

# AccountAble™

120. Dealing with Millions and Billions – 1

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When we were young, we learnt to deal with small numbers. We were also taught Indian number names (lakhs, crores etc.) for larger numbers. However, we did not learn the Western system for large numbers (millions, billions etc.). This often causes confusion when people use millions and billions, instead of lakhs and crores.

Similarly, when a donor agency talks about a billion, we should know whether it means a thousand million or a million million.

This issue of AccountAble tries to give an idea of the Western numbering system. This system has been designed to deal with large numbers in a simple and functional way.

A comparative chart showing how to translate from Indian system to Western is also given in AccountAble 121.

## Western System

In ancient times, Western civilizations did not have much need for large numbers. For instance, the Greeks stopped after naming 10,000 as myriad. A hundred million (100,000,000) was therefore called 'myriad myriad'. This is also the largest number found in Holy Bi-

ble<sup>1</sup>.

Archimedes (?287-212 BCE), of the 'Eureka' fame, also tried to work with large numbers<sup>2</sup>. He imagined a sphere whose diameter was equal to the distance between the earth and the fixed stars. He wanted to count the number of sand-grains needed to fill the sphere. For his calculations, he needed



a way to express large numbers.

This he did by imagining a 'doubled class' of

numbers containing eight digits. These were called *octets*. He then calculated that the sand-grains needed would be slightly less than  $10^{64}$ ! Fortunately, his system never caught on amongst Greek mathematicians 😊.

## The Present System

In the West, large number names are based on Latin words. The names

<sup>1</sup> Daniel 7:10. 'A fiery stream issued and came forth from before him: thousand thousands ministered unto him, and *ten thousand times ten thousand* stood before him: the judgment was set and the books were opened.' [emphasis added]

<sup>2</sup> Georges Ifrah, p. 222

change every time you multiply a basic unit of 1,000 by a thousand. Thus, a million contains one thousand thousands. A billion contains thousand thousand thousands. A trillion contains thousand thousand thousand thousands. This is also called the short-scale system.

### Origins

Essentially, this system is similar to the old Arabic system<sup>3</sup>, where a quadrillion would be expressed as one thousand thousand thousand thousands. However, the smart thing is that



you don't have to repeat the word thousand again and again. Instead, you simply count the number of times 'thousand' has been used as a multiplier and use it as a name. In this case, the basic figure of 1,000 was multiplied four times. Therefore, the number name is *quadrillion*. Why *quadri*? Because, *quadri* is Latin for four.

Who invented this system of naming<sup>4</sup>? A French mathematician named Nicolas Chuquet is believed to have written

about this for the first time<sup>5</sup> in 1484. However, he died shortly afterwards and his work<sup>6</sup> remained unpublished for another 400 years. In the meanwhile, a person called Estienne de La Roche copied most of the work in his textbook, *Larismetique*<sup>7</sup>. It was only much later that Chuquet got the credit due to him.

Gradually, by about 1650 C.E. or so,<sup>8</sup> large number-names became common in Europe.

We will now look at the current Western number names. In the West, there are two different types of systems: short-scale (US)<sup>9</sup> and long-scale (UK)<sup>10</sup>.

### US System<sup>11</sup>

This system is used in France, Germany and USA. It is also used in most international transactions.

**Million:** A million means one thousand thousands (1,000,000). The word mil-

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<sup>3</sup> Georges Ifrah, p.428

<sup>4</sup> Source: Wikipedia;  
[http://en.wikipedia.org/wiki/Nicolas\\_Chunque\\_t](http://en.wikipedia.org/wiki/Nicolas_Chunque_t), last visited 16-Aug-2006

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<sup>5</sup> A person called Jehan Adams used similar words (bymillion, trymillion) in 1475.

<sup>6</sup> *Triparty en la science des nombres*

<sup>7</sup> 1520 C.E.

<sup>8</sup> Georges Ifrah, *The Universal History of Numbers*, 1998, p. 428

<sup>9</sup> The short-scale system is a modified form of the original French system. It is the most popular system, and is fast replacing the long-scale system. It is used in Canada, France and USA, and in almost all international transactions.

<sup>10</sup> This system was originally designed by the French mathematician Chuquet in 1484. It is still used in Germany and Great Britain. This uses a million as the basic unit for large numbers. The names are given on the basis of number of times 1 has been multiplied by a million.

<sup>11</sup> Also known as the short-scale system.

lion (imil yn) comes from the Latin *mille* (ma#l ). In Roman times, the plural of this word (*millia*) meant a distance of thousand paces. Today, it is generally used to indicate a thousand of anything, such as a thousand years (millennium) or an insect with a thousand legs (millipede)!



its  
around the world.

The word *million* was introduced into French language around 1270 CE. From there it entered English language and has now gradually made way

Though the word *million* has a Roman link, the Romans themselves never used it in this sense. They did not have specific names for any numbers beyond a hundred thousand. Therefore, 1,000,000 was referred as *decies centena milia* (ten hundred thousand)<sup>12</sup>.

**Billion:** A billion means a thousand million (1,000,000,000)<sup>13</sup>. The Latin prefix *bi* means two<sup>14</sup>. What does this mean? Well, a billion means a thousand thou-

<sup>12</sup> Georges Ifrah, p.427. This style of expression is somewhat similar to what the Government has started doing in India, using unmanageable phrases such as five thousand crores or five lakh crores.

<sup>13</sup> One followed by nine zeros

<sup>14</sup> as in bicycle, having two wheels (or cycles).

sand thousands. Thus, the word thousand occurs twice. Hence, the name billion.

The Forbes magazine publishes a list of billionaires each year. These are people who are believed to own a billion dollars or more. According to the latest list for 2006, there are 793 billionaires in the world<sup>15</sup>. The top five are:

1. Sh. Bill Gates, 50 yrs., USA
2. Sh. Warren Buffett, 75 yrs., USA
3. Sh. Carlos Slim Helú, 66 yrs., Mexico
4. Sh. Ingvar Kamprad, 79 yrs., Sweden
5. Sh. Lakshmi Mittal, 55 yrs., India

You would probably think that being a billionaire is a good thing. However, sometimes the listing causes controversies. For example, in 2006, Forbes magazine claimed<sup>16</sup> that Sh. Fidel Castro is world's sixth richest ruler (\$900 million). The British Queen, Elizabeth II, was a poorer ninth on the list (\$500 million)! Sh. Castro has denied the allegation: "If they can prove I have an account abroad... containing even one dollar I will resign my post."<sup>17</sup>

<sup>15</sup> <http://www.forbes.com/billionaires/>; last visited 18-Aug-06

<sup>16</sup>

<http://www.forbes.com/business/forbes/2006/0522/056.html>, last visited 18-Aug-06

<sup>17</sup> 'Castro: I Am Not Rich' CBS News; <http://www.cbsnews.com/stories/2006/05/16/world/main1622957.shtml>, last visited 16-Aug-06

**Trillion:** A trillion means a thousand billion (1,000,000,000,000)<sup>18</sup>. The Latin prefix *tri* means three<sup>19</sup>. What does this mean?

A trillion means a thousand thousand thousand thousands. Thus, the word thousand occurs thrice. Hence, the name trillion.

So far, Forbes magazine has not discovered any trillionaires on this planet. The



Photo Credit: Ricardo Stuckert/ABr.

one possible future candidate, Sh. Bill Gates, has already decided to donate most of his wealth to charity.

Now for an interesting thought. How much space would a trillion pennies<sup>20</sup> occupy?

Or what would you get if you stacked up a trillion pennies<sup>21</sup>? Well, you will get a cube, which would be 273 ft. high, 273 ft. wide and 273 feet long. That's four feet taller than the Vikas Minar in Delhi, which is just 269 feet high!

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<sup>18</sup> One followed by 12 zeros, same as British billion

<sup>19</sup> as in tricycle, having three wheels (a wheel is also known as a cycle).

<sup>20</sup> In USA, a cent is called a penny. It is worth about 45 paise.

<sup>21</sup> Actually, 1,000,000,016,640 pennies to be exact.

## References:

1. Georges Ifrah, *The Universal History of Numbers*, 1998, The Harvill Press Ltd., Great Britain; Indian edition (paperback) available in Penguin India.
2. *Holy Bible*, 2003, Thomas Nelson Publishers, U.S.A

*Continued in AccountAble 121*

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