Programming Assignment #3

Fun with stacks

CS 3358.751, Summer II 2013
Instructor: Jill Seaman

Due: Thursday, 7/25/2013 (upload electronic copy by 11:30am)

Problem (two parts):

Implement a Stack:

You will be using List_3358 to implement Stack_3358. That means you will need to create a templated version of List_3358 to use with Stack_3358. You can use whatever actual implementation for List_3358 that you want (there is one on the class website.) Note that the implementations will move to the .h file. You can use this to get started with Stack_3358: stack_3358.h.

Flood Fill:

Given an input file of the following format (a fake_picture):

yyywwbbbbbbbggggg
yyybbbbbbgggbbbb
ybybybybybwwwwwyy
ybbbbggwwwwwbbbg
gggggggwwbbbbbbbbb
yyyyyyyybbbyyyy
ggggyyyygggggyyyy

that uses characters to represent colors in a picture, you will need to write a function that will "flood fill" an area with another "color." For example. If I were to flood fill the pixel at row 0 col 6 (a"b") with a "P", I would get this:

yyywwPPPPPPggggg
yyyPPPPPPgggbbbb
yPyPyPyPyPwwwwwyy
yPPPPggwwwwwbbbg
gggggggwwbbbbbbbbb
yyyyyyyybbbyyyy
ggggyyyygggggyyyy

Every pixel that has the same color and is connected to the area of the flood fill is changed to the new color.

Write a program that reads in a file that is at most 25 rows and 25 columns and repeatedly prompts the user for a row and column number, and a "color". The program will fill that area with the new color, show the new picture and prompt the user again. The program will end when the user enters -1 for the row or column.

Example Run:

```
Please enter file name containing image:
fake_picture.txt
```

yyywwbbbbbbbggggg
yyybbbbbbbgggbbbb
ybybybybybwwwwwyy
ybbbbggwwwwwwbbbg
ggggggwwbbbbbbbbb
yyyyyyyyybbbyyyyy
ggggyyyyggggggyyyy

Enter a row: 0
Enter a column: 6
Enter a color: P

yyywwPPPPPPPggggg
yyyPPPPPPPgggbbbb
yPyPyPyPyPwwwwwyy
yPPPPggwwwwwwbbbg
gggggwwbbbbbbbbb
yyyyyyyyybbbyyyyy
ggggyyyyggggggyyyy

Enter a row: 1
Enter a column: 1
Enter a color: G

```
GGGwwPPPPPPggggg
GGGPPPPPPgggbbbb
GPGPyPyPyPwwwwyy
GPPPPggwwwwwbbbg
gggggwwbbbbbbbbb
yyyyyyyybbbyyyyy
ggggyyyyggggyyyy

Enter a row: -1
Enter a column: 1
Enter a color: G
```

NOTES:

- The default copy constructor should work for Stack_3358 implemented using List_3358.

- I will put a file called flood_fill_starter.cpp file on the class website to get you started with the flood_fill program. It will include the code for everything except the main algorithm that uses the stack (but it will include comments explaining the algorithm).

- I recommend using the pair type from the C++ STL as the type of the elements on the stack. One pair stores two values (named first and second).

Style:

See the Style Guidelines document on the course website.

Logistics:

Please submit the following files in a single zip file (assign3_xxxxxx.zip):

```
list_3358.h stack_3358.h flood_fill.cpp
```

The xxxxx is your TX State NetID (your txstate.edu email id).

Submit: an electronic copy only, using the Assignments tool on the TRACS website for this class.