01/09/24

## Vacuum Cleaner Problem

Algorithm:

Step 1: Consider two Rooms $R_1$ and $R_2$, status, S (0 represents the room is dirty, 1 represents the room is clean)

Step 2: Start from Room $R_1$, check the status, If it is 0 clean the room $R_1$ and move to room $R_2$ (status to 1)

Step 3: Check Room $R_2$, if it is dirty clean the room and change the status to 1.

Step 4: Check all the Rooms, If status is 0, clean, go to step 2

Step 5: Go back to start.

Percept Sequence:

| Room No: (Location) | Status | Action |
|---|---|---|
| Room 1 | 0 | Clean the room |
| Room 1 | 1 | Move right |
| Room 2 | 0 | Clean the room |
| Room 2 | 1 | Move left |
| Room 1 | 1 | Stop |

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Pseudocode:

Initialize a list (2 x 1), two rooms R, L
rooms ← [0, 0] // 0 → dirty.

curr ← [0] (1st index)

while (true) do.

If rooms [curr] == 0
rooms [curr] = 1.
curr ← (curr + 1) % 2

rooms [curr] ← random (0, 1)
If rooms [curr] == 0
break;

Else,
curr ← (curr + 1) % 2
If rooms [curr] = 1
break;

Code:

```
import random

def vaccum_cleaner():
    rooms = [random.choice([0, 1]),
             random.choice([0, 1])]

print("Initial status of rooms:")
for i, status in enumerate(rooms):
    print(f"Room {i+1}: {'Clean' if status == 1 else 'Dirty'}")
```

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```
while not all (room == 1 for room in
                rooms):
    for i in range (len( rooms)):
        if rooms[i] == 0:
            print (f" Room {i+1} is dirty.
                    cleaning ...")
            rooms[i] == 1
            print (f" Room {i+1} is now
                    clean.")
        else:
            print (f" Room {i+1} is already
                    clean")
            rooms[i] = random.choice ([0,1])

print ("Status Update")
for i, status in enumerate (rooms):
    print (f"Room {i+1} : {'clean' if
        status == 1 else 'Dirty'}")

print ("All rooms are clean!")
```

Output:

```
Initial status of rooms:
Room 1 : Dirty
Room 2 : Dirty

Room 1 is dirty . Cleaning
Room 1 is now clean.
Room 2 is dirty cleaning
Room 2 is now clean

Status Update
```

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Room 1 : Clean
Room 2 : Dirty
Room 1 is already clean
Room 2 is dirty . Cleaning
Room 2 is now clean.

Status update.
Room 1 : Clean
Room 2 : Clean
All rooms are clean

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