Puzzle 11 | (1000 Coins and 10 Bags)

A dealer has 1000 coins and 10 bags. He has to divide the coins over the ten bags, so that he can make any number of coins simply by handing over a few bags. How must divide his money into the ten bags?

Solution:

We can represent any decimal number as weights of binary system. For example, if we want to measure upto 7, first three bags are sufficient.

1 = 2^0

2 = 2^1

3 = 2^0 + 2^1

4 = 2^2

5 = 2^2 + 2^0

6 = 2^2 + 2^1

7 = 2^2 + 2^1 + 2^0

It can be easily generalized. We can measure upto 2^n – 1.

Fun is, we can also measure the same using powers of 3. For example, we have bags with 1, 3 and 9 coins,

1 = 1

2 = 3-1

3 = 3

4 = 3+1

5 = 9-3-1

6 = 9-3

7 = 9+1-3

8 = 9 -1

9 = 9

10 = 9+1

11 = 9+3-1

12 = 9+3

13 = 9+3+1

From 14 onwards next bag comes into picture.

Factorization algorithms other than powers of 2 are costly on computer systems. Please share any other information. Any person working on cryptography can share more details.

Source: http://www.geeksforgeeks.org/forums/topic/1000-coins-and-10-bags/