Water Jug Problem

Problem : We have 2 water jugs, one measure x Gallon and the other one measure y Gallon. But there is no measuring label mentioned on either of these jugs i.e we cannot know the exact amount of water filled in the jug. If we want to know ⟶ how ?

i) The is infinite amount of water supply.
ii) We can empty / fill the jugs completely.
iii) We can transfer water from 1 jug to another.

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Q- Fill 2G of water into any one of this jug

x = 0, y = 0
x = 0, y = 3
x = 3, y = 0
x = 3, y = 3
x = 4, y = 2

Start state : (0,0)
Goal state : (2,0)

x	y
4G	3G

→ Production rules :

Rule	State	Process
1	(x, y / x < 4)	(4, y) $ Fill 4-gallon jug
2	(x, y / y < 3)	(x, 3) $ Fill ... jug
3	(x, y / x > 0)	(0, ...) $
4	(x, y / y > 0)	
	(x, y / x + y ≥ 4, y > 0)	

6	$(x, y \mid x+y \geq 3 \wedge x>0)$	$(x-(3-y), 3)$	§ Pour water from 4 to the other 3 gallon jug until 3-gallon jug is full & mentioned ut of water
7	$(x, y \mid x+y \leq 4 \wedge y>0)$	$(x+y, 0)$	§ Pour all water from 3 to 4 gallon jug
8	$(x, y \mid x+y \leq 3 \wedge x>0)$	$(0, x+y)$	§ Pour all water f 4 to 3 gallon jug

Problem

9

$\Longrightarrow$

Gallons in 4-gallon jug	Gallons in 3-gallon jug
0	0
0	0
4	3

Rule

1
6

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