

AI

LAB-13

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Problem Implement the Water Jug Problem using Prolog

Code:

```
member(X, [X|R]).
```

```
member(X, [Y|R]) :- member(X,R).
```

```
append([X|Y], Z, [X|W]) :- append(Y,Z,W).
```

```
append([], X, X).
```

```
/*
```

```
production rules for the water jug problem
```

```
*/
```

```
maneuver(X, Y, Z):-X==2, Y==0, write('done').
```

```
maneuver(X, Y, Z):-X<4, \+ member(Z, (4,Y)), append(Z, [(4,Y)], A), write('Fill 4 gallon jug\n'),  
maneuver(4,Y,A).
```

```
maneuver(X, Y, Z):-Y<3, \+ member(Z, (X,3)), append(Z, [(X,3)], A), write('Fill 3 gallon jug\n'),  
maneuver(X,3,A).
```

```
maneuver(X, Y, Z):-X>0, \+ member(Z, (0,Y)), append(Z, [(0,Y)], A), write('Empty the 4 gallon jug\n'),  
maneuver(0,Y,A).
```

```
maneuver(X, Y, Z):-Y>0, \+ member(Z, (X,0)), append(Z, [(X,0)], A), write('Empty the 3 gallon jug\n'),  
maneuver(X,0,A).
```

```
maneuver(X, Y, Z):-X+Y>=4, Y>0, \+ member(Z, (4,Y-(4-X))), append(Z, [(4,Y-(4-X))], A), write('Pour from 3  
gallon jug to 4 gallon jug\n'), ma$
```

```
maneuver(X, Y, Z):-X+Y>=3, X>0, \+ member(Z, (X-(3-Y),3)), append(Z, [(X-(3-Y),3)], A), write('Pour from 4  
gallon jug to 3 gallon jug\n'), ma$
```

```
maneuver(X, Y, Z):-X+Y<=4, Y>0, \+ member(Z, (X+Y, 0)), append(Z, [(X+Y, 0)], A), write('Pour the water in  
the 3 gallon jug into the 4 gallon$
```

```
maneuver(X, Y, Z):-X+Y<=4, Y>0, \+ member(Z, (0, X+Y)), append(Z, [(0, X+Y)], A), write('Pour the water in  
the 4 gallon jug into the 3 gallon$
```

**Output:**

Fill 4 gallon jug

Fill 3 gallon jug  
Empty the 4 gallon jug

Fill 4 gallon jug

Empty the 4 gallon jug

Fill 4 gallon jug

Empty the 4 gallon jug

Fill 4 gallon jug

Empty the 4 gallon jug

Fill 4 gallon jug

Empty the 4 gallon jug

Fill 4 gallon jug

Empty the 4 gallon jug

Fill 4 gallon jug

Empty the 4 gallon jug

...