

NUMBERS IN DIFFERENT BASES

Kumar Gandharv Mishra

SUPPOSE you take a spacecraft from Earth and land on a different planet where life exists. After travelling so much from Earth, you are hungry and want to eat something. There are some food vending machines around you. The machine vends biscuits based on how many times you press the key. You wanted to get 20 biscuits, so you pressed the key 20 times, and in return, you got 18 biscuits. Assuming there might have been some error, you press the key 25 times again and get 21 biscuits. You are puzzled. What's happening? This time, you press the key two times and get exactly two biscuits. To check your curiosity, you press the key 12 times and get 10 biscuits. You seriously get puzzled and ask one of the residents why you could not fetch the exact amount equivalent to the number of times you have pressed the key. The resident informs you that the planet works on number base 12. So, since you are in a different world, a different number system works here. You are present in a duodecimal (12) system. Accept it!

Well, we all use numbers in our day-to-day activities. The numbers we use today are based on a decimal number system. It is also well known that the computer uses the binary number system. So, these are the popular number systems we often come across. But our civilisation's development didn't start with a decimal or binary number system. Different civilisations had different styles of counting. For example, it is said that the Maya civilisation used a base 20 number system, the

Babylonian civilisation used a base 60 (sexagesimal) number system, the Papua New Guinea civilisation highlighted the use of a base 27 number system and the Indus Valley civilisation is said to have used the decimal number system. Gradually, with trade spreading across the globe, the number system became unified, and the decimal number system found popularity and acceptability around the globe.

Our hands also have 10 fingers, so one of the popular notions behind this is also credited to this idea. So, what does a number system mean here? In simple terms, a number system in base 10 means using numbers from 0 to 9, a number system in base 12 means using numbers from 0 to 11, and a number system in base two means using numbers from 0 to 1. In a number system, we shift the numbers to the left side when the unit's place gets the maximum value embedded in that number system. For example, in a decimal number system (based on the number 10), we start counting from 0, 1, 2, 3, 4, 5, 6, 7, 8 till 9,

9 marbles			*****
10 marbles		*	
11 marbles		*	*
100 marbles	*		
101 marbles	*		*
111 marbles	*	*	*