ITP 20002-03 Discrete Mathematics, Fall 2021

Homework 2

22000239 류지연

1. Introduction

Gappy is a logical game where you color 2 cells black in each and every column/row. However, there is a condition that the black cells can't be adjacent to each other. Before solving it, the program gets an input of two rows of 9 numbers. The values are numbers of white cells in between the black cells in each row/column in order.

2. Approach

I need to color 2 cells black in each and every row & column. Also, I recognized that I should add conditions to keep the black cells adjacent diagonally.

3. Evaluation

I planned to apply the following conditions to the program.

First, a condition for coloring 2 cells whose distance between the two is k + 1. black in each row. The other cells in that row would then be colored white. (k is the input value meaning the numbers of white cells in between two black cells.)

Second, a condition for coloring 2 cells whose distance between the two is k + 1 black in each column. The left cells would then be colored white. (k is the input value meaning the numbers of white cells in between two black cells.)

Third, to keep black cells from being adjacent diagonally I applied a double for loop and compared two cells at a time. I divided this condition into two because there are two types of diagonals. ("\" and "/")

4. Discussion

I struggled setting logical operators with parenthesis in the right place. Moreover, sometimes I was so stressed when a little mistake in the code gave out a totally wrong formula. At first, I planned to have two more conditions to keep black cells adjacent horizontally and vertically. But, I found out that when the program satisfies the condition that exactly two cells are in each and every row/column it automatically satisfies the two conditions. So, I could have written codes concisely.

5. Conclusion

To summarize what I have done for this homework, I designed a program to solve a game called 'Gappy'. Gappy is a game where players color two cells black in each and every row & both columns. The program gets the input of two rows of 9 numbers each which refers to numbers of white cells in between black cells in each row and column. I turned the game rules 1) Two cells should be colored blues exactly three times in each row 2) Two cells should be colored blues exactly three times in each column 3) Two cells can't be adjacent vertically, horizontally, and diagonally to propositional logic formula. I designed the formula with the following conditions referred before at **3. Evaluation** paragraph. The program gave out a desirable output.