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Logo Music Tools
by
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Acknowledgements

Introduction

Many versions of Logo have a command that can produce sound. The primitive **note** or **tone** produces a sound of a specified pitch for a specified amount of time. (These tools were originally developed using the Apple IIe version of LogoWriter. This documentation is, therefore, written to that version. The tools have been adapted for use with other versions of LogoWriter, Logo Ensemble, Apple Logo II, LCSI Logo II, Object Logo, and Logo PLUS. They work in pretty much the same way for all versions of Logo. The appendix describes important differences.)

For example

```
tone 1000 60
tone 100 30
```

makes a high pitched tone for one second followed by a deeper tone for half a second. You can create sound effects:

```
to jaws
repeat 15 [jaw]
end
```

```
to jaw
tone 50 10
tone 60 10
tone 40 10
tone 60 10
end
```

You can make music:

```
to row
tone 262 30
tone 262 30
tone 262 20
tone 294 10
tone 330 30
tone 330 20
tone 294 10
tone 330 20
tone 349 10
tone 392 60
end
```

tone 262 30 produces a middle c for half a second.

tone 440 60 generates an a above middle c for one second.

But writing music with repeated **tone** commands is tedious. If you know about standard musical notation, you don't think about 262 and 30. You think about middle c and half notes; about andante and allegro. These music tools will allow you to write tunes in a way that more directly relates to musical notation.

Tempo Commands

The first thing you must do is determine the tempo at which music will play using the command **settempo**.

```
settempo 60
```

establishes a tempo of 60 quarter notes per minute.

```
settempo 120
```

sets a tempo twice as fast; 120 quarter notes per minute.

There are also procedures that allow you to control tempo with familiar words like **andante** and **presto**. Each has an equivalent numeric tempo. **Andante** is the same as

settempo 140. Here's the full list:

```
largo      settempo 55
larghetto settempo 84
adagio     settempo 112
andante   settempo 140
allegro    settempo 168
presto     settempo 196
```

Once you've set a tempo it remains in effect until you give a different tempo command. For example, you may say **andante** (or its equivalent, **settempo 140**) and work on a tune. If you later want to play the song at a quicker tempo, you might give the command **allegro**. The tune will play faster the next time you run the procedure that plays it. No changes to the procedure itself are needed.

You may use any number as an input to **settempo**. **Settempo 150** sets a tempo that is a bit faster than **andante**.

The reporter **tempo** tells you what the current tempo is. For example:

```
settempo 60
show tempo
60
presto
show tempo
196
```

The **tempo** reporter also lets you change the tempo based on whatever the current tempo is. For example

```
settempo 2 * tempo
```

doubles the tempo.

```
settempo 3 / 4 * tempo
```

slows the tempo to three fourths of what it is.

Procedures for Notes

Once you've set a tempo, you can play a tune with a procedure like this:

```
to row.better
allegro
c3 h. c3 h. c3 h d3 q e3 h.
e3 h d3 q e3 h f3 q g3 (h. + h.)
end
```

c3, **d3**, **e3**, **f3**, and **g3** are the names of notes. **q**, **h**, and **h.** stand for quarter, half, and three quarter (dotted half.) **c3 h.** means a three quarter note c. **d3 q** is a quarter note d. **e3 h** is a half note e.

There are five octaves of notes provided in these tools. The number **3** following the **c** and the **d** indicates that they are in the third octave. **d1** is in the lowest octave, **d5** is in the highest octave. There is no space between d and 3 because the name of the procedure is d3, a single Logo word.

Sharps are indicated with the **#** symbol. **c#2** is c sharp above middle c. Flats are indicated using the **!** symbol. **d!2** is the d flat above middle c.

Each note procedure requires a duration input. This may be a number.

```
f#2 60
```

generates an F sharp above middle c for one second. But the input may instead be one of the time value reporters included in the Music Tools.

Time Value Reporters

The time value reporters are **w**, **h**, **q**, **e**, and **s**, for whole, half, quarter, eighth, and sixteenth. So

f2 h produces an f above middle c for twice as long a duration as **f2 q**

There are also procedures for "dotted" notes: **s.**, **e.**, **q.**, and **h.**

f2 q. is a dotted quarter note f above middle c and **f2 h.** is a three quarter note f above middle c.

The procedure **r** is a rest. It takes the same inputs as the notes do. **r q** is a quarter rest. **r h.** is a three quarter rest.

Tied notes may be written by adding time values together. For example

```
g3 (q + h) r h
```

is a g played for a half note plus a quarter note - the same sound as **g3 h.** - followed

by a half rest. The parentheses aren't needed, but they may make your music easier to read.

The actual number that is reported by each of the time value procedures depends on the overall tempo that has been set by the **settempo** command. If you don't set a tempo, you'll get an error message from Logo because it won't be able to determine the actual values of the time value reporters **w**, **h**, **h.**, **q**, **q.**, **e**, **e.**, **s**, and **s.**

Using the Logo Music Tools

To use these tools you will need a suitable version of Logo and the appropriate Logo Music Tools disk. The Music Tools for the various versions of Logo are grouped by disk format, ProDOS, MSDOS, and Macintosh. The ProDOS and MSDOS disks come in both 3.5" and 5.25" sizes. Music Tools for several Logo versions are on the same disk. Just ignore the ones you don't need.

For each version of Logo there is a file that contains the Music Tools themselves, and another file with procedures that play a sample song. Except where indicated, the name of the Music Tools file is MUSIC and the sample song is TWINKLE.

The files are "locked" so as to prevent unintentional changes. It is best to make a copy of the Music Tools disk and leave the original as it is.
The details of how to get the tool procedures into memory are specific to your version of Logo. Here are ways you may get the Music Tools and, if you wish, the sample song, into memory:

ProDOS Disk
Apple Logo II and LCSI Logo II
```
load "logo2music
load "logo2twinkle
```

LogoWriter - Apple IIe version and LogoWriter Robotics
```
getpage "music
``` (or select the MUSIC page from CONTENTS)
```
load "twinkle
```

LogoWriter - Apple IIGS version
```
getpage "gsmusic
``` (or select the GSMUSIC page from CONTENTS)
```
load "gsletwinkle
```

LogoEnsemble
```
getpage "lemusic
``` (or select the LEMUSIC page from CONTENTS)
```
load "gsletwinkle
```

Logo PLUS
```
read "music
read "twinkle
```

MSDOS
LogoWriter and LogoWriter Robotics
`getpage "music` (or select the MUSIC page from CONTENTS)
`load "twinkle`

PC Logo
```
load "music
load "twinkle
```

Macintosh
LogoWriter
`getpage "music` (or select the MUSIC page from CONTENTS)
`load "twinkle`

Object Logo
```
load "music
load "twinkle
```

Apple Logo II, LCSI Logo II and Object Logo allow you to "bury" procedures. You might want to have the Music Tools buried so that they won't be saved along with any songs you are writing. Look at your reference guide for information about how to do this.

A similar capability is provided in LogoWriter, LogoWriter Robotics and LogoEnsemble with the command **gettools**. You might want to **gettools "music**, instead of **getpage "music**. Again, check your reference guide for details.

Appendix

Differences Between Versions of Logo

In most versions of Logo the sound producing command takes two inputs. The first input is a number that determines the pitch in cycles per second, or hertz. This is the same for all versions.

The second input determines the duration of the sound. The units for this input vary from one version to the next.

The name of the sound making primitive also varies. This table summarizes the differences:

Version of Logo	Primitive Name	Units of the Duration Input
LogoWriter		
Apple(including LogoWriter Robotics)	tone	60ths of a second
Macintosh	tone	60ths of a second
GS	tone	20ths of a second
MSDOS	tone	20ths of a second
Logo Ensemble	tone	10ths of a second
Logo PLUS	note	100ths of a second
Apple Logo II	toot	60ths of a second
LCSI Logo II	toot	60ths of a second
PC Logo	tone	100ths of a second

Object Logo has a three input primitive called **toot**. The first input is frequency. The second input is amplitude, or volume, in the range of 0 to 255. The third input is duration measured in whole seconds. Fractional inputs are acceptable. The Music Tools do not make any use of the second input. The note primitives all sound at maximum volume. (You could modify these tools to take advantage of this feature, implementing procedures such as **forte** and **piano**.)

The Music Tools for each version of Logo have been written to take account of version differences. In each case the appropriate name of the sound-making primitive is used, and the procedures **settempo** and **tempo** take account of the differences in the duration input to that primitive. So, a song may be written the same way for all versions for which these Music Tools are provided.

There are other important differences between versions of Logo. Read the sections that apply to the one that you are using.

LogoEnsemble and LogoWriter for the Macintosh

E is the name of a primitive, so it can't be used. The name for an eighth note is **eth** instead of **e**.

MSDOS LogoWriter

Tones run together so that

```
tone 440 20 tone 440 20
```

sounds the same as

```
tone 440 40
```

rather than sounding as two separate notes. The Music Tools for MSDOS LogoWriter have been written to introduce a short wait at the end of each note procedure. But if the tempo is fast, notes with short durations may not sound at all.

All LogoWriter versions and LogoEnsemble

It is possible to set a tempo that is so slow that it causes an error message such as

tone doesn't like 300 as input in c3

This results from having an input to **tone** that is too big (above 255). This is especially a problem in LogoWriter for the Apple II where the duration input to **tone** is 60ths of a second.

Apple IIGS Computers

The Apple IIGS has two speeds, Normal and Fast, which are set using the Control Panel. LogoWriter GS and LogoEnsemble require the fast setting. The other Apple II versions of Logo that may be used on the Apple IIGS require the normal setting. The Music Tools will work even if the setting isn't correct, but it sounds like a record playing at the wrong speed.