EXPERIMENT-14

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Course: CSA1789 Artificial Intelligence

Q) Write the python program for Missionaries Cannibal problem

PROGRAM:

```
start,end =[3,3,1],[0,0,0]
def do_action(state,action):
    if state[2] == 1:
        return [state[i] - action[i] for i in range(3)]
    else:
        return [state[i] + action[i] for i in range(3)]
def is_legal(state):
    if 0 <= state[0] <= 3 and 0 <= state[1] <= 3:
        return True
    else:
        return False
def is_bank_safe(bank):
    if bank[1] > bank[0] and bank[0] != 0:
        return False
    else:
        return True
def is_state_safe(state):
    other_bank = [start[i]-state[i] for i in range(3)]
    if is_bank_safe(state) and is_bank_safe(other_bank) :
        return True
    else:
        return False
def next_possible_actions(state):
    actions = [[1,0,1],[0,1,1],[1,1,1],[2,0,1],[0,2,1]]
    moves = []
    for i in actions:
        j = do_action(state,i)
        if is_legal(j) and is_state_safe(j):
            moves.append(j)
    return moves
solutions = []
def solve(next_action,path):
    _path = path.copy()
    if next_action == end:
        _path.append(next_action)
        solutions.append(_path)
        return
    elif next_action in path:
        return
    else:
        _path.append(next_action)
```

```
        for i in next_possible_actions(next_action):
            solve(i,_path)

solve([3,3,1],[])
print(*solutions,sep="\n")
```

OUTPUT: