

Topic: **Heuristics**

Station: **Halving the wine**

Call the containers **3, 5, 8**.

The 8 litre container is just used as a receptacle, so the number 8 does not figure in the solution. The problem, then, amounts to asking, 'How can you make the number 4 from the numbers 5 and 3, just using addition and subtraction?'

There are two solutions, corresponding to these two chains of operations:

(A) $5 - [3 - (5 - 3)]$ and (B) $3 + [3 - (5 - 3)]$.

In both cases we first make 1 litre, then obtain 4 as follows:

in case (A) by subtracting the 1 from 5.

in case (B) by adding the 1 to 3.

We start with 8 l. in **8**.

(A) Fill **5**.

Fill **3** from **5**, leaving 2 l. in **5**.

Empty **3** into **8**.

Empty **5** into **3**, leaving a 1 l. space in **3**.

Fill **5**.

Fill **3** from **5**, leaving 4 l. in **5**.

Pour **3** into **8**, leaving 4 l. in **8**.

(B) Fill **3**.

Fill **5** from **3**, leaving a 2 l. space in **5**.

Fill **3**.

Fill **5** from **3**, leaving 1 l. in **3**.

Empty **5** into **8**.

Empty **3** into **5**, leaving 1 l. in **5**.

Refill **3**.

Empty **3** into **5**, to make 4 l. in **5**, therefore leaving 4 l. in **8**.

Number of litre in each of the three containers

8	5	3
3	5	0
3	2	3
6	2	0
6	0	2
1	5	2
1	4	3
4	4	0
5	0	3
5	3	0
2	3	3
2	5	1
7	0	1
7	1	0
4	1	3
4	4	0