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Class / Branch: TE/CSE-DS
Subject: **Artificial Intelligence Lab**
Name of Instructor: Prof. Sarala Mary

Name of Student:Gauri Iyer
Student ID: 22107030
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Experiment No.02

Aim:- To implement 8 puzzle problem using heuristic technique in python.

Program:

1. Write a program to implement 8 puzzle problem using heuristic technique in python.

Code:

```
def print_in_format(matrix):
    for i in range(9):
        if i % 3 == 0 and i > 0:
            print("")
        print(str(matrix[i]) + " ", end="")
    print()  # Ensure there's a newline after the matrix

def count(s):
    c = 0
    ideal = [1, 2, 3, 4, 5, 6, 7, 8, 0]
    for i in range(9):
        if s[i] != 0 and s[i] != ideal[i]:
            c += 1
    return c

def move(ar, p, st):
    rh = float('inf')  # Use infinity for comparison
```

```
    store_st = st.copy()
    for i in range(len(ar)):
        if 0 <= ar[i] < 9:  # Ensure the move is within bounds
            dupl_st = st.copy()
            # Swap the zero tile with the adjacent tile
            dupl_st[p], dupl_st[ar[i]] = dupl_st[ar[i]], dupl_st[p]

            trh = count(dupl_st)
            if trh < rh:
                rh = trh
                store_st = dupl_st.copy()
    return store_st, rh

state = [1, 2, 3, 0, 5, 6, 4, 7, 8]
h = count(state)
level = 1
print("\n-----level " + str(level) + "-------")
print_in_format(state)
print("\nHeuristic value (misplaced): " + str(h))

while h > 0:
    pos = state.index(0)
    level += 1
    if pos == 0:
        arr = [1, 3]
    elif pos == 1:
        arr = [0, 2, 4]
    elif pos == 2:
```

```
    arr = [1, 5]
elif pos == 3:
    arr = [0, 4, 6]
elif pos == 4:
    arr = [1, 3, 5, 7]
elif pos == 5:
    arr = [2, 4, 8]
elif pos == 6:
    arr = [3, 7]
elif pos == 7:
    arr = [4, 6, 8]
elif pos == 8:
    arr = [5, 6]

state, h = move(arr, pos, state)

print("\n-----level " + str(level) + "-------")
print_in_format(state)
print("\nHeuristic value (misplaced): " + str(h))
```

Output:

```
-----level 1-------
1 2 3
0 5 6
4 7 8

Heuristic value (misplaced): 3

-----level 2-------
1 2 3
4 5 6
0 7 8

Heuristic value (misplaced): 2

-----level 3-------
1 2 3
4 5 6
7 0 8

Heuristic value (misplaced): 1

-----level 4-------
1 2 3
4 5 6
7 8 0

Heuristic value (misplaced): 0
```