

# EC447 Course Web Site

## Lab 4

### Due Tuesday July 25 by Midnight

In this assignment you will implement the eight queens puzzle. This is a classic problem devised in the 1800's. The first thing you should do is read the article at [http://en.wikipedia.org/wiki/Eight\\_queens\\_puzzle](http://en.wikipedia.org/wiki/Eight_queens_puzzle).

I completed the assignment and my implementation can be downloaded from <http://tomcat.bu.edu/ec447/Queens.exe>. In order to get a perfect score you must duplicate all the features of my solution. It took me at least six hours to write my solution. It will most likely take you two to four times longer. Start on this assignment right away.

## Board

- The chess board is located at (100, 100). Each square is 50 x 50.
- The squares (cells) are filled rectangles with a black border. The border is more obvious when hints are turned on (see below).
- Size the form to accommodate the board centered.
- The form title should be Eight Queens by <your name>.

## Placing or Removing a Queen

- A left click in a cell places a queen there if there isn't one there already AND it is a safe cell. A safe cell is one that if a queen is placed there it can't be captured by any queen already on the board.
- If the cell is occupied or not safe a beep is sounded (see Programming Hints below).
- Any click outside the board is ignored and no sound is played.
- A queen is indicated by a large centered Q. The color needs to be set for the black or white squares.
- A right click in a cell with a queen removes the queen otherwise it is ignored and no sound is played.
- The count of the number of queens on the board is displayed at the top of the form next to the controls. This count must always be accurate.
- Add a button in the upper left labeled "Clear" that removes all queens.
- Display a message indicating that the eighth queen has been added. Enter a valid solution to my example to see the message pop up.

## Hints Feature

- Place a check box in the upper left corner of the form with the label "Hints."
- When this box is checked all unsafe cells are colored red. See my solution for how this works.
- You will need to implement the check changed event to cause an instant update when turning this feature on and off.

## Solution Hints

- You can play a beep with this line of code  
`System.Media.SystemSounds.Beep.Play();`
- The `MessageBox.Show` method is used to display the winning dialog.
- I wrote a method to test if a cell is safe. That way it can be called in several places.
- I used a 30 pt. Arial bold style font for the Q.
- TESTING - the main reason students lose points is inadequate testing. This is also the result of waiting until the last minute to do the assignment. If something doesn't work like my solution you will lose points.