

Combinatorial Analysis of the Organic ScoreCard

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Abstract. To complete the Organic ScoreCard, respondents are asked to allocate ten points to nine statements, for each of the twelve blocks. Estimates of the total possible ways this can be done run in the ‘trillions’, but no-one knows for sure. This paper presents the definitive answer to that question.

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1 Introduction

The Organic ScoreCard is a 108-item scale, measuring the concept of “consciousness”. It was developed by Marcus Andreas Grond, a Dutch philosopher, business consultant and behavioural coach (Grond, 2005). The scale is being used commercially for coaching and consulting purposes within different industries in the Netherlands, South Africa and other parts of the world.

The question has arisen on how large the number of possible Organic ScoreCards really is. Estimates run in the ‘trillions’ but no definitive answer has been provided yet.

The paper begins with an overview of the Organic ScoreCard. Section 3 outlines the combinatorial analysis, and the results are presented in section 4.

2 Background

The Organic ScoreCard questionnaire is completed by respondents in their own time and the findings are presented as an automated report. Customised feedback sessions can be arranged with individual clients or groups of clients.

The questionnaire consists of 108 statements, grouped in twelve blocks of nine statements each. Respondents complete the Organic ScoreCard one set at the time and are asked to allocate a total of ten points to each of the statements that apply to them. Statements that are more applicable should be allocated more points.

3 Analysis

Respondents are asked to allocate ten points to nine statements, for each of the twelve blocks, so the problem can be simplified to finding the number of permutations for a single block, and raising the answer to the twelfth power.

Our first task is to find the number of ways ten points can be distributed over nine statements, which is equivalent to finding all unique multisets. Figure 1 lists all 41 possible multisets.

10										{(10,1),(0,8)}
9	1									{(9,1),(1,1),(0,7)}
8	2									{(8,1),(2,1),(0,7)}
8	1	1								{(8,1),(1,2),(0,6)}
7	3									{(7,1),(3,1),(0,7)}
7	2	1								{(7,1),(2,1),(1,1),(0,6)}
7	1	1	1							{(7,1),(1,3),(0,5)}
6	4									{(6,1),(4,1),(0,7)}
6	3	1								{(6,1),(3,1),(1,1),(0,6)}
6	2	2								{(6,1),(2,2),(0,6)}
6	2	1	1							{(6,1),(2,1),(1,2),(0,5)}
6	1	1	1	1						{(6,1),(1,4),(0,4)}
5	5									{(5,2),(0,7)}
5	4	1								{(5,1),(4,1),(1,1),(0,6)}
5	3	2								{(5,1),(3,1),(2,1),(0,6)}
5	3	1	1							{(5,1),(3,1),(1,2),(0,5)}
5	2	2	1							{(5,1),(2,2),(1,1),(0,5)}
5	2	1	1	1						{(5,1),(2,1),(1,3),(0,4)}
5	1	1	1	1	1					{(5,1),(1,5),(0,3)}
4	4	2								{(4,2),(2,1),(0,6)}
4	4	1	1							{(4,2),(1,2),(0,5)}
4	3	3								{(4,1),(3,2),(0,6)}
4	3	2	1							{(4,1),(3,1),(2,1),(1,1),(0,5)}
4	3	1	1	1						{(4,1),(3,1),(1,3),(0,4)}
4	2	2	2							{(4,1),(2,3),(0,5)}
4	2	2	1	1						{(4,1),(2,2),(1,2),(0,4)}
4	2	1	1	1	1					{(4,1),(2,1),(1,4),(0,3)}
4	1	1	1	1	1	1				{(4,1),(1,6),(0,2)}
3	3	3	1							{(3,3),(1,1),(0,5)}
3	3	2	2							{(3,2),(2,2),(0,5)}
3	3	2	1	1						{(3,2),(2,1),(1,2),(0,4)}
3	3	1	1	1	1					{(3,2),(1,4),(0,3)}
3	2	2	2	1						{(3,1),(2,3),(1,1),(0,4)}
3	2	2	1	1	1					{(3,1),(2,2),(1,3),(0,3)}
3	2	1	1	1	1	1				{(3,1),(2,1),(1,5),(0,2)}
3	1	1	1	1	1	1	1			{(3,1),(1,7),(0,1)}
2	2	2	2	2						{(2,5),(0,4)}
2	2	2	2	1	1					{(2,4),(1,2),(0,3)}
2	2	2	1	1	1	1				{(2,3),(1,4),(0,2)}
2	2	1	1	1	1	1	1			{(2,2),(1,6),(0,1)}
2	1	1	1	1	1	1	1	1		{(2,1),(1,8)}

Figure 1: list of multisets

The next step is to find all possible permutations for each of the multisets. If the multiplicities of the elements of M (taken in some order) are $m_1, m_2, m_3, \dots, m_l$, then the number of multiset permutations of M is given by the multinomial coefficient:

$$\frac{(\sum_{i=1}^l m_i)!}{\prod_{i=1}^l m_i!} \quad (1)$$

If we apply (1) to the list of multiset in Figure 1, this gives us the number of permutations per multiset:

$\{(10,1),(0,8)\}$	9
$\{(9,1),(1,1),(0,7)\}$	72
$\{(8,1),(2,1),(0,7)\}$	72
$\{(8,1),(1,2),(0,6)\}$	252
$\{(7,1),(3,1),(0,7)\}$	72
$\{(7,1),(2,1),(1,1),(0,6)\}$	504
$\{(7,1),(1,3),(0,5)\}$	504
$\{(6,1),(4,1),(0,7)\}$	72
$\{(6,1),(3,1),(1,1),(0,6)\}$	504
$\{(6,1),(2,2),(0,6)\}$	252
$\{(6,1),(2,1),(1,2),(0,5)\}$	1512
$\{(6,1),(1,4),(0,4)\}$	630
$\{(5,2),(0,7)\}$	36
$\{(5,1),(4,1),(1,1),(0,6)\}$	504
$\{(5,1),(3,1),(2,1),(0,6)\}$	504
$\{(5,1),(3,1),(1,2),(0,5)\}$	1512
$\{(5,1),(2,2),(1,1),(0,5)\}$	1512
$\{(5,1),(2,1),(1,3),(0,4)\}$	2520
$\{(5,1),(1,5),(0,3)\}$	504
$\{(4,2),(2,1),(0,6)\}$	252
$\{(4,2),(1,2),(0,5)\}$	756
$\{(4,1),(3,2),(0,6)\}$	252
$\{(4,1),(3,1),(2,1),(1,1),(0,5)\}$	3024
$\{(4,1),(3,1),(1,3),(0,4)\}$	2520
$\{(4,1),(2,3),(0,5)\}$	504
$\{(4,1),(2,2),(1,2),(0,4)\}$	3780
$\{(4,1),(2,1),(1,4),(0,3)\}$	2520
$\{(4,1),(1,6),(0,2)\}$	252
$\{(3,3),(1,1),(0,5)\}$	504
$\{(3,2),(2,2),(0,5)\}$	756
$\{(3,2),(2,1),(1,2),(0,4)\}$	3780
$\{(3,2),(1,4),(0,3)\}$	1260
$\{(3,1),(2,3),(1,1),(0,4)\}$	2520
$\{(3,1),(2,2),(1,3),(0,3)\}$	5040
$\{(3,1),(2,1),(1,5),(0,2)\}$	1512
$\{(3,1),(1,7),(0,1)\}$	72
$\{(2,5),(0,4)\}$	126
$\{(2,4),(1,2),(0,3)\}$	1260
$\{(2,3),(1,4),(0,2)\}$	1260
$\{(2,2),(1,6),(0,1)\}$	252
$\{(2,1),(1,8)\}$	9

Figure 2: The total number of permutations per multiset

5 Conclusion

To complete the Organic ScoreCard, respondents are asked to allocate ten points to nine statements, for each of the twelve blocks. Estimates of the total possible ways this can be done ran in the ‘trillions’, but this paper show that this couldn’t be more wrong. The actual number is $\pm 6.1 \times 10^{1308}$.

For comparison, the number of atoms in the universe is estimated at $\pm 6 \times 10^{79}$, the number of possible chess games is $\pm 10^{120}$ and the number of possible Go games is estimated at $\pm 2.1 \times 10^{170}$.

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References

Marcus Andreas Grond. *De organisatie Burnout*. Kerk Avezaath: Management Book International, 2005.