# Music Research Using Humdrum

## A USER'S GUIDE

David Huron

# NOTICE

This *User Guide* is a draft manuscript only. Several chapters are incomplete and further revisions are planned for the entire manuscript.

Please note that this *User Guide* describes Humdrum Version 2.3. Public release of this version is not expected before late 1999. Some users have access to Humdrum Version 2.2, but many users will have access only to Version 1.0. Please note that some older tools do not work precisely as described in this Guide. The following commands are available only with Humdrum Version 2.3: **db**, **hum**, **melac**, **ms**, **text** and the **-t** option for **yank**. Version 1.0 of the **simil** command has a known bug. In addition, the former **fill** command has been renamed **ditto**.

Comments, corrections and suggestions are welcome concerning this *User Guide*. Please send your remarks to:

David Huron (huron.1@osu.edu)
School of Music
1866 College Road,
Ohio State University
Columbus, OH 43210
U.S.A.

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# Preface

The sad truth about research is that many good scholarly projects are dominated by mindless repetitive tasks. Throughout history, scholars of exceptional intelligence and training have often appeared to squander their talent and time on activities that require only moderate intelligence and little training. Unfortunately, even simple mechanical tasks are often impossible to delegate to other people because the sheer mindlessness of the work can lead to carelessness in those who don't share a passion for the underlying research problem. At the same time, otherwise gifted scholars have occasionally failed to engage in the sort of "drudge work" they know is needed to support their claims. This understandable human failing has sometimes led to abstract theorizing that is only tenuously connected to the objects of study. In addition, many otherwise promising research ideas have been abandoned due to the discouraging volume of work entailed.

This book is about making music scholarship easier and more rigorous. It is no secret that computers have engendered a revolution in productivity for researchers in the sciences. With the increasing availability of large databases, a comparable revolution is now under way in the arts and humanities disciplines. Coupled with large musical databases, *Humdrum* provides resources for increasing the productivity of individual music scholars.

This book is intended to develop the reader's facility with Humdrum. The book is organized in a tutorial format with hundreds of examples ranging from text rhythms in Gregorian chant to rock-guitar fingerings. A wide range of applications are discussed from different periods, styles, and cultures. In addition to describing specific procedures, overall research strategies are also discussed. By the end of the book, attentive readers will have become 'power users' — able, for example, to answer detailed questions pertaining to Beethoven's orchestration in less than an hour.

Arts and humanities scholars rarely have access to the sorts of financial support that is common in the sciences. As a result, arts and humanities scholars seldom have the luxury of delegating tasks: for the most part, we have to do it all ourselves. My hope is that Humdrum will help to redress this imbalance of power, and provide music scholars with tools that genuinely contribute to their personal productivity.

David Huron
Columbus, Ohio

# Acknowledgements

The first draft of this book was written while I was a visiting scholar at the Center for Computer Assisted Research in the Humanities at Stanford University. I am grateful to the Center's Director, Dr. Walter Hewlett, for the invitation, and for support and encouragement in writing this guide.

While developing Humdrum, I have benefitted over the years from the advice and critical support of many friends, colleagues, students, research associates and correspondents. I am indebted to Keith Orpen, Keith Mashinter, Jasba Simpson, Sandra Serafini, Randall Howard, Simon Clift and Maki Ishizaki, (of the University of Waterloo), Timothy Prime (Wilfrid Laurier University), Eleanor Selfridge-Field and Frances Bennion (Stanford University), Andreas Kornstädt (University of Hamburg), Bo Alphonce, Bruce Pennycook and Bruce Minorgan (McGill University), Paul von Hippel, Bret Aarden and Peter Pfordresher (Ohio State University), Perry Roland (University of Virginia), Michael Taylor (University of Belfast), Gregory Sandell (Loyola University), Carol Krumhansl (Cornell University), and Jordi Martin (UPF, Spain). I am especially indebted to my former research assistants Tim Racinsky and Kyle Dawkins for their superb programming efforts. My very warm thanks to each of these individuals.

# How To Use This Book

The purpose of this book is to help you become a fluent and effective user of Humdrum. The book is intended to be read from the beginning to the end — since later materials assume knowledge of earlier chapters.

Humdrum is closely linked with software tools associated with the UNIX operating system. Although Humdrum runs on several different computer systems, some familiarity with UNIX is assumed. Specifically, readers should know how to log-in, how to edit text files, and how to rename and delete files. A number of popular books are available that cover these basic tasks.

Learning how to use the Humdrum software tools may be likened to learning the vocabulary of a new language. Initially, a small vocabulary won't allow you to say very much. But as your vocabulary expands, you can use previously learned words in entirely novel sentences. Similarly, the full power of the tools discussed in the initial chapters won't become clear until they are used in conjunction with tools introduced in later chapers.

You may be tempted to skip over certain chapters. For example, much of Chapter 18 discusses the representation of music for fretted instruments. For many readers this discussion will be of marginal interest. However, there are important lessons from this discussion that generalize to a wide variety of circumstances unrelated to fretted instruments, and later chapters will build on these lessons. Similarly, Chapter 34 ostensibly deals with the analysis of 12-tone and serial music. Again, some readers may be tempted to skip this chapter. However, the tools and procedures introduced in this chapter turn out to be useful well beyond this relatively narrow repertory. For example, a dance scholar interested in studying historical ballet choreographies would be ill-advised to skip either of chapter 18 or 34.

In general, the discussions alternate between descriptions of computer-based music representations and computer-based manipulation of these representations. Not all of the pre-defined Humdrum representations are discussed in this book, nor are all of the commands or options identified. For complete technical documentation of representations and commands, readers should refer to the *Humdrum Reference Manual.*

In the concluding chapters, the book offers some advice about pursuing systematic music research. We will point to several possible pitfalls in computer-assisted musicology and suggest ways to negotiate around these pitfalls. Not all questions of musical importance can be addressed using computer technology. However, a large number of musically useful problems can indeed be profitably pursued using the tools and methods described in this book.

In addition to a bibliography and appendices, the book provided three indexes. The *General Index* permits readers to search for specific topics, features or commands. The *Name Index* allows readers to find references to particular people, works, and musical genres. The *Problem Index* allows readers to look-up passages that discuss particular musical problems or questions.

This book describes the Humdrum Toolkit Release 2.0. Humdrum is available free of charge and may be downloaded via the internet. Refer to the following web site for details: `http://www.lib.virginia.edu/dmmc/Music/Humdrum/`

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