

# AI EX-1: Implementation of Toy Problem

## Team : Automata Lab

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## \*Problem Name : Water Jug Problem

\*Problem Statement : There are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to fill the jug, and the container in which water may be poured. Neither jug has any measuring markings on it. How to get exactly 2 gallons of water in the 4-gallon jug?

Note : Initially both the jugs are empty.

## \*Code:

```
print("Water Jug Problem")

x=int(input("Enter X:"))

y=int(input("Enter Y:"))

while True:

    rno=int(input("Enter the Rule no"))

    if rno==1:

        if x<4:

            x=4

    if rno==2:
```

```
    if y<3:
        y=3
if rno==5:
    if x>0:
        x=0
if rno==6:
    if y>0:
        y=0
if rno==7:
    if x+y>=4 and y>0:
        x,y=4,y-(4-x)
if rno==8:
    if x+y>=3 and x>0:
        x,y=x-(3-y),3
if rno==9:
    if x+y<=4 and y>0:
        x,y=x+y,0
if rno==10:
    if x+y<=3 and x>0:
        x,y=0,x+y
print("X=",x)
print("Y=",y)
if(x==2):
    print("The Goal is reached")
    break
```

Home Page - Select or create a n x

Water-Jug Problem - Jupyter No x

+

localhost:8888/notebooks/Water-Jug%20Problem.ipynb

Jupyter Water-Jug Problem Last Checkpoint: 18 minutes ago (unsaved changes)

Logout

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 3

In [3]:

```
print("Water Jug Problem")
x=int(input("Enter X:"))
y=int(input("Enter Y:"))
while True:
    rno=int(input("Enter the Rule no"))
    if rno==1:
        if x<4:
            x=4
    if rno==2:
        if y<3:
            y=3
    if rno==5:
        if x>0:
            x=0
    if rno==6:
        if y>0:
            y=0
    if rno==7:
        if x+y>=4 and y>0:
            x,y=4,y-(4-x)
    if rno==8:
        if x+y>=3 and x>0:
            x,y=x-(3-y),3
    if rno==9:
        if x+y<=4 and y>0:
            x,y=x+y,0
    if rno==10:
        if x+y<=3 and x>0:
            x,y=0,x+y
    print("X=",x)
    print("Y=",y)
    if(x==2):
        print("The Goal is reached")
        break
```

Water Jug Problem  
Enter X:0  
Enter Y:0  
Enter the Rule no2  
X= 0

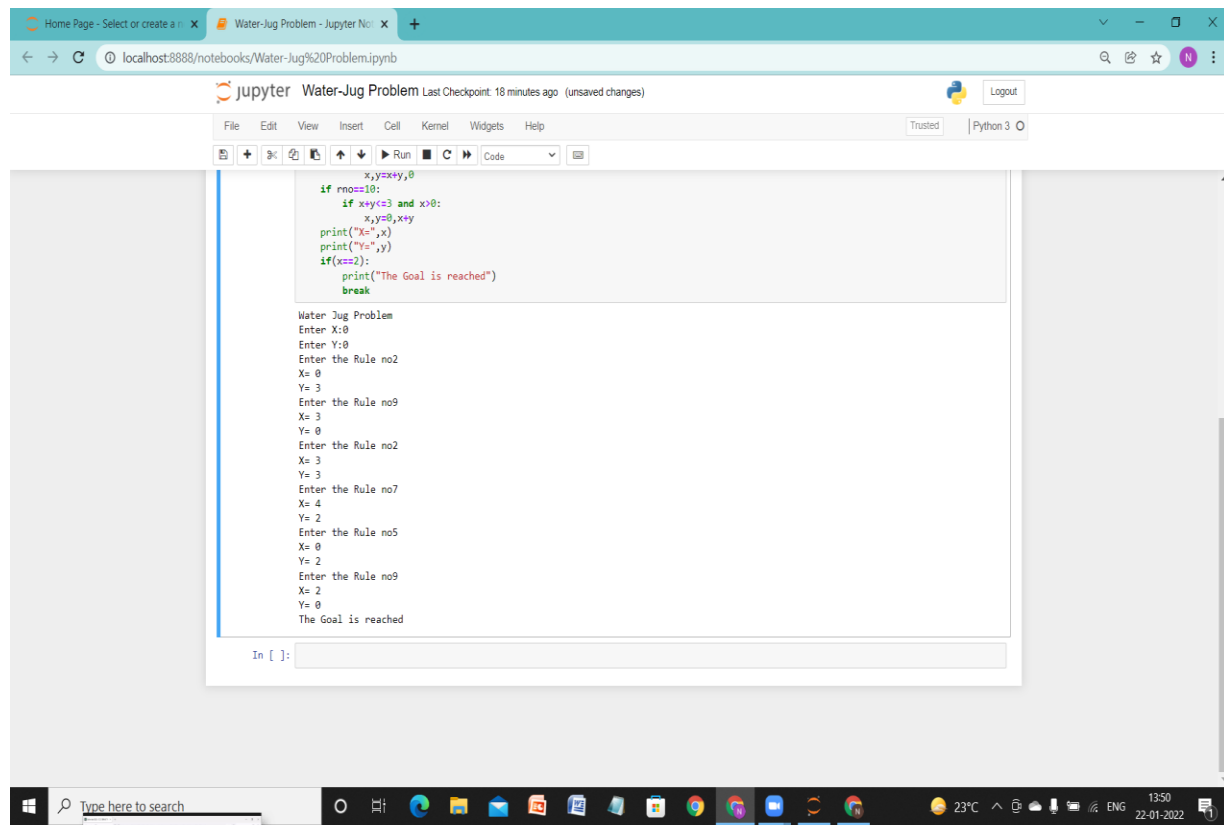
Type here to search

23°C

13:50

22-01-2022

## **\*Output:**



The screenshot shows a Jupyter Notebook interface in a web browser. The browser address bar shows 'localhost:8888/notebooks/Water-Jug%20Problem.ipynb'. The notebook title is 'Water-Jug Problem' with a 'Last Checkpoint: 18 minutes ago (unsaved changes)' status. The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for file operations, running, and code execution. The code cell contains the following Python code:

```
x,y=x,y,0
if rno==10:
    if x+y<=3 and x!=0:
        x,y=0,x+y
    print("X=",x)
    print("Y=",y)
    if(x==2):
        print("The Goal is reached")
        break
```

The output cell displays the following text:

```
Water Jug Problem
Enter X:0
Enter Y:0
Enter the Rule no2
X= 0
Y= 3
Enter the Rule no9
X= 3
Y= 0
Enter the Rule no2
X= 3
Y= 3
Enter the Rule no7
X= 4
Y= 2
Enter the Rule no5
X= 0
Y= 2
Enter the Rule no9
X= 2
Y= 0
The Goal is reached
```

The bottom of the image shows a Windows taskbar with various application icons, a search bar, and system tray information including temperature (23°C), time (13:50), and date (22-01-2022).

## **\*State a scenario to map your toy world solution to a real-world solution.**

In solving water jug problem we have used production rule, which is used in our day to day life in the field of artificial intelligence and in the field of production in the companies. It provides modularity, as all the rules can be added, deleted or modified individually.