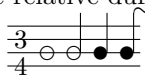An important component of music is the rhythm, or duration of the sounds. We designate this with whole notes, half notes, quarter notes, eighth notes, etc., the names of which indicate the relative duration of notes (e.g., a half note lasts four times as long as an eighth note).

It is of course necessary to specify the actual (not just relative) duration of sounds. There are several ways to do this, we shall discuss two which reflect the manner in which music is displayed.

Printed music groups notes into measures, and begins each line with a time signature which looks like a fraction, and specifies the number of notes in each measure. For example, the time signature 3/4 specifies that each measure contains three quarter notes (or six eighth notes, or a half note and a quarter note, or any collection of notes of equal total duration). (The above schematic is not divided into measures; a whole note would not fit within a measure in 3/4 time.) Indeed, you cannot tell from looking just at a measure whether the time signature is 3/4 or 6/8, but both the top and bottom of the time signature are important for specifying the nature of the rhythm. The top number specifies how many beats (or fundamental time units) there are in a measure, and the bottom number specifies which note represents the fundamental time unit. For example, 3/4 time specifies three beats to a measure with a quarter note representing one beat, 6/8 time specifies six beats to a measure with an eighth note representing one beat.

With this structure, the duration of notes is often specified by giving the duration of a particular note, usually the beat note (e.g., the quarter note in 3/4 time). In practice, this is expressed as the reciprocal beats per minute. Alternatively, the number of measures per minute is sometimes specified.

Example: In 4/4 time with 120 beats per minute, a quarter note lasts 1/120 of a minute (i.e., 1/2 second). This same tempo could be specified as 30 measures per minute (which provides 1/30 minute or two seconds per measure, hence 1/2 second per beat since there are four beats in a measure, hence 1/2 second per quarter note, since quarter notes represent one beat). In 2/2 time with 60 beats per minute, a half note lasts 1/60 minute or one second; this provides 1/2 second per quarter note. This same tempo could be specified as 30 measures per minute, since there are two beats per measure.

Exercise: In 3/4 time with 90 beats per minute, how long does a quarter note last? How many measures are in a minute? In 4/2 time, with 80 measures per minute, how long does a half note last? a quarter note? How many beats are in a minute?

Unfortunately, not everyone thinks in powers of two (whole, half, quarter, eighth, sixteenth) for the duration of notes. Some music from the dawn of time has been based on the juxtaposition of slow and quick notes. This is true of Balkan music, where patterns of slows and quicks are more uniform across regions than ratios of duration of slows and quicks. Musicologists must make judgements as to whether the ratio of slow to quick is 2:1 or 3:2 or ... in order to write down their music in our notation. Some tunes have been transcribed using 2:1 from one village, but using 3:2 from an adjacent village. Some Balkan music with the SQ pattern identified can be heard at http://www.ethnicdance.net/rhythms.html.

As an example, consider the sequence SQSSQ. Using the ratio 2:1, this could be represented as a measure in 8/16 using eighth notes for the slows, and sixteenth notes for the quicks. Using the ratio 3:2, it could be represented as a measure in 13/16 time using dotted eighth notes for the slows (dots multiply the duration of notes by a factor of 1.5, hence a dotted eighth note has the duration of three sixteenth notes) and eighth notes for the quicks. Using the ratio of 3:1, it could be represented in 11/16 time with the slow lasting 3/16 and the quicks lasting 1/16. It is standard to notate most Balkan music in x/16 time in order to allow the ratio of slow to quick.

Exercise: What time signature would you use to represent QQSQS in a single measure assuming a 2:1 slow to quick ratio? assuming a 3:2 slow to quick ratio?