

## Mind Game # 4 - Detailed Solution, Comments and Winners

### Mind Game # 4

The following number written in the old Babylonian numeral system has no spaces to indicate the place values:



This number is the largest sexagesimal palindrome, i.e. it reads the same backwards as forwards in base 60, that is divisible by 6 and less than 215, 999 **that can be written using the above symbols**. Find this number with explanation and write it in the old Babylonian numeral system with proper spacing to indicate the place values.

### Solution

A number in sexagesimal has the form  $n_k 60^k + n_{k-1} 60^{k-1} + \dots + n_1 60 + n_0$  where  $n_k, n_{k-1}, \dots, n_1, n_0$  are non-negative integers. From this form it is clear that a sexagesimal number is divisible by 6 if and only if 6 divides  $n_0$ . Since the given number is less than 215, 999 (decimal) and  $59 \times 60^2 + 59 \times 60 + 59 = 215, 999$ , the given number has 3 digits in sexagesimal. The number is a palindrome in sexagesimal and therefore the first digit and the last digit are the same. Last digit has to be divisible by 6. So the last digit has to be 6 as it can not be 12, 18, 24, 30, 36, 42, 48 or 54. So the number in sexagesimal satisfying the given conditions must be:



### Comment

In the given problem the words in bold are assumed. But the problem is more clearer if they are given.

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