CMPT 103 – Project Milestone #3

General Information

Python version and IDE:	Python 3.3 / Wing IDE 101
Allocated lab time:	2 hrs and 50 min
Due date:	April 8 at 5 p.m.
Lab weight:	10%

Topics

Design and Implementation of Celtica

Before coming to the lab, please read the lab specification carefully.

The goals of this lab are twofold:

1. Complete the implementation of Celtica
2. Implement any bonus features (optional)

Submission

- ✓ **All code file (.py) should be submitted electronically** to your Lab Blackboard site.
- ✓ A portion of the total marks (20%) will be allocated for the programming style. For example, functions should be small; avoid writing duplicate code; names should be meaningful and descriptive; naming conventions should be followed consistently; code should be formatted properly; and comments should be accurate and well written.
- ✓ Comments are **required** for:
  - EACH program indicating the student name and program name.
  - EACH function indicating the function purpose, syntax (example usage of the function), parameters, and return value
  - Any block of code for which the purpose may be unclear (Note: you should always try to write clean code that can be understood easily without comments).

Assignment

For this project, please put all functions into a file called `Celticayour_initials.py` (e.g., `CelticaFL.py` where F and L are the first letter of your first name and last name). Please feel free to write helper functions if necessary.

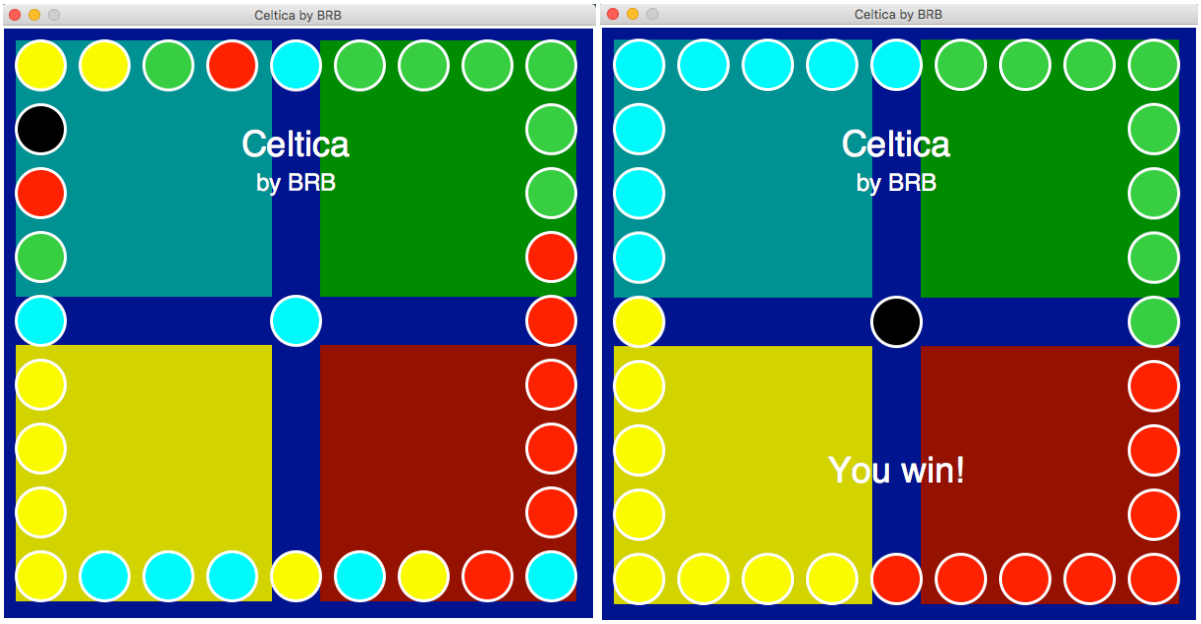

Figure 1: The winning configuration (shown above right) has each of the colours together in the four corners of the board and the open hole in the center.

Celtica (original design by B. Brookwell) is a game consisting of square track of 32 holes around with a single hole in the centre. The board is usually drawn in the form of a Celtic cross (hence the name). Each hole can hold a single marble (red, green, blue, or yellow). One hole is always left open. The player clicks on a circle beside the open/black hole, and the circles/colours exchange. A marble in the centre has four neighbours. The player clicks on circles until all the red, green, blue, and yellow circles are in their correct positions. When all circles are in the correct positions, the game is over, and a "You win!" message should be displayed (see Fig. 1).

From the first and second project milestones, you should have implemented several functions that can be used as building blocks to implement the Celtica game. Please use these functions as a starting point to think about your program design. However, feel free to modify your existing functions, if necessary, and write additional functions to complete the implementation of Celtica.

The third and final project milestone requires you to complete the implementation of Celtica (please see a demo in the lab to learn about the required features of this game).

Hints:

- A main function is necessary to take the required actions to set up and run the game.
- When the game starts, the initial configuration of the board should be scrambled by making a large number of random, legal moves. Making legal moves is important to ensure that the game board can be solved.
- Being able to determine if a mouse click occurs inside a circle object (and which circle) is necessary. You may use/modify the `is_clicked` function provided in Lab 6 as a helper function.
- When the game board changes, remember to change the colours of the relevant circles in the application window.

Implementing all required features of Celtica as described above (and demonstrated in the lab) is worth 100 marks. After you complete the implementation of Celtica, you may choose to implement the optional bonus features for additional marks (up to 20 bonus marks).

Optional bonus features

Please ask your lab/class instructors for detailed descriptions of these bonus features:

- Show a splash screen when users start Celtica. The splash screen should contain basic instructions how to play the game and a button to start the game (5 marks).
- Keep track and display the number of player moves (5 marks).
- Arrange the layout of the marbles as a circle instead of a square (5 marks).
- While playing Celtica, users need to click individual marbles to rotate them in a specific quadrant (green, red, yellow, or blue square) or in the outer square. Add 10 buttons to allow users to rotate left/right the marbles both in each quadrant and in the outer square when appropriate (15 marks).