NMTTNT_Tuan2_19110413

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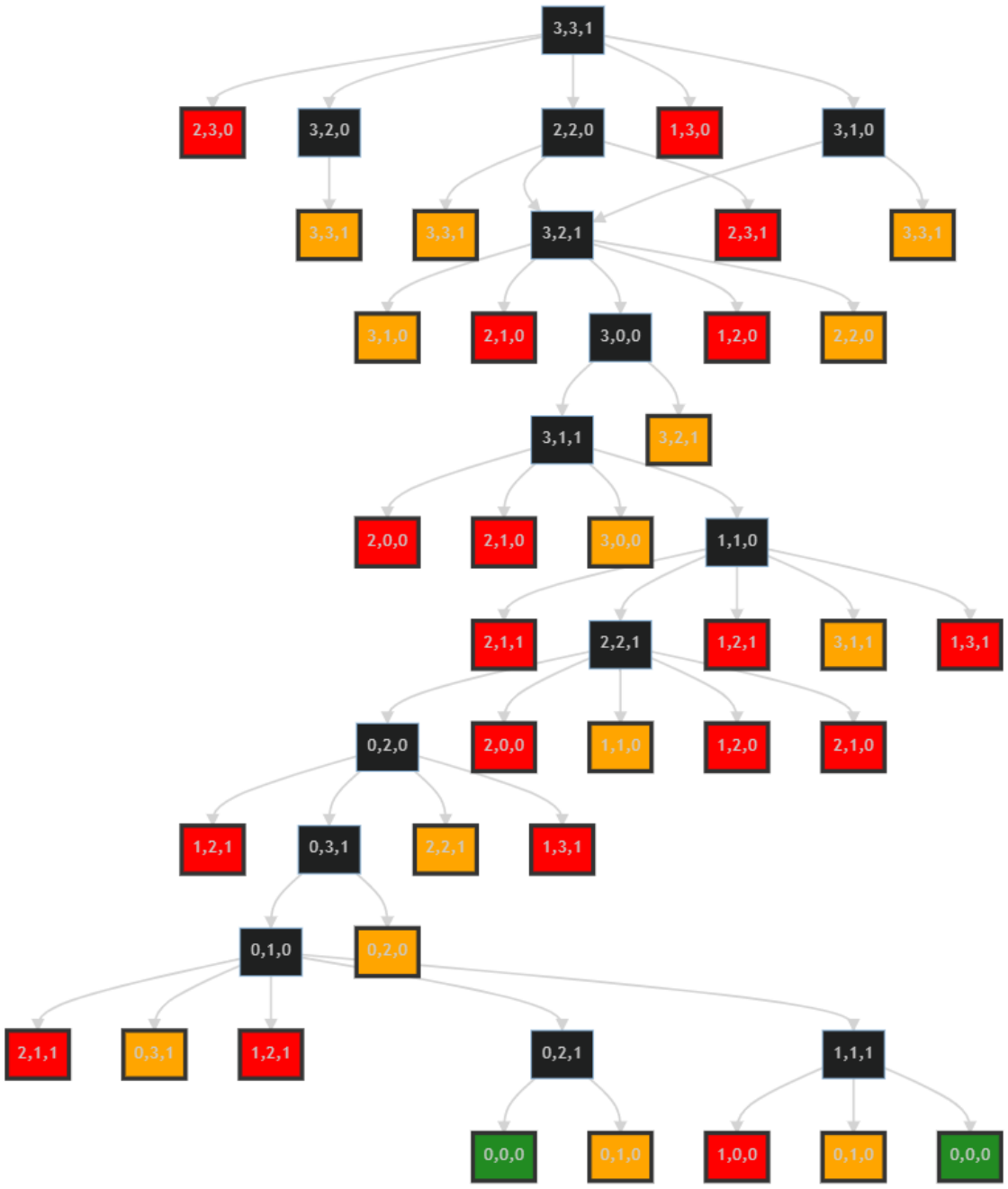
1 Tên : Vòng Vĩnh Phú

2 MSSV : 19110413

[ ]:
```
def bfs(graph, start, goal):
    queue = []
    # push the first path into the queue
    queue.append(([start],[0]))
    while queue:
    # can't find path to goal
        if (len(queue)==0):
            raise Exception("No way Exception")
    # get the first path from the queue
        path_state,path = queue.pop(0)
        # get the last node from the path
        node=path[-1]
        node_state= path_state[-1]
        # path found
        if node_state == goal:
            return path_state
        # explore path and push it into the queue
        for adj in graph.get(node, []): # explore path of graph
            explored = list(path_state) # remember node visited
            explored.append(adj[0])
            explored_node=list(path)
            explored_node.append(adj[1])
            queue.append((explored,explored_node)) #push path explored into␣
↪queue
```

[ ]:
```
from IPython.display import Image
Image("Graph.png")
```

[ ]:


3,3,1
2,3,0
3,2,0
2,2,0
1,3,0
3,1,0
3,3,1
3,3,1
3,2,1
2,3,1
3,3,1
3,1,0
2,1,0
3,0,0
1,2,0
2,2,0
3,1,1
3,2,1
2,0,0
2,1,0
3,0,0
1,1,0
2,1,1
2,2,1
1,2,1
3,1,1
1,3,1
0,2,0
2,0,0
1,1,0
1,2,0
2,1,0
1,2,1
0,3,1
2,2,1
1,3,1
0,1,0
0,2,0
2,1,1
0,3,1
1,2,1
0,2,1
1,1,1
0,0,0
0,1,0
1,0,0
0,1,0
0,0,0

[ ]:
```
MCGraph = {
    0:[([3,2,0],1),([2,2,0],2),([3,1,0],3)],
    2:[([3,2,1],4)],
    3:[([3,2,1],4)],
    4:[([3,0,0],5)],
    5:[([3,1,1],6)],
    6:[([1,1,0],7)],
    7:[([2,2,1],8)],
    8:[([0,2,0],9)],
    9:[([0,3,1],10)],
    10:[([0,1,0],11)],
    11:[([0,2,1],12),([1,1,1],13)],
    12:[([0,0,0],14)],
    13:[([0,0,0],14)],

}
MCGraph
```

[ ]:
```
{0: [([3, 2, 0], 1), ([2, 2, 0], 2), ([3, 1, 0], 3)],
 2: [([3, 2, 1], 4)],
 3: [([3, 2, 1], 4)],
 4: [([3, 0, 0], 5)],
 5: [([3, 1, 1], 6)],
 6: [([1, 1, 0], 7)],
 7: [([2, 2, 1], 8)],
 8: [([0, 2, 0], 9)],
 9: [([0, 3, 1], 10)],
 10: [([0, 1, 0], 11)],
 11: [([0, 2, 1], 12), ([1, 1, 1], 13)],
 12: [([0, 0, 0], 14)],
 13: [([0, 0, 0], 14)]}
```

[ ]:
```
path=bfs(MCGraph,[3,3,1],[0,0,0])
print("Solution for The missionaries and cannibals problem of BFS:","\n" ,*path)
```

```
Solution for The missionaries and cannibals problem of BFS:
 [3, 3, 1] [2, 2, 0] [3, 2, 1] [3, 0, 0] [3, 1, 1] [1, 1, 0] [2, 2, 1] [0, 2, 0]
[0, 3, 1] [0, 1, 0] [0, 2, 1] [0, 0, 0]
```