Question: This programming assignment requires you to write a C++ pro...

This programming assignment requires you to write a C++ program that creates and plays a game as described below. You should implement both the framework and the algorithm that finds the theoretical minimum number of steps for completing the game.

At the beginning, the program will randomly generate an $N \times N$ square-board. Each grid of the board will be painted by one of six colours. You can use the numbers from 1 to 6 to represent the 6 colours. A player will then start from the top left corner (named as the *pivot*). At each step of the game, she or he will choose one of the 6 colours to change all the grids *connected* with the *pivot* to this color. The definition of *connection* means: there is a path between the two grids under the condition that each pair of adjacent grids on this path is in the same color and shares an edge. In this way the player can paint the board from the *pivot* step by step until all grids are in the same color. The following figure demonstrates the key ideas of this game.

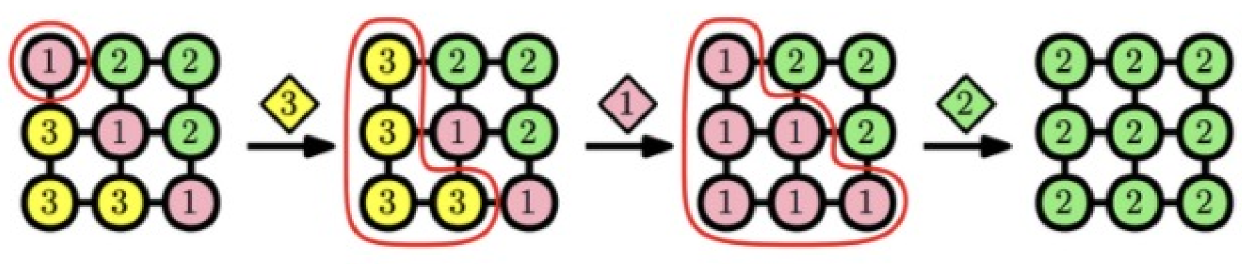

Figure 1: The sequence of a game in 3×3 grids. Each move in this example changes the colour of the *pivot* connected component.

- You should use the concepts and tools learned in the **C++** programming language courses (and C if only necessary) to implement this game;
- Your program should be able to generate new games with a size of $N \times N$ grids (N is from 3 to 9), randomly painted in 6 colours (represented in numbers). N should be read from the keyboard;
- Your program should be able to read a player's legal inputs from the keyboard, until all grids are painted in the same colour, following the rules described above;
- Your program should be able to read from a text file defined as follows, showing the initial colours of the grids:
  - The first line contains a single integer N ($3 \le N \le 9$) indicating the size of the game board.
  - The following N lines show an $N \times N$ matrix to denote the game board. Each item is an integer between 1 and 6, representing the color of the corresponding grid.
  - The example input text file is provided on the course ELE page, named as *example.txt*.
- Your program should find and print the theoretical minimum number of steps for completing the current game, ideally after a player finishes the game. You are suggested to pay special attention to developing a correct and efficient algorithm;
- Your program should print the state of the game board at each stage, the number of attempts, the theoretical minimum number of steps, and terminate properly (during the course of a game and after completing it).

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Expert Answer

Anonymous answered this
772 answers

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Q: THE PROJECT The purpose of the project is to perform a timing experiment. You are required to complete the following activities: 1/ Write a computer program that prompts the user for a number, creates an array for that number of random integers, and then uses the bubble sort to order the array. The program should print out the array prior to the call to the sorting algorithm and...

A: See answer

Q: (3) Find the equivalent transfer function of the block diagram using Matlab codes as s+2 2 s+5 G == G2 3s2+s G3 4 s2+6s+3 S G2 R(S) CIS) G1 G3 G4 (4) Consider the following system. Use MATLAB to find T(s)=C(s)/R(s), the closed loop transfer function. Show the MATLAB commands required to calculate T(s). Make use of the commands tf, conv and feedback. Show the step response of this...

A: See answer 100% (1 rating)

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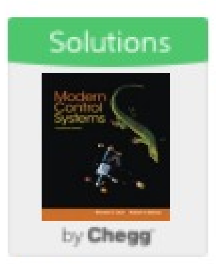

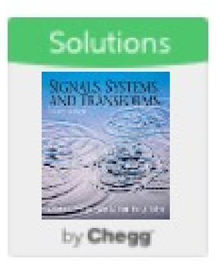

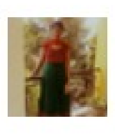

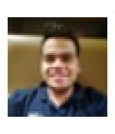

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