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# AI Assignment – 2

Que1. Given two jugs- a 4 litre and 3 litre capacity. Neither has any measurable markers on it. There is a pump which can be used to fill the jugs with water. Simulate the procedure in Python to get exactly 2 litre of water into 4-litre jug.

Code :

```
def get_2l_in_4ljug():
    start=[0,0]
    a_cap=4
    b_cap=3
    print(start)
    while(start[0]!=2):
        if start[0]==0 and start[1]==0:
            start[1]=3
        elif start[0]==4:
            start[0]=0
            start[0]=start[1]
            start[1]=0
        elif start[1]==0:
            start[1]=3
        elif start[1]==b_cap and start[0]!=a_cap and start[1]!=0:
            temp=start[0]
            r_cap=a_cap-temp
            if r_cap>=start[1]:
                start[0]=start[0]+start[1]
                start[1]=0
            elif r_cap<start[1]:
                start[0]=4
                start[1]=start[1]-r_cap
```

```
    print(start)
print("Water Jug Problem starts in which output is [2,] :: ")
get_2l_in_4ljug()
```

**OUTPUT:**

```
[2, 0]
```

**Que2. Given three jugs: 12, 8 and 5 liter capacities. Largest jug is completely filled. Using these 3 jugs, split the water to obtain exactly 6 liter in largest jugs.**

**Code:**

```
def get_6l_in_12ljug():
  start=[12,0,0]
  a=12
  b=8
  c=5
  if start[0]+start[1]+start[2]==12:
    pass
  else:
    print("Sum of this problem is not 12")
  while(start[0]!=6):
    if start[1]==0:
      if start[0]<=b:
        start[1]=start[0]
        start[0]=0
      elif start[0]>b:
        rem=b-start[1]
        start[1]=b
        start[0]=start[0]-rem
    elif start[2]==0:
      if start[1]>=c:
        start[2]=c
```

```
            start[1]=start[1]-c
        elif start[1]<c:
            start[2]=start[1]
            start[1]=0
    elif start[2]==c:   # c is full
        start[0]=start[0]+start[2]
        start[2]=0
    elif start[2]<c and start[1]==b:
        rem=c-start[2]
        start[2]=c
        start[1]=start[1]-rem
    print(start)
print("Water Jug Problem starts in which output is [2, , ] :: ")
get_6l_in_12ljug()
```

**OUTPUT:**

```
PS D:\GIT\AI-Lab> & C:/Users/mayan/AppData/Local/Microsoft/WindowsApps/pytho
Water Jug Problem starts in which output is [2, , ] ::
[4, 8, 0]
[4, 3, 5]
[9, 3, 0]
[9, 0, 3]
[1, 8, 3]
[1, 6, 5]
[6, 6, 0]
PS D:\GIT\AI-Lab>
```

3 Write a code in python for the 8 puzzle problem by taking the following initial and final states

Initial State

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 8 | | 4 |
| 7 | 6 | 5 |

Goal State

| | | |
|---|---|---|
| 2 | 8 | 1 |
| | 4 | 3 |
| 7 | 6 | 5 |

Code:

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