Project 3 report :

1. The main obstacle that I encountered in project 3 was the algorithm for the function hasProperSyntax(string pollData). Even though there was some hint given in the project spec, it still took me a while to figure it out the insight from it. Eventually, I figure out the comma was an impotent condition for the inner loop, such that in each iteration it should only process one segment at a time. However, soon I realized the last segment of the poll string was giving me error, because the last segment of the poll string doesn’t end with a comma. My solution to it was to add an if statement, such that if syntax was all correct and my position counter reached the size of the string it will break the loop and return true.
2. * 1. bool hasProperSyntax(string pollData) :

// empty and obvious syntax error

if the pollData is an empty string

return true

if position [0] or position[size-1] is a comma

return false

Repeatedly (until the size of pollData reached ):

{

check if the first and second position of the pollData is alphabet)

if true, then check if they form a valid state code with

***isValidUppercaseStateCode()***

check if the current postion+2 == the size (ex: “Ca” or ”ca,ny” )

otherwise increment current position to the first position of poll result

else

return false

// now that the current position is at the first position of poll result

Repeatedly(until the position reach the comma):

{

If( the current position is not a digit

Return false

Increment current position by 1

// left with 2 possible outcomes, the next position is digit or letter

//path1

If the current position is a digit

The next position must be letter, otherwise return false

Increment current position

If the current position is not a letter // path 2

Return false

Else

Increment current position by1

In the case where position reach the end

Decrement current position by 1

Break

} // end of inner loop

Increment the current position for the outer loop

} // end of outer loop

up to this point the pollData is fully checked and should return true

* + 1. int tallySeats(string **pollData**, char **party**, int& **seatTally**):

check **pollData** with hasProperSyntax(), if not return 1

check if **party** is a letter, if not return 2

check if both **pollData** and **party** are bad, if so return 2

// guaranteed by hasProperSyntax(), it is safe and appropriate to loop **pollData**

Repeatedly( through the whole **pollData**):

{

if find the char **party** at position **k** within the **pollData**

// then the 2 character or 1 character before k will be digits

if the 2 characters are digit, then ***after convert to integer***:

there are [k-2]\*10+[k-1] seats

else

there are[k-1] seats

}

now set **seatTally** to total seats

The function returns 0

c)

Test cases for hasProperSyntax()

1. Check if it return true for a poll string that has correct syntax

hasProperSyntax("CT5D,NY9R17D1I,VT,ne3r00D")

1. Check if it return false if the state code is not valid

hasProperSyntax("ZT5D,NY9R17D1I,VT,ne3r00D")

1. Bad state code in the middle of poll strings

hasProperSyntax("AK5D,MP9R17D1I,VT,ne3r00D")

1. Lower case of good state code

hasProperSyntax("sc5D,pa9R17D1I,VT,ca3r00D")

1. Combinations of lower and upper case of good state code

hasProperSyntax("Ak5D,Ny9R17D1I,VT,or3r00D")

1. Check if it returns false if the poll string ends with comma

hasProperSyntax("AK5D,NY9R17D1I,VT,OR3r00D,")

1. Check if it returns false if the poll string starts with comma

hasProperSyntax(",AK5D,NY9R17D1I,VT,OR3r00D")

1. Check if it returns false if there is a 3 DIGIT IN PARTY RESULT

hasProperSyntax("AK5D,NY9R17D1I,VT030D,OR3r00D")

1. Check if it returns false if there is extra space

hasProperSyntax("AK5D,NY9R17D1I, VT030D,OR3r00D”)

1. Check if it returns false if the separation is space instead of comma

hasProperSyntax("AK5D,NY9R17D1I VT030D,OR3r00D")

1. Test case where there are state code but no data follows

hasProperSyntax("ca,ny,FL,La") and hasProperSyntax("ca,ny09d,FL,La")

1. Test case where there are only one state code but no data follows

hasProperSyntax("ca")

1. Test case for empty string

hasProperSyntax("")

Test case for tallySeats(string pollData, char party, int& seatTally)

1. Detect whether tallySeats sets seats

int seats;

seats = -999;

assert(tallySeats("CT5D,NY9R17D1I,VT,ne3r00D", 'd', seats) == 0 && seats == 22); assert(tallySeats("CT5D,NY9R17D1I,VT,ne3r00D", '%', seats) == 2 && seats == -999);

1. Check if it return 2 if the party code is not letter

int r1 = tallySeats("MA9D", '@', s);

1. Check if it returns 1 if the poll data has bad syntax

int r2 = tallySeats("MA9@", 'D',s);

1. Check if it returns 2 if both the poll data has bad syntax and the party code is not letter

int r2 = tallySeats("MA9@", '#',s);

1. Test if it returns 0 and if the seats equals 0 if empty pollData is passed in

int r = tallySeats("", 'D', s);

int t1;

t1 =tallySeats("CT0D,NY9R00D1I,VT,ne3r00D", 'd', seats);

if(t1 == 0 && seats== 0) cout<<"pass 0 party code test"<<endl;