Experiment 1: 8-Puzzle Program

Aim:

Implement an Algorithm in Python for solving 8-Puzzle Problem.

Python Program:

```
cost={(1,2,3,4,5,6,7,8,0):0}
tree=cost.copy()

def move(state,d):
    b=list(state)
    b[i],b[i+d]=b[i+d],0
    b=tuple(b)
    if b not in tree:
        tree[b]=state
        cost[b]=cost[state]+1

for x in range(14):
    for state in tree.copy():
        i=list(state).index(0)
        if i>2:
            move(state,-3)
        if i%3:
            move(state,-1)
        if i%3<2:
            move(state,1)
        if i<6:
            move(state,3)

g=[]
print("Enter initial state:")
for x in range(3):
    g+=map(int,input().split())

g=tuple(g)
if g in tree:
 print("cost:",cost[g],"\n")
 while g:
    for i in (0,3,6):
        print('%d %d %d'%g[i:i+3])
    g=tree[g]
    print()
else:
    print( -1)
```

Output:

```
Enter initial state:
1 2 3
0 4 6
7 5 8
cost: 3

1 2 3
0 4 6
7 5 8

1 2 3
4 0 6
7 5 8

1 2 3
4 5 6
7 0 8

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

Result:

Code has been Implemented successfully.