Write-Ups for Project 2 “Graph Coloring”

GitHub Repo Link:

https://github.com/lukelii/CSCI4511-Project2.git

Language Used: Python

Package Used: typing (Generic, TypeVar), sys, pprint

Algorithm Explanation:

Using CSP with a basic frame of variable, domain and constraint, which variable is the vertices, domain will be the range of color (ex:0,1,2,3…) of bonded variables, and constraint will be our herustic that no adjacent vertex will be assigned the same color. The CSP search is simply adding our vertices of choice into the constraint nested dict and apply the herustic on it to check for domains. Our herustic is that we check if selected two vertices are assigned with any color, if one of them is not assigned, then it will not be conflicting with the other, since conflict does not happen with unassigned vertex. Then if both of the vertices are assigned, check if they have the different colors, and if they have the same color, the conflict will happen. Besides, to apply the Constraint propagation using AC3, I have chosen to implement a backtracking which will be checked once the CSP search is applied, each time the backtracking is called, it will check for all unassigned vertices that is not in the solution set, and during the checking if will see if they have possible next step to color, and if they have a next step available, we will recurse until we have find the solution.

To Run Script:

In Terminal, run python GC\_CSP.py under the folder with .txt input file and the python file itself. (package installation needed prior of running the script) To Modify test input, change txt\_path in line 13 of GC\_CSP.py

Example output:文本

描述已自动生成