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**Step 4**

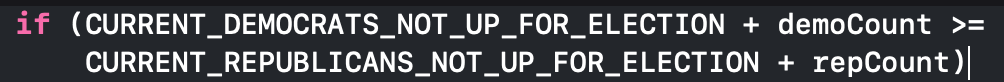
|  |  |  |
| --- | --- | --- |
| Input | Output | Explanation |
| In the 35 Senate seats up for election in 2022,  how many went for Democrats? 35  how many went for Republicans? 0 | Looks like the Senate will be controlled by Democrats | The result makes sense because if the Democrats win all 35 available Senate seats, they will have more total Senate seats and will control the Senate. |
| In the 35 Senate seats up for election in 2022,  how many went for Democrats? 13  how many went for Republicans? 22 | Looks like the Senate will be controlled by Republicans | The result makes sense because if the Republicans win 22 seats, they will have 51 seats in the Senate, giving them majority control over the Democrats. |

**Step 5**

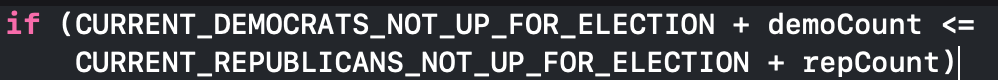
|  |  |  |
| --- | --- | --- |
| In the 35 Senate seats up for election in 2022,  how many went for Democrats? 100  how many went for Republicans? 20 | Looks like the Senate will be controlled by Democrats  Something looks awry with the numbers... | My input doesn’t make sense logically, but the program is able to recognize that there is something wrong with the input integers. The issue is that the number of Senate seats won by any one party (Democrats) is greater than the number of Senate seats available in the current election(and in the Senate as a whole). |
| In the 35 Senate seats up for election in 2022,  how many went for Democrats? -35  how many went for Republicans? 70 | Looks like the Senate will be controlled by Republicans | The program should recognize that negative values aren’t valid and warn you, but it carries on with the code and says the Republicans will control the Senate, which is a nonsense result. This doesn’t make logical sense because you can’t have a negative number of seats in the first place. |
| In the 35 Senate seats up for election in 2022,  how many went for Democrats? 14  how many went for Republicans? 21 | Looks like the Senate will be controlled by Democrats | Assuming the Democratic Party is in control of the vice presidency, the program should recognize that when there are an equal number of seats in the Senate belonging to each party, the Senate goes to the Democrats, which it does here. In the case that the party in control of the vice presidency isn’t accounted for, the program would need to recognize that neither party controls the Senate. |

**Step 6**

1. In line 31, I changed



**to**

****

When calculating the number of Senate seats after the 2022 election for each political party in line 31, I changed the greater than or equal to operator to a less than or equal to operator by switching the sign of the arrow. When I enter 35 seats going to the Democrats and 0 seats going to the Republicans, the program compiled and ran successfully, but the output will tell you that the Republicans are going to control the Senate, which is a nonsense result because the Democrats will have more total majority seats in the Senate than the Republicans after the election and should control the Senate. The program will incorrectly output that whichever party has the lower number of majority seats in the Senate will control the Senate. Or, in the case of a tie, it will output that the Republicans control the Senate.

**Step 7**

The first error I introduced was in line 5 where I changed



**to**



Here, I removed the # at the start so the header file is no longer valid. If you try to compile, the compiler won’t recognize certain keywords and will tell you that there is a use of undeclared identifier 'iostream', ‘cin’, and ‘cout’. The compiler will also tell you that the reference to overloaded function could not be resolved. In this case, you need to remember to include # so that the library for input and output streams is actually imported since those define cin and cout functions. Otherwise, you have no input and output objects that are valid to use in the code without #include <iostream>

The second error I introduced was in line 14 where I changed



to



Here, I removed the semicolon at the end of line 14, which causes the code to not compile successfully. Someone could easily forget to include the semicolon at the end, but you need it to separate each statement or “action” that you do in C++. If you try to run the program, C++ will tell you that it expected a “;” at the end of the declaration