

The Elements of Rhythm

Volume I

2ⁿ

**Binary Theory and Creation of
the Fundamental Rhythm Patterns**

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Table of Contents

Preface	x
Introduction	xi
Prologue	13
Part I 2ⁿ - Binary Theory of the Fundamental Rhythm Patterns	15
Part II Applying, Organizing, and Practicing the Patterns	25
Part III Creation of the Fundamental Patterns	37
Level 1 - 4 Event Point Patterns	38
Binary Combination Tables	
0/1	39
2/2 - 4/2	40
2/4 - 4/4	41
2/8 - 4/8	42
2/16 - 4/16	43
2/32 - 4/32	44
Level 2 - 4 Event Point Patterns - Music Measure Formats (Beat)	45
2/2 - 4/2	47
2/4 - 4/4	48
2/8 - 4/8	49
2/16 - 4/16	50
2/32 - 4/32	51
Level 5 Event Point Patterns	52
Level 5 Event Point Patterns - Discussion	53
Binary Combination Tables	
0/1	58
5/2	59
5/4	60
5/8	61
5/16	62
5/32	63
Level 5 Event Point Patterns - Music Measure Formats (Beat)	64
5/2	65
5/4	66
5/8	67
5/16	68
5/32	69

Table of Contents (cont'd)

Level 6 Event Point Patterns	70
Level 6 Event Point Patterns - Discussion	71
Binary Combination Tables	
0/1	72
Level 6 Event Point Patterns - Compound Beat	74
Binary Combination Tables	
6/2	76
6/4	78
6/8	80
6/16	82
6/32	84
Level 6 Event Point Patterns - Music Measure Formats (Compound Beat)	86
6/2	88
6/4	90
6/8	92
6/16	94
6/32	96
Level 6 Event Point Patterns - Simple Beat Division	98
Binary Combination Tables	
3/2	100
3/4	102
3/8	104
3/16	106
3/32	108
Level 6 Event Point Patterns - Music Measure Formats (Simple Beat Division)	110
3/2	112
3/4	114
3/8	116
3/16	118
3/32	120
Level 7 Event Point Patterns	122
Level 7 Event Point Patterns - Discussion	123
Binary Combination Tables	
0/1	126
7/2	130
7/4	134
7/8	138
7/16	142
7/32	146

Table of Contents (cont'd)

Level 7 Event Point Patterns - Music Measure Formats (Beat)	151
7/2	152
7/4	156
7/8	160
7/16	164
7/32	168
Level 8 Event Point Patterns	172
Level 8 Event Point Patterns - Discussion	173
Binary Combination Tables	
0/1	174
Half Rest/Note	182
Quarter Rest/Note	190
Eighth Rest/Note	198
Sixteenth Rest/Note	206
Thirty-second Rest/Note	214
 Level 8 Event Point Patterns - Music Measure Formats (Beat Division)	 222
4/2	224
4/4	232
4/8	240
4/16	248
4/32	256
 Level 8 Event Point Patterns - Music Measure Formats (Beat Subdivision)	 264
2/2	266
2/4	274
2/8	282
2/16	290
 Epilogue	 298
 Appendices	 299
Appendix A	301
Appendix B	302
Appendix C	303
Appendix D	304
Appendix E	306

Preface

The Elements of Rhythm Volume I is a comprehensive rhythm pattern resource, based on the notion of there being a finite number of fundamental rhythmic “elements” that make up all the larger possible combinations. Our text’s two primary objectives are to provide you with that collection of elements and to make them the foundation of your rhythm vocabulary.

Designed for all musicians and for researchers in music-related fields, our text offers a unifying theory of rhythm pattern development based on simple binary principles. This work is preceded by several publications with varying approaches to fundamental rhythm pattern theory:

- Peter Randall - *Rhythm in Action* (Belwin-Mills Publishing Corp., 1981)
- Chuck Braman - *Drumming Patterns* (Drumstroke Publications, 1988)
- Mike Mangini - *Mike Mangini’s Rhythm Knowledge Vol. I & II* (Rhythm Knowledge, 1997-1998)
- Joseph Schillinger - *Encyclopedia of Rhythms* (Clock & Rose Press, 2003)
- Mick Goodrick and Mitch Haupers - *Factorial Rhythm for All Instruments, 2nd Edition* (Mr. Goodchord Publications, 2008)
- Johnny Rabb - *The Official Freehand Technique* (Hudson Music, 2008)
- Benny Greb - *The Language of Drumming* (Hudson Music, 2009)
- Thom Hannum - *A Percussionist’s Guide to Check Patterns* (Alfred Publishing, 2009)
- John Favicchia - *Elements* (Alfred Publishing, 2010)

Musicians and academic authors who have explored math and binary logic include:

- Lou Harrison - *Music Primer* (C. F. Peters Corp., 1971)
- Andranik Tangian - “A Binary System for Classification of Rhythm Patterns” (*Computing in Musicology* 8 1992, pp. 75-81)
- Mike Mangini - *Mike Mangini’s Rhythm Knowledge Vol. I & II* (Rhythm Knowledge, 1997-1998)
- Daniel LaBerge - *Rhythm Explained*
(www.daniellaberge.com/music/rhythm/rhythmI.htm) (2002)
- Godfried T. Toussaint - “The Euclidean Algorithm Generates Traditional Musical Rhythms” (Proceedings of BRIDGES: Mathematical Connections in Art, Music, and Science, Banff, Alberta, Canada, July 31 to August 3, 2005, pp. 47-56)
- Vi Hart - “Using Binary Numbers in Music” (Proceedings of the 11th Annual BRIDGES Conference: Mathematics, Music, Art, Architecture, Culture (BRIDGES 8), Leeuwarden, Netherlands, July 2008)
- Bernhard Wagner - *Rhythmic Patterns As Binary Numbers*
(www.bernhardwagner.net/musings/RPABN.html) (2009)

Our text furthers the exploration of fundamental rhythm pattern theory by expanding on binary logic, applying a systematic pattern combination method, and introducing a unique categorizing system. Applicable to many areas of music study and related research, *The Elements of Rhythm Volume I* provides readers interested in rhythm with the essential building blocks of their art and the primary colors of their temporal palette.

Introduction

This book owes its initial inception to drummers Peter Erskine and Terry Bozzio, and its completion to drummer John Tharnstrom and American music composer Lou Harrison. The journey began in 1976, when I attended a summer jazz camp where Peter Erskine was the drummer-in-residence. One night during the camp, Erskine had to sight-read some challenging sheet music for an evening faculty performance. The next day in our master class, Erskine mentioned how glad he was to have seen some “familiar friends” on the charts.

Five years later, I had the opportunity to study with Terry Bozzio, who introduced me to the math concept of permutations (order possibilities) as they applied to quarter and eighth rests and notes in a measure of 2/4. Bozzio told me that if I could master the sixteen basic possibilities, I would have seen and played many of the patterns from which larger, more complex combinations in simple meter were constructed.

I recalled Erskine’s comment about “familiar friends” and wondered if it would be possible to systematically combine the sixteen basic patterns into a larger, more comprehensive list. My initial thought was to create a “vocabulary of rhythm patterns” for drummers, because the value was immediately obvious: If you knew all the basic possible patterns, you could practice reading and thinking about them, then play them to further develop your overall rhythmic abilities.

In 1982, after spending months hand-writing hundreds of these patterns in a variety of time signature and note value contexts, I met John Tharnstrom, a drummer and college student in Austin, Texas. John helped me greatly by writing a software program on a mainframe that would generate as large a list of rhythm patterns as I wanted, using 0’s and 1’s. Seeing them in this context served as the impetus to create a binary theory of rhythm pattern development.

In 1986, while living in Santa Cruz, California, I had the honor of meeting Lou Harrison, the esteemed American music composer. I’d recently discovered Harrison’s *Music Primer*, in which he presented the math expression 2^n and the possible applications it held for creating the fundamental rhythm patterns. This simple binary tool, first shown to Harrison by composer Henry Cowell, serves as the core of our approach to rhythm pattern theory.

Harrison invited me to his home for an amazing afternoon of conversation, and I’ll never forget the bemused look on his face when I showed him the hundreds of handwritten patterns I’d generated using essentially the same binary approach he had explored. His nod of approval meant a great deal, but completing what you are now reading was initially overwhelming. I was young and ill-prepared, and many times over the following decades, I wanted to abandon this project. Humble thanks are owed to Lou Harrison that afternoon for his kind words of encouragement; they were ones I fell back on often to recharge, regroup and move forward.

Still, it took many years and *many* revisions to arrive at a point where what needed to be said (and to whom) was reasonably resolved. In the end, the idea of this text as a **rhythm pattern resource** covers the most bases, with an emphasis on drumming, teaching, musical performance, and suggestions for academic applications. Certain needs for all groups may not have been met, but if this broad effort generates on-going research and idea exchanges between the arts and sciences, the highest hopes will have been realized.

David R. Aldridge
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Figure 2 contains a sample of rhythm patterns, but suppose we wanted to see all the possible triplet groupings, or all the possible five-note groupings. Where would we go to *find* them?

The answers are in the binary combination tables we'll be creating. But first, we need to address some issues concerning the relative nature of music notation.

There are many ways to write a rhythm pattern and its possible variations (e.g., ties, dotted notes). Additionally, a rhythm pattern may occur in varying beat note contexts. **Figure 3** illustrates this complexity, which only compounds the challenge of finding a pattern's point of origin:



Figure 3. *Beat Subdivision Pattern Expressed Using Three Different Beat Note Values*

Figure 3 also generates two distinctly important questions:

1. What is it that these rhythm patterns share in common?
2. What are they versions of in terms of core sounds?

The answers to these questions largely define the scope and approach of our text:

1. The initial silence and sound events occur at the **same** points in measured time.
2. They're all relative versions of the **same** absolute sound shape.

What we need now is a way to **create** that absolute sound shape.