Simply Marble-ous Problem

Solution: Let each bag (coloured red, blue and green) originally contain *n* marbles and let each scoop contain *s* marbles. If $x =$ red marbles moved from bowl 2 to bowl 3 and $y =$ blue marbles moved from bowl 2 to bowl 3 then

$$x + y = s.$$

Further, let a, b, c be the red, blue and green marbles moved from bowl 3 to the bowl 1. Since the third bowl finishes with 12 red marbles, we have

$$x - a = 12.$$

Also $a + b + c = s$.

Now the condition of 3 bowls will be given as follows:

Bowl 1: $(R, B, G) = (n - b - c, b, c)$

Bowl 2: $(B, G) = (b + c - 12, n - b - c + 12)$

Bowl 3: $(R, B, G) = (12, c - 12, n - c,)$.

Since every colour present is between one-fourth and one-half of the bowl and bowl 3 contains 12 red marbles, we have

$$\frac{n}{4} \leq 12 \leq \frac{n}{2}$$

$$24 \leq n \leq 48.$$

Similarly applying the same inequality to bowls1 and 2, we get

$$c = 24, b = 12 \text{ and } n = 48.$$

This shows that each bag originally contains 48 marbles. Therefore total number of marbles is 144. The final contents of bowls are given by:

BOWL	RED	BLUE	GREEN
1	12	12	24
2	24	24	0
3	12	12	24

Now $s = x + y = x + (24 - 12) = x + 12$. Therefore x may be between 12 and 35. Since the first scoop can not empty the first bowl, we have $s < 48$. So $24 \leq s \leq 47$.

Thus the total number of marbles is 144, the final arrangement is given in the above table and scoop size is any integer between 24 and 47.

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