

Introduction

Throughout history, music has been of massive cultural importance. Songs were often passed down from generation to generation in the same way that stories and folk tales were passed down, however, before written music was invented compositions would be taught by memory, leaving them open to interpretation. It became obvious that a form of written music needed to be invented to ensure that music would be recited exactly as the composer intended.

The method created to write down music was called Notation and is considered to have been invented during the 1400's by Roman Catholic priests to describe the pitch and length of a tone in early Gregorian chants. Musical notes called "Neumes" would be drawn above the words in hymn books to indicate the melodies to be sung or played.

Written notation would evolve over hundreds of years and as new instruments were invented; the way in which we wrote down music would branch into many other, instrument specific, types of musical notation.

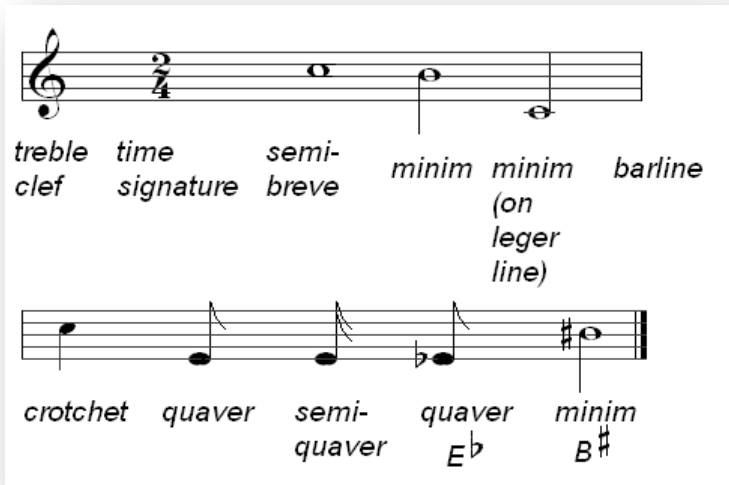
Stave

The "stave" or "staff" is essentially a set of five horizontal lines and four spaces, each of which corresponds to a specific pitch or in the case of a percussion stave, it refers to different percussion instruments. The exact pitch of each space is determined by the placement of a clef symbol to the left of the stave. A commonly used clef in written music is the treble clef which is placed on the second line from the bottom of the stave, making that pitch the first G above middle C.

Measures are placed along the stave in order to group notes and organize the music being composed. The number of beats contained within each measure is then determined by a time signature that is added to the left of the stave next to the clef.

Notes are represented by small ovals placed on the stave either on one of the five lines or four spaces. The pitch that these notes represent is determined by the clef used at the beginning of the stave.

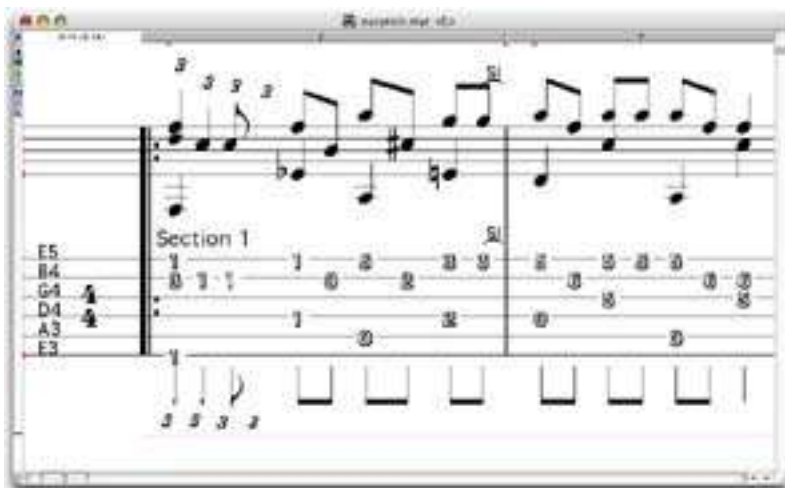
The duration of each note to be played is indicated using various combinations of stems, flags and dots allowing the composer to exactly determine the pitch, time and dynamic of the note leaving no room for instrumental misinterpretation of the original composition.



Tablature

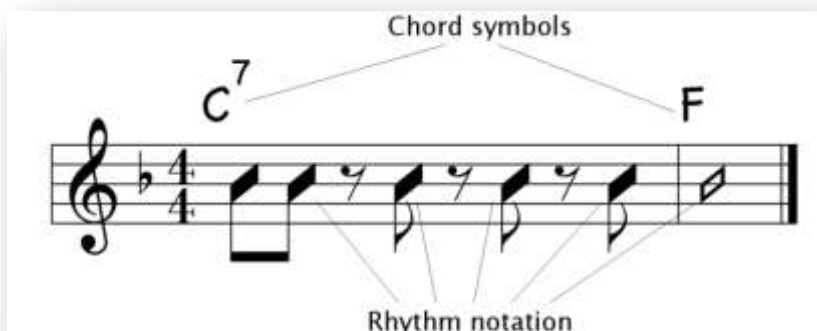
Many people are under the misapprehension that tablature is a fairly recent invention by rock guitarists; however, its history can be traced back to the renaissance where it was made popular by early Lute players. Tablature is a written method invented specifically for stringed instruments. The lines of the staff directly correspond to the strings of the instrument being played. Guitar tablature, for instance, has six lines on its stave that represent the six strings of the guitar (E, A, D, G, B, E) with the bottom E represented by the lowest line on the staff and then ascending. Other stringed instrument tablatures have more or less lines on the staff depending on their number of strings.

In place of musical notes on the staff there are left hand finger positions represented by numbers indicating which fret is to be played on the corresponding string. The rhythm of the notes is dictated above the staff, however, it is reduced to its shortest note value, and the longer or sustained notes are left up to the interpretation of the person playing the instrument.



Chord charts

Chord charts are a form of notated music that, as well as specifying melody, also contain harmonic and rhythmic information, and are generally used by the rhythm section of a band (normally made up of drums, bass guitar, Guitar and piano). This form of music is quite open to interpretation by the instrumentalist and they are often expected to improvise the specific notes as long as they stick to the chord sequence set above the staff. There are three main types of chord chart popular with musicians, Rhythmic notation, Slash notation and Nashville notation, all of which combine rhythmic and harmonic information.



Step sequencer

Another more recent invention for composing music was the step sequencer. Rather than recording live instruments or drawing each note onto the piano roll, the player enters notes into the sequencer using a sequence of buttons (most commonly 16 buttons) with each of the buttons representing 1/16th of a measure. This form of sequencing is commonly used with drum machines or groove boxes as it is a very accurate method for creating rhythms. Step sequencers are monophonic meaning they only play back one note at a time. The user has a selection of instruments each of which has 16 measures (or buttons) that they can program notes into to create expansive compositions dictating the velocity and length of each note. The sequencer cycles through notes one after another at a set tempo allowing the user to create complex compositions. Although users can only compose using sequences of 16 measures, these sequences can then be chained together to add more complexity to the structure.



Midi track

One of the biggest revolutions in music composition came with the invention of the MIDI keyboard. Announced in 1982 and actually built into an instrument in 1983 (the Prophet 600), MIDI, an acronym for Musical Instrument Digital Interface, allowed composers to connect musical instruments together and communicate basic instructions such as what note to play and its output volume. But most importantly it allowed computers to be used in the composition process. As the composer played a musical piece on the keyboard, the MIDI interface transmitted the information as a MIDI file containing pitch, velocity, instrument, timbre and time information. This information can then be viewed on screen in notated form and manipulated and quantized using a mouse. This revolutionary invention gave composers the ability to attain complete precision in their recordings. The recorded MIDI file would then be played back using the sounds of the device it was connected to, recreating the original recorded part. With the development of new technologies and computer capabilities composers were able to achieve results that would give them huge sounds at relatively low cost. Once the part has been recorded as a MIDI file it can then be loaded into any software or hardware sequencer and be recreated exactly as the composer wrote it leaving no room for individual interpretation.

The MIDI file itself is actually a computer language where certain elements are represented by numbers and code. This code contains representations of all the sonic values of the instrument that was played. These values include:-

Pitch

If an E flat is played on a MIDI keyboard the code that is transmitted looks like this:

```
<note>
  <pitch>
    <step>E</step>
    <alter>-1</alter>
    <octave>5</octave>
  </pitch>
```

The actual note being played is contained within the step command where the alter command is set to -1 indicating it is a flat note. Alternatively a 1 in the alter bracket would indicate that it was an E sharp. The octave command represents which octave on the keyboard the E flat was being played.

Timbre

The word timbre describes the tone quality that distinguishes it from other tones of the same pitch, volume and duration. In MIDI timbre is often referred to as a sound or an instrument, such as “acoustic piano” or “Synth Brass 1”. The manipulation of settings and years of reprogramming, developers are able to create accurate replications of acoustic instruments using MIDI hardware and software sequencers. This has led to a boom in home based recording where composers are achieving sounds equivalent to expensive studios and instruments, but simply with a software sequencer and a MIDI keyboard.

Amplitude

One of MIDI's strengths is its ability to record the amplitude (volume) of each individual note being played. Depending how hard a key is pressed, this is converted into digital code so that it is accurately recreated when played back, at the correct volume. MIDI notation also gives the composer the ability to alter the amplitude of the notes played with the click of a mouse in order to achieve the best results possible.

Time

One of MIDI's most popular attributes is its standardised time code that is generated and transmitted to any device that it is connected to making them run in synch. The device generating the MIDI Time Code is commonly known as the Master and the connected device is known as the Slave device. This gives composers the ability to easily run devices alongside each other and expanding their ability to generate sounds without any lag or digital drop out. This ability has also been used to programme light shows where MIDI keyboards are used to control large lighting installations. The development of the MIDI time Code would make sequencing audio and visual elements a lot more accurate and exciting.