

8 PUZZLE PROGRAM:

```
import copy

# Importing the heap methods from the python
# library for the Priority Queue
from heapq import heappush, heappop

# This particular var can be changed to transform
# the program from 8 puzzle(n=3) into 15
# puzzle(n=4) and so on ...
n = 3

# bottom, left, top, right
rows = [ 1, 0, -1, 0 ]
cols = [ 0, -1, 0, 1 ]

# creating a class for the Priority Queue
class priorityQueue:

    # Constructor for initializing a
    # Priority Queue
    def __init__(self):
        self.heap = []

    # Inserting a new key 'key'
    def push(self, key):
        heappush(self.heap, key)
```

```
# funct to remove the element that is minimum,
```

```
# from the Priority Queue
```

```
def pop(self):
```

```
    return heappop(self.heap)
```

```
# funct to check if the Queue is empty or not
```

```
def empty(self):
```

```
    if not self.heap:
```

```
        return True
```

```
    else:
```

```
        return False
```

```
# structure of the node
```

```
class nodes:
```

```
    def __init__(self, parent, mats, empty_tile_posi,
```

```
        costs, levels):
```

```
        # This will store the parent node to the
```

```
        # current node And helps in tracing the
```

```
        # path when the solution is visible
```

```
        self.parent = parent
```

```
        # Useful for Storing the matrix
```

```
        self.mats = mats
```

```
        # useful for Storing the position where the
```

```
        # empty space tile is already existing in the matrix
```

```
        self.empty_tile_posi = empty_tile_posi
```

```
# Store no. of misplaced tiles
```

```
self.costs = costs
```

```
# Store no. of moves so far
```

```
self.levels = levels
```

```
# This func is used in order to form the
```

```
# priority queue based on
```

```
# the costs var of objects
```

```
def __lt__(self, nxt):
```

```
    return self.costs < nxt.costs
```

```
# method to calc. the no. of
```

```
# misplaced tiles, that is the no. of non-blank
```

```
# tiles not in their final posi
```

```
def calculateCosts(mats, final) -> int:
```

```
    count = 0
```

```
    for i in range(n):
```

```
        for j in range(n):
```

```
            if ((mats[i][j]) and
```

```
                (mats[i][j] != final[i][j])):
```

```
                count += 1
```

```
    return count
```

```
def newNodes(mats, empty_tile_posi, new_empty_tile_posi,
```

```
            levels, parent, final) -> nodes:
```

```
# Copying data from the parent matrixes to the present matrixes
```

```
new_mats = copy.deepcopy(mats)
```

```
# Moving the tile by 1 position
```

```
x1 = empty_tile_posi[0]
```

```
y1 = empty_tile_posi[1]
```

```
x2 = new_empty_tile_posi[0]
```

```
y2 = new_empty_tile_posi[1]
```

```
new_mats[x1][y1], new_mats[x2][y2] = new_mats[x2][y2], new_mats[x1][y1]
```

```
# Setting the no. of misplaced tiles
```

```
costs = calculateCosts(new_mats, final)
```

```
new_nodes = nodes(parent, new_mats, new_empty_tile_posi,  
                  costs, levels)
```

```
return new_nodes
```

```
# func to print the N by N matrix
```

```
def printMatsrix(mats):
```

```
    for i in range(n):
```

```
        for j in range(n):
```

```
            print("%d " % (mats[i][j]), end = " ")
```

```
        print()
```

```
# func to know if (x, y) is a valid or invalid
```

```
# matrix coordinates
```

```

def isSafe(x, y):

    return x >= 0 and x < n and y >= 0 and y < n

# Printing the path from the root node to the final node
def printPath(root):

    if root == None:
        return

    printPath(root.parent)
    printMatsrix(root.mats)
    print()

# method for solving N*N - 1 puzzle algo
# by utilizing the Branch and Bound technique. empty_tile_posi is
# the blank tile position initially.
def solve(initial, empty_tile_posi, final):

    # Creating a priority queue for storing the live
    # nodes of the search tree
    pq = priorityQueue()

    # Creating the root node
    costs = calculateCosts(initial, final)
    root = nodes(None, initial,
                 empty_tile_posi, costs, 0)

    # Adding root to the list of live nodes

```

```
pq.push(root)
```

```
# Discovering a live node with min. costs,  
# and adding its children to the list of live  
# nodes and finally deleting it from  
# the list.
```

```
while not pq.empty():
```

```
    # Finding a live node with min. estimatsed  
    # costs and deleting it form the list of the  
    # live nodes
```

```
    minimum = pq.pop()
```

```
    # If the min. is ans node
```

```
    if minimum.costs == 0:
```

```
        # Printing the path from the root to  
        # destination;  
        printPath(minimum)  
        return
```

```
    # Generating all feasible children
```

```
    for i in range(n):
```

```
        new_tile_posi = [  
            minimum.empty_tile_posi[0] + rows[i],  
            minimum.empty_tile_posi[1] + cols[i], ]
```

```
        if isSafe(new_tile_posi[0], new_tile_posi[1]):
```

```
# Creating a child node

child = newNodes(minimum.mats,
                  minimum.empty_tile_posi,
                  new_tile_posi,
                  minimum.levels + 1,
                  minimum, final,)

# Adding the child to the list of live nodes

pq.push(child)
```

```
# Main Code
```

```
# Initial configuration
```

```
# Value 0 is taken here as an empty space
```

```
initial = [ [ 1, 2, 3 ],
            [ 5, 6, 0 ],
            [ 7, 8, 4 ] ]
```

```
# Final configuration that can be solved
```

```
# Value 0 is taken as an empty space
```

```
final = [ [ 1, 2, 3 ],
          [ 5, 8, 6 ],
          [ 0, 7, 4 ] ]
```

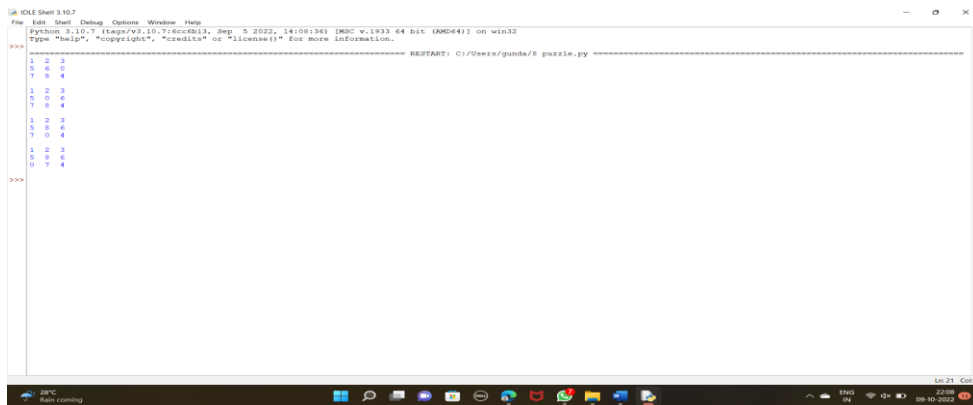
```
# Blank tile coordinates in the
```

```
# initial configuration
```

```
empty_tile_posi = [ 1, 2 ]
```

```
# Method call for solving the puzzle
```

solve(initial, empty_tile_posi, final)



```
KDE Shell 3.10.7
Python 3.10.7 (tags/v3.10.7:6c06b13, Sep 5 2022, 14:09:34) [AMD64] on win32
Type "help()", "copyright()", "credits()" or "license()" for more information.

>>>
===== RESTART: C:\Users\gunda\8 puzzle.py =====
1 2 3 4
2 3 4 1
3 4 1 2
4 1 2 3
>>>
```

8QUEENS:

Taking number of queens as input from user

```
print ("Enter the number of queens")
```

```
N = int(input())
```

here we create a chessboard

NxN matrix with all elements set to 0

```
board = [[0]*N for _ in range(N)]
```

```
def attack(i, j):
```

```
    #checking vertically and horizontally
```

```
    for k in range(0,N):
```

```
        if board[i][k]==1 or board[k][j]==1:
```

```
            return True
```

```
    #checking diagonally
```

```
    for k in range(0,N):
```

```
        for l in range(0,N):
```

```
            if (k+l==i+j) or (k-l==i-j):
```

```
                if board[k][l]==1:
```

```
                    return True
```

```
    return False
```

```
def N_queens(n):
```



```

if n==0:
    return True

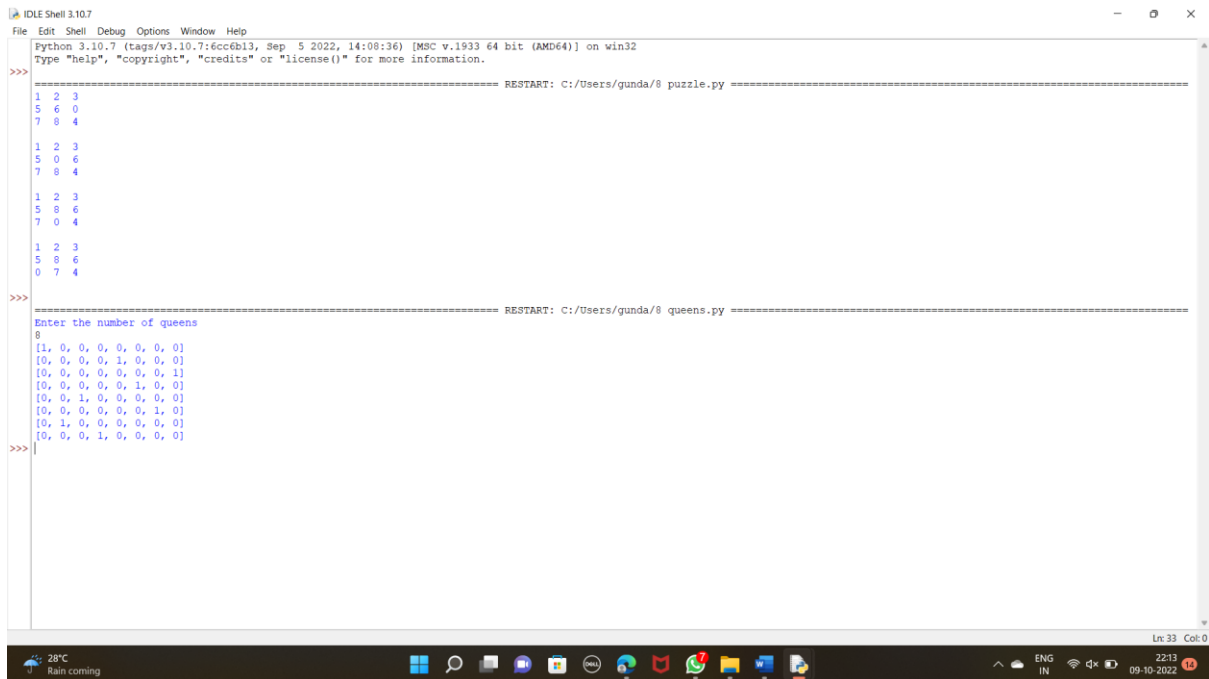
for i in range(0,N):
    for j in range(0,N):
        if (not(attack(i,j))) and (board[i][j]!=1):
            board[i][j] = 1
            if N_queens(n-1)==True:
                return True
            board[i][j] = 0
    return False

N_queens(N)

for i in board:

    print (i)

```



```

IDLE Shell 3.10.7
File Edit Shell Debug Options Window Help
Python 3.10.7 (tags/v3.10.7:6cc6b13, Sep 5 2022, 14:08:36) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/Users/gunda/8 puzzle.py =====
1 2 3
5 6 0
7 8 4
1 2 3
5 0 6
7 8 4
1 2 3
5 8 6
7 0 4
1 2 3
5 8 6
0 7 4
>>>
===== RESTART: C:/Users/gunda/8 queens.py =====
Enter the number of queens
8
[1, 0, 0, 0, 0, 0, 0, 0]
[0, 0, 0, 0, 1, 0, 0, 0]
[0, 0, 0, 0, 0, 0, 0, 1]
[0, 0, 0, 0, 0, 1, 0, 0]
[0, 0, 1, 0, 0, 0, 0, 0]
[0, 0, 0, 0, 0, 0, 1, 0]
[0, 1, 0, 0, 0, 0, 0, 0]
[0, 0, 0, 1, 0, 0, 0, 0]
>>>

```

Tower of Hanoi:

```

def TowerOfHanoi(n , source, destination, auxiliary):

    if n==1:

```

```
print ("Move disk 1 from source",source,"to destination",destination)
```

```
return
```

```
TowerOfHanoi(n-1, source, auxiliary, destination)
```

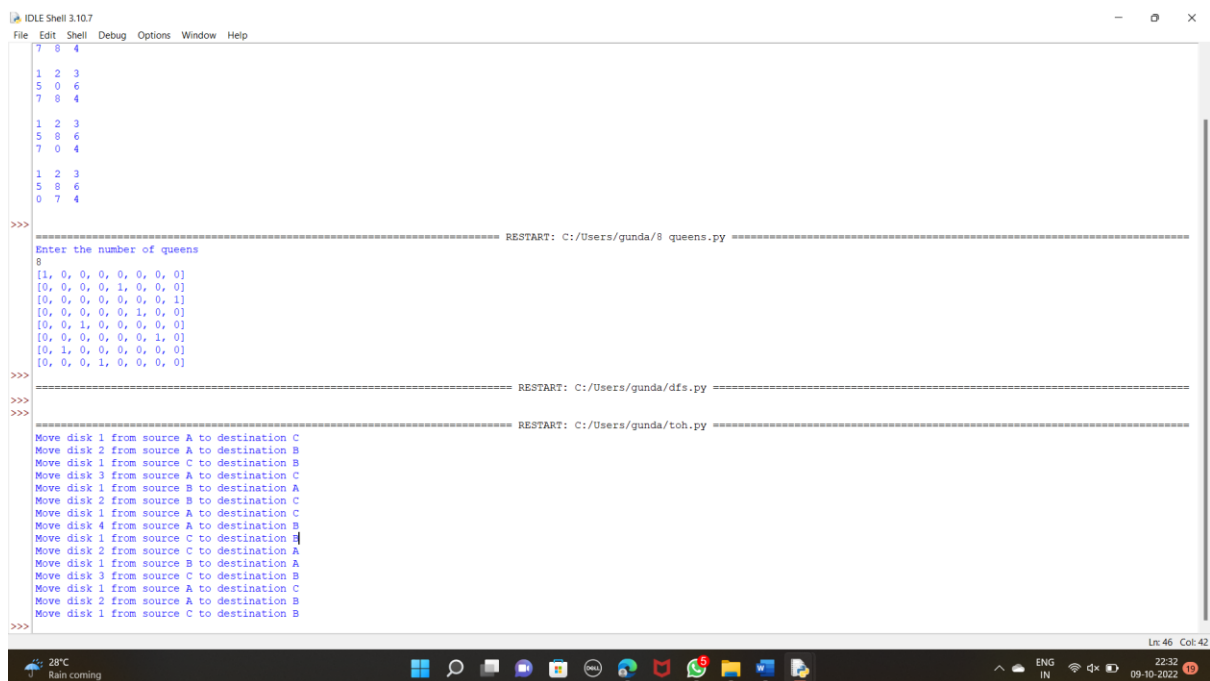
```
print ("Move disk",n,"from source",source,"to destination",destination)
```

```
TowerOfHanoi(n-1, auxiliary, destination, source)
```

Driver code

n = 4

TowerOfHanoi(n,'A','B','C')



```
IDLE Shell 3.10.7
File Edit Shell Debug Options Window Help

1 2 3
5 0 6
7 8 4

1 2 3
5 8 6
7 0 4

1 2 3
5 8 6
0 7 4

>>>
===== RESTART: C:/Users/gunda/8 queens.py =====
Enter the number of queens
8
[[0, 0, 0, 0, 0, 0, 0, 0],
 [0, 0, 0, 0, 1, 0, 0, 0],
 [0, 0, 0, 0, 0, 0, 0, 1],
 [0, 0, 0, 0, 0, 1, 0, 0],
 [0, 0, 1, 0, 0, 0, 0, 0],
 [0, 0, 0, 0, 0, 0, 1, 0],
 [0, 1, 0, 0, 0, 0, 0, 0],
 [0, 0, 0, 1, 0, 0, 0, 0]]
>>>
===== RESTART: C:/Users/gunda/dfs.py =====
>>>
===== RESTART: C:/Users/gunda/toh.py =====
Move disk 1 from source A to destination C
Move disk 2 from source A to destination B
Move disk 1 from source C to destination B
Move disk 3 from source A to destination C
Move disk 1 from source B to destination A
Move disk 2 from source B to destination C
Move disk 1 from source A to destination C
Move disk 4 from source A to destination B
Move disk 1 from source C to destination B
Move disk 2 from source C to destination A
Move disk 1 from source C to destination A
Move disk 3 from source C to destination B
Move disk 1 from source A to destination C
Move disk 2 from source A to destination B
Move disk 1 from source C to destination B
>>>
```

Water jug:

This function is used to initialize the

dictionary elements with a default value.

from collections import defaultdict

jug1 and jug2 contain the value

for max capacity in respective jugs

and aim is the amount of water to be measured.

```
jug1, jug2, aim = 4, 3, 2
```

```
# Initialize dictionary with
```

```
# default value as false.
```

```
visited = defaultdict(lambda: False)
```

```
# Recursive function which prints the
```

```
# intermediate steps to reach the final
```

```
# solution and return boolean value
```

```
# (True if solution is possible, otherwise False).
```

```
# amt1 and amt2 are the amount of water present
```

```
# in both jugs at a certain point of time.
```

```
def waterJugSolver(amt1, amt2):
```

```
    # Checks for our goal and
```

```
    # returns true if achieved.
```

```
    if (amt1 == aim and amt2 == 0) or (amt2 == aim and amt1 == 0):
```

```
        print(amt1, amt2)
```

```
        return True
```

```
    # Checks if we have already visited the
```

```
    # combination or not. If not, then it proceeds further.
```

```
    if visited[(amt1, amt2)] == False:
```

```
        print(amt1, amt2)
```

```
    # Changes the boolean value of
```

```
    # the combination as it is visited.
```

```
    visited[(amt1, amt2)] = True
```

```
# Check for all the 6 possibilities and
# see if a solution is found in any one of them.
return (waterJugSolver(0, amt2) or
        waterJugSolver(amt1, 0) or
        waterJugSolver(jug1, amt2) or
        waterJugSolver(amt1, jug2) or
        waterJugSolver(amt1 + min(amt2, (jug1-amt1)),
                        amt2 - min(amt2, (jug1-amt1))) or
        waterJugSolver(amt1 - min(amt1, (jug2-amt2)),
                        amt2 + min(amt1, (jug2-amt2))))
```

```
# Return False if the combination is
# already visited to avoid repetition otherwise
# recursion will enter an infinite loop.
else:
    return False
```

```
print("Steps: ")
```

```
# Call the function and pass the
# initial amount of water present in both jugs.
waterJugSolver(0, 0)
```

```
IDLE Shell 3.10.7
File Edit Shell Debug Options Window Help
5 8 6
0 7 4

>>>
===== RESTART: C:/Users/gunda/8 queens.py =====
Enter the number of queens
8
[1, 0, 0, 0, 0, 0, 0, 0]
[0, 0, 0, 0, 1, 0, 0, 0]
[0, 0, 0, 0, 0, 0, 0, 1]
[0, 0, 0, 0, 0, 1, 0, 0]
[0, 0, 1, 0, 0, 0, 0, 0]
[0, 0, 0, 0, 0, 0, 1, 0]
[0, 1, 0, 0, 0, 0, 0, 0]
[0, 0, 0, 1, 0, 0, 0, 0]

>>>
===== RESTART: C:/Users/gunda/dfs.py =====
>>>
===== RESTART: C:/Users/gunda/toh.py =====
Move disk 1 from source A to destination C
Move disk 2 from source A to destination B
Move disk 1 from source C to destination B
Move disk 3 from source A to destination C
Move disk 1 from source B to destination A
Move disk 2 from source B to destination C
Move disk 1 from source A to destination C
Move disk 4 from source A to destination B
Move disk 1 from source C to destination B
Move disk 2 from source C to destination A
Move disk 1 from source C to destination A
Move disk 3 from source B to destination A
Move disk 3 from source C to destination B
Move disk 1 from source A to destination C
Move disk 2 from source A to destination B
Move disk 1 from source C to destination B

>>>
===== RESTART: C:/Users/gunda/water jug.py =====
Steps:
0 0
4 0
4 3
0 3
3 0
2 3
4 2
0 2

>>>
```

Greedy first search :

from queue import PriorityQueue

v = 14

graph = [[] for i in range(v)]

Function For Implementing Best First Search

Gives output path having lowest cost

def best_first_search(actual_Src, target, n):

visited = [False] * n

pq = PriorityQueue()

pq.put((0, actual_Src))

visited[actual_Src] = True

while pq.empty() == False:

u = pq.get()[1]

```

        # Displaying the path having lowest cost
        print(u, end=" ")

        if u == target:
            break

    for v, c in graph[u]:
        if visited[v] == False:
            visited[v] = True
            pq.put((c, v))

    print()

# Function for adding edges to graph

def addedge(x, y, cost):
    graph[x].append((y, cost))
    graph[y].append((x, cost))

# The nodes shown in above example(by alphabets) are
# implemented using integers addedge(x,y,cost);
addege(0, 1, 3)
addege(0, 2, 6)
addege(0, 3, 5)
addege(1, 4, 9)
addege(1, 5, 8)
addege(2, 6, 12)
addege(2, 7, 14)
addege(3, 8, 7)

```

```

addedge(8, 9, 5)
addedge(8, 10, 6)
addedge(9, 11, 1)
addedge(9, 12, 10)
addedge(9, 13, 2)

```

```
source = 0
```

```
target = 9
```

```
best_first_search(source, target, v)
```

This code is contributed by Jyotheeswar Ganne

```

IDLE Shell 3.10.7
File Edit Shell Debug Options Window Help
Move disk 2 from source A to destination B
Move disk 1 from source C to destination B
Move disk 3 from source A to destination C
Move disk 1 from source B to destination A
Move disk 2 from source B to destination C
Move disk 1 from source A to destination C
Move disk 4 from source A to destination B
Move disk 1 from source C to destination B
Move disk 2 from source C to destination A
Move disk 1 from source B to destination A
Move disk 1 from source C to destination B
Move disk 1 from source A to destination C
Move disk 2 from source A to destination B
Move disk 1 from source C to destination B
Move disk 2 from source A to destination B
>>>
===== RESTART: C:/Users/gunda/water jug.py =====
Steps:
0 0
4 0
4 3
0 3
3 0
3 3
4 2
0 4
>>>
===== RESTART: C:/Users/gunda/tic tac toe.py =====
Traceback (most recent call last):
  File "C:/Users/gunda/tic tac toe.py", line 5, in <module>
    import numpy as np
ModuleNotFoundError: No module named 'numpy'
>>>
===== RESTART: C:/Users/gunda/tic tac toe.py =====
Traceback (most recent call last):
  File "C:/Users/gunda/tic tac toe.py", line 5, in <module>
    import numpy as np
ModuleNotFoundError: No module named 'numpy'
>>>
===== RESTART: C:/Users/gunda/tic tac toe.py =====
Traceback (most recent call last):
  File "C:/Users/gunda/tic tac toe.py", line 32, in <module>
    if __name__ == "__main__":
NameError: name '__name__' is not defined. Did you mean: '__name__'?
>>>
===== RESTART: C:/Users/gunda/greedy.py =====
0 1 3 2 8 9
>>>
Ln: 63 Col: 3

```

Dfs:

Python program to print DFS traversal for complete graph

```
from collections import defaultdict
```

```
# This class represents a directed graph using adjacency
# list representation
class Graph:

    # Constructor
    def __init__(self):

        # default dictionary to store graph
        self.graph = defaultdict(list)

    # function to add an edge to graph
    def addEdge(self,u,v):
        self.graph[u].append(v)

    # A function used by DFS
    def DFSUtil(self, v, visited):

        # Mark the current node as visited and print it
        visited[v]= True
        print v,

        # Recur for all the vertices adjacent to
        # this vertex
        for i in self.graph[v]:
            if visited[i] == False:
                self.DFSUtil(i, visited)
```



```

# The function to do DFS traversal. It uses
# recursive DFSUtil()

def DFS(self):
    V = len(self.graph) #total vertices

    # Mark all the vertices as not visited
    visited =[False]*(V)

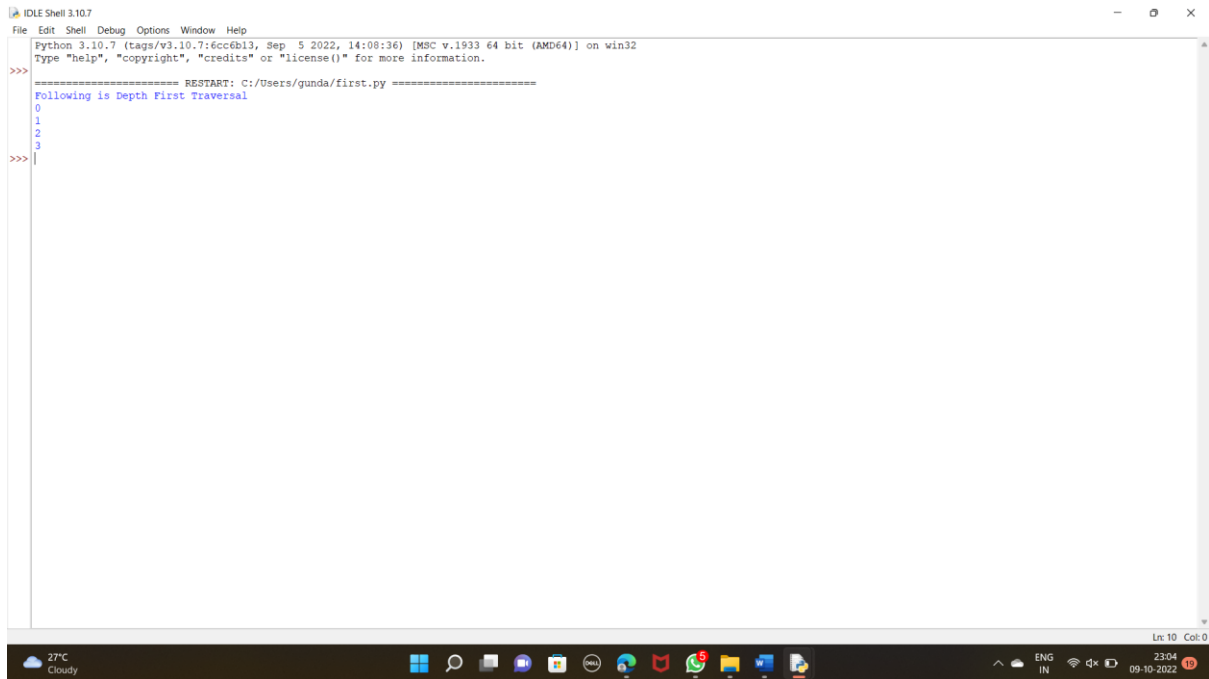
    # Call the recursive helper function to print
    # DFS traversal starting from all vertices one
    # by one
    for i in range(V):
        if visited[i] == False:
            self.DFSUtil(i, visited)

# Driver code
# Create a graph given in the above diagram
g = Graph()
g.addEdge(0, 1)
g.addEdge(0, 2)
g.addEdge(1, 2)
g.addEdge(2, 0)
g.addEdge(2, 3)
g.addEdge(3, 3)

print "Following is Depth First Traversal"

g.DFS()

```



Map colouring:

Python3 program for the above approach

Number of vertices in the graph

define 4 4

check if the colored

graph is safe or not

def isSafe(graph, color):

 # check for every edge

 for i in range(4):

 for j in range(i + 1, 4):

 if (graph[i][j] and color[j] == color[i]):

```
        return False
```

```
    return True
```

```
# /* This function solves the m Coloring  
# problem using recursion. It returns  
# false if the m colours cannot be assigned,  
# otherwise, return true and prints  
# assignments of colours to all vertices.  
# Please note that there may be more than  
# one solutions, this function prints one  
# of the feasible solutions.*/
```

```
def graphColoring(graph, m, i, color):
```

```
    # if current index reached end
```

```
    if (i == 4):
```

```
        # if coloring is safe
```

```
        if (isSafe(graph, color)):
```

```
            # Print the solution
```

```
            printSolution(color)
```

```
            return True
```

```
        return False
```

```
# Assign each color from 1 to m
```

```
for j in range(1, m + 1):
```

```
    color[i] = j
```

```

        # Recur of the rest vertices
        if (graphColoring(graph, m, i + 1, color)):
            return True
        color[i] = 0
    return False

```

```

# /* A utility function to print solution */

```

```

def printSolution(color):
    print("Solution Exists:" " Following are the assigned colors ")
    for i in range(4):
        print(color[i], end=" ")

```

```

# Driver code

```

```

if __name__ == '__main__':

```

```

    # /* Create following graph and
    # test whether it is 3 colorable
    # (3)---(2)
    # | / |
    # | / |
    # | / |
    # (0)---(1)
    # */
    graph = [
        [0, 1, 1, 1],

```

```

[1, 0, 1, 0],
[1, 1, 0, 1],
[1, 0, 1, 0],
]

m = 3 # Number of colors

# Initialize all color values as 0.

# This initialization is needed

# correct functioning of isSafe()

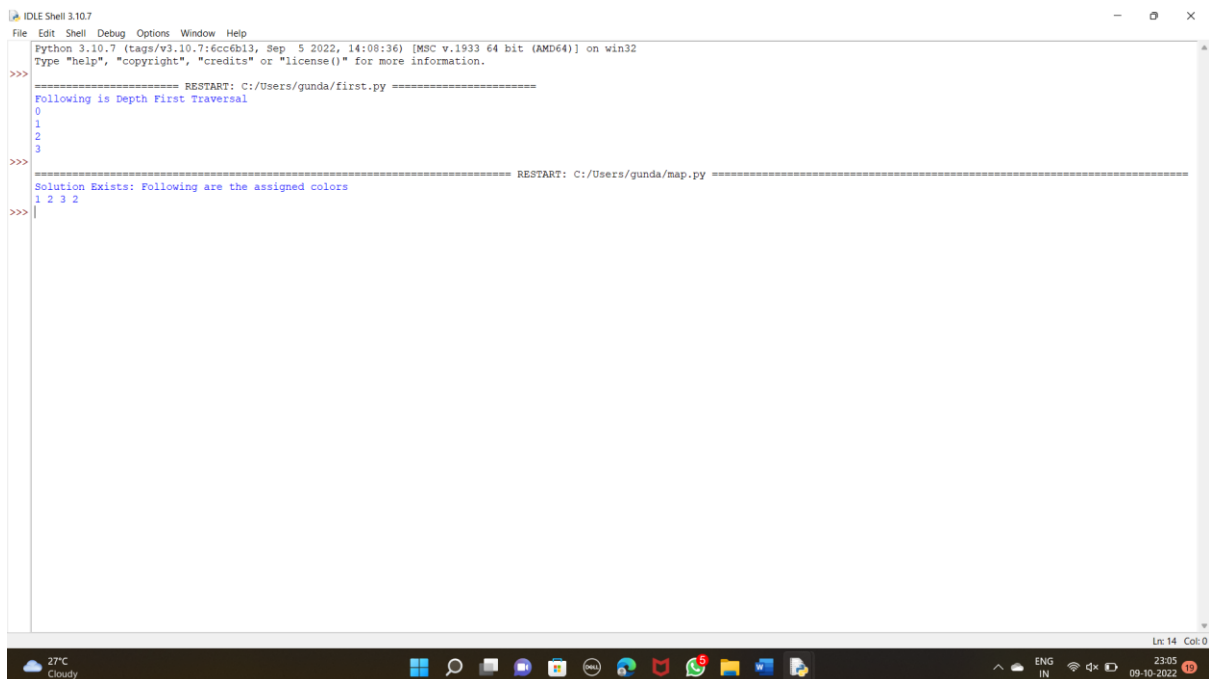
color = [0 for i in range(4)]

# Function call

if (not graphColoring(graph, m, 0, color)):

    print("Solution does not exist")

```



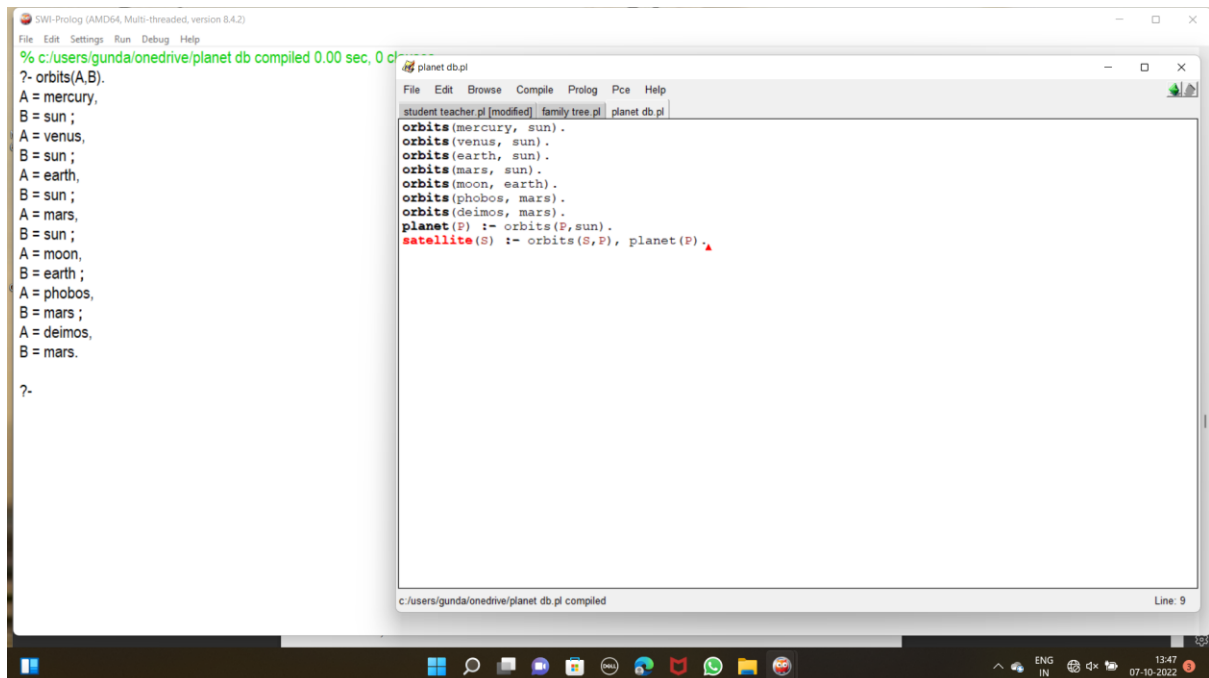
```

IDLE Shell 3.10.7
File Edit Shell Debug Options Window Help
Python 3.10.7 (tags/v3.10.7:6cc6b13, Sep 5 2022, 14:08:36) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/Users/gunda/first.py =====
Following is Depth First Traversal
0
1
2
3
>>>
===== RESTART: C:/Users/gunda/map.py =====
Solution Exists: Following are the assigned colors
1 2 3 2
>>>

```

Prolog programs:

Planet db:



```
SWI-Prolog (AMD64, Multi-threaded, version 8.4.2)
File Edit Settings Run Debug Help
% c:/users/gunda/onedrive/planet db compiled 0.00 sec, 0 d...
?- orbits(A,B).
A = mercury,
B = sun ;
A = venus,
B = sun ;
A = earth,
B = sun ;
A = mars,
B = sun ;
A = moon,
B = earth ;
A = phobos,
B = mars ;
A = deimos,
B = mars.
?-

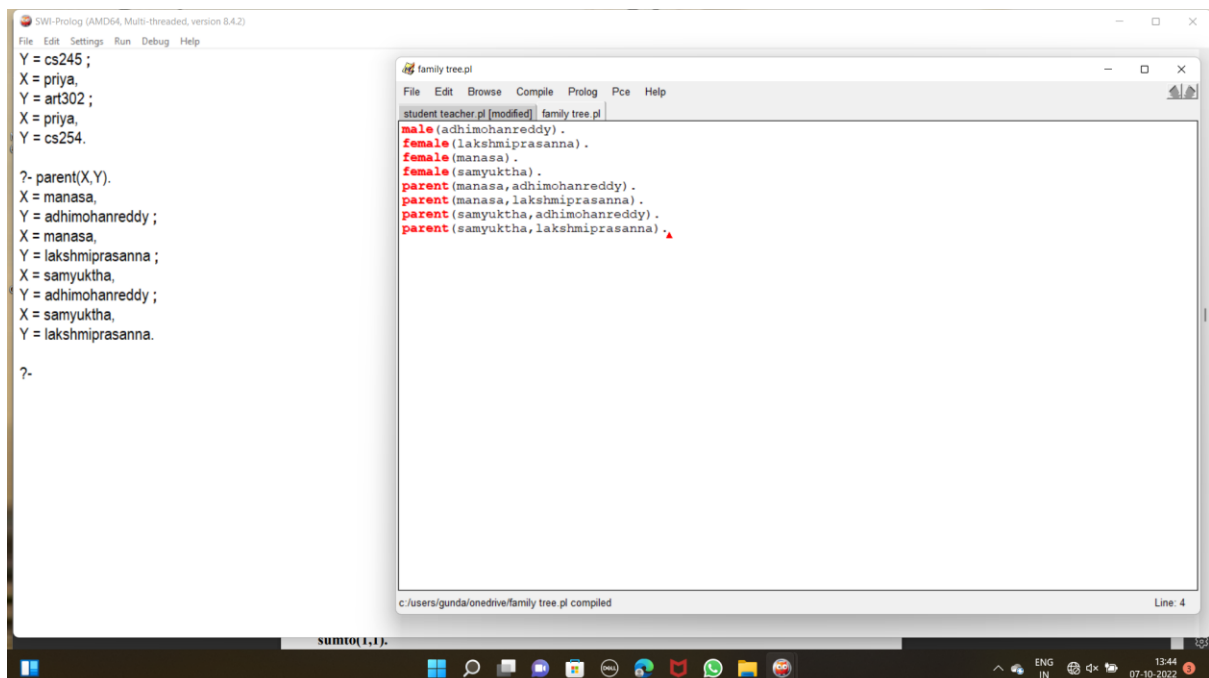
```

```
planet db.pl
File Edit Browse Compile Prolog Pce Help
student teacher.pl [modified] family tree.pl planet db.pl
orbits(mercury, sun).
orbits(venus, sun).
orbits(earth, sun).
orbits(mars, sun).
orbits(moon, earth).
orbits(phobos, mars).
orbits(deimos, mars).
planet(P) :- orbits(P,sun).
satellite(S) :- orbits(S,P), planet(P).

```

c:/users/gunda/onedrive/planet db.pl compiled Line: 9

Family tree:



```
SWI-Prolog (AMD64, Multi-threaded, version 8.4.2)
File Edit Settings Run Debug Help
Y = cs245 ;
X = priya,
Y = art302 ;
X = priya,
Y = cs254.
?- parent(X,Y).
X = manasa,
Y = adhimohanreddy ;
X = manasa,
Y = lakshmiarasanna ;
X = samyuktha,
Y = adhimohanreddy ;
X = samyuktha,
Y = lakshmiarasanna.
?-

```

```
family tree.pl
File Edit Browse Compile Prolog Pce Help
student teacher.pl [modified] family tree.pl
male(adhimohanreddy).
female(lakshmiarasanna).
female(manasa).
female(samyuktha).
parent(manasa,adhimohanreddy).
parent(manasa,lakshmiarasanna).
parent(samyuktha,adhimohanreddy).
parent(samyuktha,lakshmiarasanna).

```

c:/users/gunda/onedrive/family tree.pl compiled Line: 4

Student teacher :

SWI-Prolog (AMD64, Multi-threaded, version 8.4.2)

Welcome to SWI-Prolog (threaded, 64 bits, version 8.4.2)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This
Please run ?- license. for legal details.

For online help and background, visit <https://www.swi-prolog.org>
For built-in help, use ?- help(Topic). or ?- apropos(Word).

```
?- takes(X,Y).
ERROR: Unknown procedure: takes/2 (DWIM could not correct)
?- takes(X,Y).
X = sameera,
Y = his201 ;
X = sameera,
Y = cs245 ;
X = priya,
Y = art302 ;
X = priya,
Y = cs254.
?-
```

student teacher.pl

```
takes(sameera,his201).
takes(sameera,cs245).
takes(priya,art302).
takes(priya,cs254).
classmates(X,Y):-takes(X,Z),takes(Y,Z).
```

c:/users/gunda/onedrive/student teacher.pl compiled

Line: 1

Causes diseases:

SWI-Prolog (AMD64, Multi-threaded, version 8.4.2)

?- hypothesis(amt,X).
false.

```
?- symptom(X,Y).
X = amt,
Y = rash ;
X = amt,
Y = headache ;
X = amt,
Y = runn_nose ;
X = kaushal,
Y = chills ;
X = kaushal,
Y = fever ;
X = kaushal,
Y = headache ;
X = ram,
Y = runny_nose ;
X = ram,
Y = rash
```

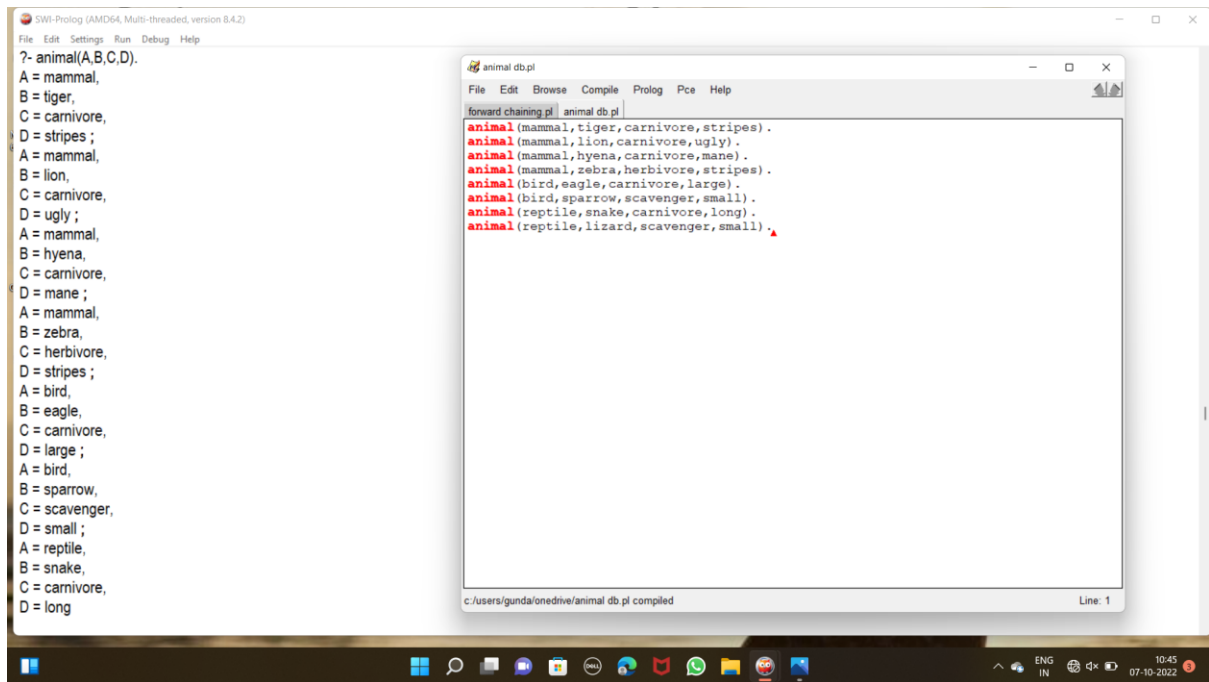
causes diseases.pl [modified]

```
forward chaining.pl | animal db.pl [modified] | causes diseases.pl [modified]
domains
disease,indication,name=symbol
predicates
hypothesis(name,disease)
symptom(name,indication)
clauses
symptom(amt,fever).
symptom(amt,rash).
symptom(amt,headache).
symptom(amt,runn_nose).
symptom(kaushal,chills).
symptom(kaushal,fever).
symptom(kaushal,headache).
symptom(ram,runny_nose).
symptom(ram,rash).
symptom(ram,flu).
hypothesis(patient,measels):-
symptom(patient,fever),
symptom(patient,cough),
symptom(patient,conjunctivitis),
symptom(patient,rash).
hypothesis(patient,german_measles):-
symptom(patient,fever),
symptom(patient,headache),
symptom(patient,runny_nose),
symptom(patient,rash).
hypothesis(patient,flu):-
symptom(patient,fever),
symptom(patient,headache),
symptom(patient,body_ache),
symptom(patient,chills).
```

File contains 1 errors

Line: 17

Animal db:



Forward chain:

