Ballots\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #3\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #3\n"

      "Ballot #10 went to Candidate #5\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 3 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 2 vote(s)\n"

      "Candidate #4 received 3 vote(s)\n"

      "Candidate #5 received 1 vote(s)\n"

      "No Majority Found with more than 2 Candidates remaining\n"

      "Dropped Candidate Name: E\n"

      "Redistribute Votes\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #3\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #3\n"

      "Ballot #10 went to Candidate #4\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 3 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 2 vote(s)\n"

      "Candidate #4 received 4 vote(s)\n"

      "Candidate #5 received 0 vote(s)\n"

      "No Majority Found with more than 2 Candidates remaining\n"

      "Dropped Candidate Name: C\n"

      "Redistribute Votes\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #4\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #4\n"

      "Ballot #10 went to Candidate #4\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 3 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 0 vote(s)\n"

      "Candidate #4 received 6 vote(s)\n"

      "Candidate #5 received 0 vote(s)\n"

      "No Majority Found with more than 2 Candidates remaining\n"

      "Tie Has Occurred\n"

      "Candidate dropped based of tieLoser: B\n"

      "Redistribute Votes\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #4\n"

      "Ballot #3 went to Candidate #1\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #1\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #4\n"

      "Ballot #10 went to Candidate #4\n"

      "Ballot #11 went to Candidate #4\n"

      "Candidate #1 received 5 vote(s)\n"

      "Candidate #2 received 0 vote(s)\n"

      "Candidate #3 received 0 vote(s)\n"

      "Candidate #4 received 6 vote(s)\n"

      "Candidate #5 received 0 vote(s)\n"

      "Remaining 2 Candidates with no majority move to popularity\n"

      "Winner is: D with 6 Votes\n"

expectedResult2 for audit file:

      "IRElection\n"

      "Number of Candidates: 5\n"

      "Candidate 1: A\n"

      "Candidate 2: B\n"

      "Candidate 3: C\n"

      "Candidate 4: D\n"

      "Candidate 5: E\n"

      "Number of ballots: 12\n"

      "Ballot ID: 1 Ballot Info: 1,,3,2,\n"

      "Ballot ID: 2 Ballot Info: ,,1,2,3\n"

      "Ballot ID: 3 Ballot Info: 2,1,,3,4\n"

      "Ballot ID: 4 Ballot Info: ,2,,1,\n"

      "Ballot ID: 5 Ballot Info: 1,,,,\n"

      "Ballot ID: 6 Ballot Info: 2,1,,,\n"

      "Ballot ID: 7 Ballot Info: 4,3,,1,2\n"

      "Ballot ID: 8 Ballot Info: 1,,3,4,2\n"

      "Ballot ID: 9 Ballot Info: ,,1,2,\n"

      "Ballot ID: 10 Ballot Info: 3,4,5,2,1\n"

      "Ballot ID: 11 Ballot Info: 3,2,5,1,4\n"

      "Ballot ID: 12 Ballot Info: ,1,3,,2\n"

      "Counting Ballots\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #3\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #3\n"

      "Ballot #10 went to Candidate #5\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 3 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 2 vote(s)\n"

      "Candidate #4 received 3 vote(s)\n"

      "Candidate #5 received 1 vote(s)\n"

      "No Majority Found with more than 2 Candidates remaining\n"

      "Dropped Candidate Name: E\n"

      "Redistribute Votes\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #3\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #3\n"

      "Ballot #10 went to Candidate #4\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 3 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 2 vote(s)\n"

      "Candidate #4 received 4 vote(s)\n"

      "Candidate #5 received 0 vote(s)\n"

      "No Majority Found with more than 2 Candidates remaining\n"

      "Dropped Candidate Name: C\n"

      "Redistribute Votes\n"

      "Ballot #1 went to Candidate #1\n"

      "Ballot #2 went to Candidate #4\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #5 went to Candidate #1\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #1\n"

      "Ballot #9 went to Candidate #4\n"

      "Ballot #10 went to Candidate #4\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 3 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 0 vote(s)\n"

      "Candidate #4 received 6 vote(s)\n"

      "Candidate #5 received 0 vote(s)\n"

      "No Majority Found with more than 2 Candidates remaining\n"

      "Tie Has Occurred\n"

      "Candidate dropped based of tieLoser: A\n"

      "Redistribute Votes\n"

      "Ballot #1 went to Candidate #4\n"

      "Ballot #2 went to Candidate #4\n"

      "Ballot #3 went to Candidate #2\n"

      "Ballot #4 went to Candidate #4\n"

      "Ballot #6 went to Candidate #2\n"

      "Ballot #7 went to Candidate #4\n"

      "Ballot #8 went to Candidate #4\n"

      "Ballot #9 went to Candidate #4\n"

      "Ballot #10 went to Candidate #4\n"

      "Ballot #11 went to Candidate #4\n"

      "Ballot #12 went to Candidate #2\n"

      "Candidate #1 received 0 vote(s)\n"

      "Candidate #2 received 3 vote(s)\n"

      "Candidate #3 received 0 vote(s)\n"

      "Candidate #4 received 8 vote(s)\n"

      "Candidate #5 received 0 vote(s)\n"

      "Remaining 2 Candidates with no majority move to popularity\n"

      "Winner is: D with 8 Votes\n"

expectedResult1 for terminal output:

      "Election type: IR\n"

      "Number of candidates: 5\n"

      "Number of ballots cast: 12\n"

      "IR Election results in last round: \n"

      "Number of votes for candidate number 1: 0 (0.00%)\n"

      "Number of votes for candidate number 2: 3 (25.00%)\n"

      "Number of votes for candidate number 3: 0 (0.00%)\n"

      "Number of votes for candidate number 4: 8 (66.67%)\n"

      "Number of votes for candidate number 5: 0 (0.00%)\n"

      "Winner: D\n"

expectedResult1 for terminal output:

      "Election type: IR\n"

      "Number of candidates: 5\n"

      "Number of ballots cast: 12\n"

      "IR Election results in last round: \n"

      "Number of votes for candidate number 1: 5 (41.67%)\n"

      "Number of votes for candidate number 2: 0 (0.00%)\n"

      "Number of votes for candidate number 3: 0 (0.00%)\n"

      "Number of votes for candidate number 4: 6 (50.00%)\n"

      "Number of votes for candidate number 5: 0 (0.00%)\n"

      "Winner: D\n"