Programming Project 2, Due 10/31/2018

Solving N-queens problem by hill-climbing and its variants
Note: You can work alone or in a team of TWO max

You are to solve the n-queens problem by using hill-climbing and its variants. Read the slides or textbook carefully for the basic hill-climbing algorithm as applied to the 8-queens problem. However, your program should treat the number of queens as a variable n and allows the user to input the value of n. Using any programming language of your choice, implement the followings:

- Steepest- ascent hill climbing (slides 9 - 10, 22)
- Hill-climbing with sideways move (slides 23 and 24)
- Random-restart hill-climbing with and without sideways move (slides 28 -30)

Your program should report the following with respect to the *8*-queens problem

A. Implement steepest- ascent hill climbing (slides 9 - 10, 22)
    a. Run several times, say 100 to 500, and report success and failure rates
    b. The average number of steps when it succeeds
    c. The average number of steps when it fails
    d. The search sequences from three random initial configurations

B. Hill-climbing search with sideways move
    a. Run several times, say 100 to 500, and report success and failure rates
    b. The average number of steps when it succeeds
    c. The average number of steps when it fails
    d. The search sequences from three random initial configurations

C. Random-restart hill-climbing search
    a. The average number of random restarts used without sideways move
    b. The average number of steps required without sideways move
    c. The average number of random restarts used with sideways move
    d. The average number of steps required with sideways move

Your program should be well documented, and you should turn in the following in **hard copy**:

1. An external documentation describing the *n*-queens formulation, the program structure, global variables, the function/procedure to compute the heuristic function, and other functions/procedures, etc.
2. Your program source codes (with necessary inline documentation);
3. The execution results as specified above.

In addition, each member should also upload everything (e.g. report, code, etc.) to Canvas.

Warning: Any form of cheating will subject you to severe disciplinary act.