ICS 102 - Introduction to Computing
Spring Semester 182
Term Project (10%)

Santorini is strategy game where there are multiple players each one has two workers that move inside a 5*5 grid and construct buildings. The steps of the game are illustrated below:

- At the start of the game, each player places his workers on any free cell (a cell cannot be occupied by more than one worker).
- Then, the players take turn and perform the following compulsory actions:
  - Choose a worker and move it to an adjacent cell according to the moving rules mentioned below.
  - Build one level up by placing a block on top of an adjacent empty cell or on top of an adjacent one-level or two-level building. The player can also place a dome on an adjacent three-level building. No more than three level building is allowed. No building blocks or dome can removed after placed.
- The first player who places one of his workers on a three-level building, wins the game. Another wining condition happens when one of the players cannot perform any actions.

Moving Rules:

1- A worker can move to an empty adjacent cell.
   Example: if w11 is the worker you wish to move, then the green cell are all possible destinations.

	w11	w12		

2- A worker can move up one level at a time, or down any number of levels.
3- A worker cannot move on top of a three-level building that has a dome on top of it.

Project Requirements:

You will create a two-players version of the game. It is possible to design the code in multiple ways, however, to simplify the testing and grading process, please follow the following instructions:

Create a class Worker that has the following attributes:

- name: a string that identify the worker.
- positionX: an int that identify the x coordinate of the worker position.
- positionY: an int that identify the y coordinate of the worker position.
- Worker: a constructor that create a Worker with a given name.
- placeWorker(positionX, positionY): initialize the position of the worker at the start of the game.
- move(int newPositionX, int newPositionY, SantoriniGame game): change the position of the worker and return true if possible, otherwise return false.

Create a class SantoriniGame that has the following attributes:

- board: a 5 by 5 array of String that represents the current state of the game. Initially, all Strings are empty indicating an empty board.
- workers—an array of Worker of size 4 to hold the 4 Worker objects. Workers' names should be as follows:
  - "w11": indicating the first worker of the first player.
  - "w12": indicating the second worker of the first player.
  - "w21": indicating the first worker of the second player.
  - "w22": indicating the second worker of the second player.
  - Worker objects should be stored in this order, so when the player wants to move the worker at index 0, w11 is moved, and so on.
- SantoriniGame(): a constructor that creates a game with empty board and Worker array.
- toString(): returns a string representation of the game that can be printed.
  - How to represent the board?
  - When the cell has three-level building, for example, then it is represented as "BBB".
  - When the cell has three-level building and a dome on top of it, for example, then it is represented as "BBBD".
  - When the cell is empty, it is represented by an empty string "".
  - When worker w21, for example, is on the cell, then it is represented by "w21"
  - When worker w21, for example, is on top on two-level building, then it is represented as "BBw21"
- build(positionX, positionY): returns true if the building action was successful (no violations of the rules), note that when trying to build on top of a three-

level building, a dome is built on top of it. If it has a dome already then, the build action fails.

- hasWon(): check whether the current player has won the game by his last actions.
- isTrapped(): check whether the current player is trapped by his last actions, which means that he cannot do any move, and the other player wins the game.
- rese()t: reset the board by removing all workers and buildings.

Write a main method in the class Santorini that creates a SantoriniGame object and sets its initial configuration.
The program then should allow the players to assign names to themselves. After that, ask the players, one at a time to place their workers on the positions they like on the board.
Then use a loop to allow the two players to play Santorini, one at a time.
At each iteration, display the current status of the game and ask for name of the worker to move, destination's X and Y. If the selected cell does not satisfy the rules, let the player know, and allow him to enter new values.
Update the game board and display it again. After that ask for the X and Y of the cell to build on. If the selected cell does not satisfy the rules, let the player know, and allow him to enter new values.
Indicate when the game ends and declare the winners. You should also allow options for resetting the game.

Note: Make sure that all your calculations, logic and operation are using a 0-indexed arrays.

For grading purposes:

Adjust your main such that all inputs are read from a file with the following format:

```
Ahmed
Mohammed
w11 2 3
w12 3 1
w21 2 3
w22 2 3
w12 3 2
3 3
w22 2 2
1 2
```

Description:
name of the first player.
name of the second player.
The following four lines represents where each player wants to place his workers at the start of the game.
The next line represents the worker that current player wants to move, and the x,y of the destination
After that, we have the x and y that the current player wants to build on.
The following two lines are the actions of the second player, and so on.

Resources:

- (The game)
  https://en.wikipedia.org/wiki/Santorini

- (A video to explain game rules, watch from 0:25 to 2:37)

  https://www.youtube.com/watch?v=TdlOYzoDQ38