AccountAble™

121. Dealing with Millions and Billions - 2

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US System (contd.)

Quadrillion: A quadrillion means a thousand trillion $(1,000,000,000,000,000)^1$. Literally, this means thousand thousand thousand thousand thousand thousands. Or, you could say, 1, followed by 15 zeros. Mathematicians express this as 10^{15} .

As expected, the Latin prefix *quad* means four, as in *quadruped*. What is a quadruped? An animal that has four (*quad*) feet (*ped*).

If we stacked up a quadrillion pennies² in a cube, what would we get³? A cube

measuring 2730 x 2730 x 2730 x 2730 feet! That's roughly half a mile wide, and would weigh three billion tons!!



Clearly, even loose change can make a big difference if stacked together!

¹ One followed by 12 zeros, same as British billion

Centillion: The list then continues⁴ in the same manner, till the time we reach a *centillion*. A cent means a hundred. So you have to repeat your thousand for a hundred times.

A centillion is counted when you write thousand a hundred times, before you write the final 'thousands'. All told, it gives you (100x3)+3= 303 zeros.

British System⁵

The British system is essentially the original French system, as designed by Chuquet in 1484. Here million is used as a step. This means that the number names change only when multiplied by a million.

In some ways this system is more logical than the short-scale system. However, it is also much more unwieldy. For instance, if you wanted to say 900000, 000000 in words, you would have to say nine hundred thousand million. In the US system this would be said as nine hundred billion.

Talking of unwieldiness, can you guess how the Romans would have written 1,888 in Roman numerals? Turn to the end of this issue for the answer.

Million: A million means one <u>thousand</u> thousands (1,000,000). This is the same

 $^{^{2}}$ 1,000,067,088,384,000 pennies to be precise.

³ To see what it would look like, visit http://www.kokogiak.com/megapenny/seventeen.asp. Last visited 18-Aug-2006

⁴ Quintillion, Sextillion, Septillion, Octillion, Nonillion, Decillion, Undecillion, Duodecillion.

⁵ Also known as the Long Scale system

as in the short-scale system used in USA.

Billion: A billion means a million millions (1,000000,000000)⁶. However, over the recent years, some people in Britain have also started using the word in the same sense as the Americans – as a thousand million.

Clearly, a British billionaire will be richer than an American billionaire, even if we measured their wealth in same currency. At the same time, there will be far fewer of them.

Trillion: A trillion means a million billions (1,000000,000000,000000)⁷.

Quadrillion: A quadrillion is written as 1 followed by 24 zeros. That means, 1 is followed by four (*quad*) groupings of six zeros each.

Centillion: Let us now jump to a centillion. A cent means a hundred. So you have to muliply 1 by a million for a hundred times.

If you add 600 zeros after 1, you will get a *centillion* (a hundred sets of six zeros).

Mathematically, this is expressed as

10⁶⁰⁰. What does this notation mean?



⁶ One followed by 12 zeros. This means that there are two sets of six zeros in the British

write 10^3 , it means you have to multiply 10 for 3 times: 10x10x10 = 1,000.

Therefore, when you write 10^{600} , it means that you have multiplied 10 exactly 600 times.

References:

 Georges Ifrah, The Universal History of Numbers, 1998, The Harvill Press Ltd., Great Britain; Indian edition (paperback) available in Penguin hdia.

The Roman Answer

How is 1888 written in Roman numerals? As MDCCCLXXXVIII.

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⁷ One, followed by 18 zeros. You can see that this really means three (*tri*) sets of six zeros.

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Kharab, Trillion or Billion?

Figure	Scien- tific	Indian	US	British/ German
1,00,000	10 ⁵	Lakh	Hundred Thousand	Hundred Thousand
10,00,000	10 ⁶	10 Lakh	Million	Million
1,00,00,000	10 ⁷	Crore	10 Million	10 Million
10,00,00,000	10 ⁸	10 Crore	100 Million	100 Million
1,00,00,00,000	10 ⁹	Arab	Billion	1,000 Million
10,00,00,00,000	10 ¹⁰	10 Arab	10 Billion	10,000 Million
1,00,00,00,00,000	10 ¹¹	Kharab	100 Billion	1,00,000 Million
10,00,00,00,00,000	10 ¹²	10 Kharab	Trillion	Billion
1,00,00,00,00,00,000	10 ¹³	Neel	10 Trillion	10 Billion
10,00,00,00,00,00,000	10 ¹⁴	10 Neel	100 Trillion	100 Billion
1,00,00,00,00,00,00,000	10 ¹⁵	Padm	Quadrillion	1,000 Billion
10,00,00,00,00,00,000	10 ¹⁶	10 Padm	10 Quadril- lion	10,000 Billion
1,00,00,00,00,00,00,000	10 ¹⁷	Shankh	100 Quadril- lion	1,00,000 Billion
10,00,00,00,00,00,00,00	10 ¹⁸	10 Shankh	Quintillion	Trillion
1,00,00,00,00,00,00,00,00	10 ¹⁹	Samudra	10 Quintillion	10 Trillion
10,00,00,00,00,00,00,00,000	10 ²⁰	10 Samu- dra	100 Quinti l- lion	100 Trillion
1,00,00,00,00,00,00,00,00,000	10 ²¹	Antya	Sextillion	1,000 Trillion

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