Computer Science I: Final Project

due Friday, December 11, **11:59pm – right before midnight**

This assignment can be completed in two weeks. It will be of great benefit for you to complete your Lab 6 early and get started on the final project.

For this assignment, we will use the topics we have learned throughout the semester to program a simple "video game." We will call the game "Line Explorer." Your character travels left and right along a line of letters, choosing at each move whether to pick up the letter at her current location. Once you have picked up the letter, the location no longer holds a letter.

Your goal is to pick up 3 letters in a row that are consecutive in the alphabet. For example: if you pick up C, then E, then D, you win.

The game begins with:

- Your character at the center of an 11-location line
- Every location of the line assigned a letter, from A to G
    - **Each letter should be randomly chosen** from A to G, but you will get partial credit if you skip the randomization step (e.g., just say `line[3]='A';`)

In each turn, you are asked:

- What direction do you wish to move (left or right)? (You then move one step in the specified direction)
- Do you wish to pick up the letter at your location (yes or no)?

In each turn, the game displays:

- The list of the last three letters you have picked up
    - All previously picked-up letters are ignored
    - The display order of the listed letters does not matter to me!
- Your new location
- If you have won (three consecutive letters) or lost (out of turns)

The program must:

- maintain the letters remaining in the line
- maintain the list of the last three letters picked up by the player
- maintain the location of the player after each turn
- count the number of turns
- repeatedly check if the last three picked-up letters are consecutive in the alphabet

In terms of concepts from class, your program **must**

- Use at least one new function
- Use a loop
- Use at least one array

Functions:
I advise (but do not require) you write:

- a function to display the current line
- a function to test if you currently have collected three **letters that are consecutive in the alphabet**

Arrays:
I advise (but do not require) you define:

- An array listing the last three letters that have been collected
- An array specifying the letters at each location on the line

Optional:
If the user has not won after 6 turns, announce she has lost and exit program

Submitting your file:
Submit the final C++ code as lineTraveler.cpp using `submit1600` (and verify proper submission using `verify1600`).

Please see the grading guidelines starting on the next page as you allot your time for different components of this assignment.

Below is an example execution of the game:

```
> ./lineExplorer
Welcome to Line Explorer:

EGBDBCDBAFC
     X

Turn 1:
Your current letters: []

What direction do you wish to move ([L]eft or [R]ight)? R
EGBDBCDBAFC
      X
Do you wish to pick up the letter at your location ([Y]es or
[N]o)? Y
```

```
Turn 2:
Your current letters: [D]
What direction do you wish to move ([L]eft or [R]ight)? R
EGBDBC-BAFC
       X
Do you wish to pick up the letter at your location ([Y]es or
[N]o)? Y

Turn 3:
Your current letters: [BD]
What direction do you wish to move ([L]eft or [R]ight)? R
EGBDBC--AFC
        X
Do you wish to pick up the letter at your location ([Y]es or
[N]o)? Y

Turn 4:
Your current letters: [ABD]
What direction do you wish to move ([L]eft or [R]ight)? R
EGBDBC---FC
         X
Do you wish to pick up the letter at your location ([Y]es or
[N]o)? N

Turn 5:
Your current letters: [ABD]
What direction do you wish to move ([L]eft or [R]ight)? R
EGBDBC---FC
          X
Do you wish to pick up the letter at your location ([Y]es or
[N]o)? Y

You won! Letters: [CAB]
```

Grading guidelines:

For your planning purposes, I am providing here the number of points you will need to be placed in the “A range”, “B range”, “C range” or “D range” for the Final Project. I also provide a breakdown of the number of points I will award for each component of the Final Project Assignment.

“A range” – 84-100 points
“B range” – 66-84 points
“C range” – 50-66 points

“D range” – 34-50 points

Points awarded:
As usual, 30 points for style and 70 points for implementation.

Style
Comments – **10 points**
Variable names – **10 points**
Spacing – **10 points**

Implementation

Declare variable to hold the 11-location line of letters, and initialize each position with a random letter between A and G – **10 points**

Print letter line and player location – **10 points**

Print last three player-selected letters – **10 points**

Remove letter from line and place it on player’s letter list – **15 points**

Looping for six turns, unless user wins earlier – **5 points**

Updating player location – **5 points**

Test if three most recently selected letters are consecutive in the alphabet – **15 points**

- Note: You will get 5 points if you instead successfully test if the three most recently selected letters are the same letter.