**Water jug problem:**

**Problem:** There are two jugs of **volume A litre** and **B litre.** Neither has any **measuring mark** on it.There is a pump that can be used to fill the jugs with water.How can you get exactly**x litre** of water into the **A litre jug.**Assuming that we have unlimited supply of water.

**Note:**Let's assume we have **A=4 litre and B= 3 litre jugs**. And **we want exactly 2 Litre water into jug A (i.e 4 litre jug)** how we will do this.

We basically perform three operations to achieve the goal.

Fill water jug.

Empty water jug

and Transfer water jug

Two possible solutions to the above problem

(0,0) 🡪(4,0)🡪(1,3)🡪(1,0)🡪(0,1)🡪(4,1)🡪(2,3)🡪(2,0)

Steps:

* Fill the first jug
* Transfer water from first jug to another
* Empty the second jug
* Transfer water from first jug to another
* Fill the first jug again
* Transfer water from first jug to second jug
* Empty the second jug

Second solution:

(0,0)🡪(0,3)🡪(3,0)🡪(3,3)🡪(4,2)🡪(0,2)🡪(2,0)

Practice Question

Let's assume we have **A=5 litre and B= 4 litre jugs**. And **we want exactly 2 Litre water into jug B (i.e 4 litre jug)** how we will do this.

Missionaries and cannibals problem

In the missionaries and cannibals problem, three missionaries and three cannibals must cross a river using a boat which can carry at most two people, under the constraint that, for both banks, if there are missionaries present on the bank, they cannot be outnumbered by cannibals (if they were, the cannibals would eat the missionaries). The boat cannot cross the river by itself with no people on board.

