A UNIQUE WAY OF PLAYING MUSIC USING MATH PART-2

In my last article (Fibonacci and tabla), I explained about the different combinations of one and two to add up to different numbers. For example the different combinations of getting one and two to add up to four are:

- 2 + 2
- 1 + 1 + 2
- 1 + 2 + 1
- 2 + 1 + 1
- 1 + 1 + 1+ 1

We also saw that the number of possible combinations to add up to a given number, n, using one and two, would be the nth number of the Virahanka sequence.

Now, let us see how to list the combinations.

Thus, given the sum, you should be able to list all the possible combinations of adding up to that sum by using one and two.

Let us adopt the ancient Indian system of music. Instead of using one and two, let us use Laghu-L(this is the one matra kaal) and Guru-G(this is the deergha, or two matra kal).

Let us start with a simple example of adding up to three.

a. We begin by putting as many Gurus as possible in the first row. In this case, we can start with two Gurus as $2 + 2 = 4$.
Thus, our first row is: $2 + 2$ or GG(Guru Guru)

Fine, how to get the next row?

b. Now, we start looking from the left. We replace the first G that we encounter with a Laghu.

Thus, our first G becomes L.

c. Next we bring down the rest of the terms as they are.

Now we have arrived at: LG

d. But, the sum is still 3. Hence, we need one more. So, we add another Laghu to the left.

So we Arrived at the second row, LLG (1 + 1 + 2).

Let us now continue on to the next row.
First step---- replace the first G that you encounter from the left by an L.
Second step---keep the terms right of the G as they are (in this case there are no terms t the right of G)
Third step----Add the remaining terms to the left of the G which became L (I forgot to mention that the remaining sum has to be filled with as many Gs as possible. In the first case, the remaining sum was only one, so we had to use an L.)

After we replace the G with an L, the remaining sum is 4-1, which is 3.
Can a G be used here? Yes, as the sum is larger than two. So, now we add a G to the left of the L.
We have arrived at: GL. We still need one more. Therefore, we add an L to the left of the G.
Hence, the third row is: LGL (1 + 2 + 1).

Let us proceed. Now that you have understood the basics, I can move a *little* faster.

Let us try and get fourth row.
a. we substitute the G with an L and bring the L to the right of the G as it is. We have arrived at LL.
b. Next. The remaining sum is 2. we can use a G here. Thus, the

fourth combination is GLL (2 + 1 + 1).

You may remember that the fourth term in the Virahanka sequence is '5'. Thus there have to be five combinations possible. Thus, we move on to the last combination.

The fourth row was: GLL

Let us substitute the G with an L, and bring the other two Ls as they are. We arrive at: LLL
The remaining sum is 1. We cannot use a G here, so we add one more L to the left. Thus, the last row is LLLL (1 + 1 + 1 + 1). (A quick tip here. When listing the combinations using Laghu and Guru or 1 and 2, the last row is full of Laghus. This is a sure way of checking that you have got all the combinations right!!)

We can try this for any sum. Let me list the combinations for five.
1. LGG
2. GLG
3. LLLG
4. GGL
5. LLGL
6. LGLL
7. GLLL
8. LLLLL

Try this. You can remember the combinations easily. And you can use this even in the math of Classical singing. Wish you a merry time with my dear friends Laghu and Guru, Ciao!!

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