CIS 3000 Intervals Tutorial

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Introduction

An **interval** is simply a measurement of distance between two musical notes. In the last lab we learned how to measure distance in terms of whole steps and half steps, which will continue to be useful as we identify and describe the different intervals. Another important concept in describing intervals (in terms of harmony) is **consonance** and **dissonance**. Consonant intervals are considered "stable" and generally sound nice to the human ear, whereas dissonant intervals are considered "unstable," sounding unpleasant to the ear, desiring to be **resolved** to a consonant interval.

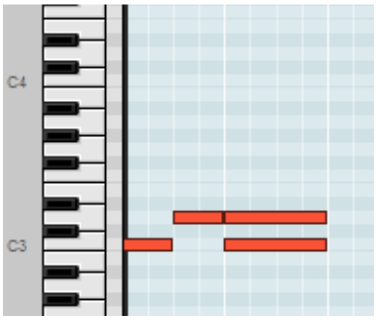
As with our scales, intervals are always relative to the root note. Fortunately, that means within any given octave, there are only a total of 13 possible intervals, including the unison (remember that there are twelve half steps in one octave). Let's start identifying these different intervals and their properties.

The Major and PerfectIntervals

A nice way to understand intervals is by starting with the first scale we learned - the major scale - and see which intervals can be formed by pairing the tonic with every other note. Recall the sequence of steps which make up a major scale: **W W h W W W h**

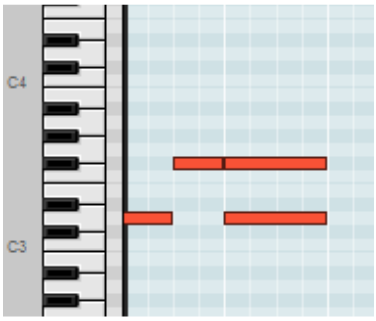
The most basic interval is a **unison** (or first). It is exactly what it sounds like: two notes at the same pitch, with no distance between them. Because of this, it's not a particularly interesting interval, so let's move up the scale to the next one.

Pairing the tonic with the second scale degree yields a **major second** – an interval of two half steps (one **W**).This makes sense, given that we're working with the *second* degree of the *major* scale. An example of this would be C to D:



Notice that the notes are presented both sequentially and simultaneously. This is because intervals are used to describe both steps in melodic distance as well as the harmonic distance between notes. While a major second is a common interval in melodies (melodies often move in **stepwise** motion, or from one scale degree to a neighboring degree). However, the major second is not a particularly pretty harmonic interval (it is in fact dissonant) due to the pitches being so close to each other.

The next interval, as you may have already guessed, is the **major third** (4 half steps, or 2 whole steps). The major third has a very nice, consonant sound, and is actually the primary interval which distinguishes a major scale from a minor scale. An example of a major third is D to F#:

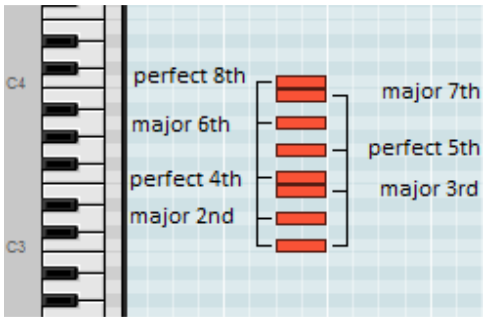


Because of the close proximity and consonant sound, major thirds are used frequently in harmonization.

Let's look at the next two intervals together. They are the **perfect fourth** (five half steps) and the **perfect fifth** (seven half steps). You might be wondering why these intervals are called "perfect" instead of "major," but the technicality behind it is not particularly relevant to us. The important thing to understand is that these intervals, especially the perfect fifth, have a relatively "empty" sound to them. While they are both usually considered consonant intervals, without the context of other notes it's hard to describe their sound as "major." In particular, the perfect fourth tends to have an **unresolved** sound, and creates a very nice resolution when immediately followed with a major third (using the same root note).

The next two intervals are the **major sixth** and **major seventh**, which are nine and eleven half steps respectively. It's rarer to see these intervals in compositions without other notes in between them, but nevertheless they're good to know about. The major sixth is consonant, while the major seventh is dissonant and, similarly to the perfect fourth, likes to resolve (often to an octave).

The last interval from the major scale is the **octave** (technically **perfect octave** or **perfect eighth**). As we know, an octave spans twelve half steps (ie the distance from one C to the C above it). Octaves can be interesting when trying to fill out the sound of a single line melody, because the resulting harmony sounds virtually the same as the original melody. Here's a recap of our major and perfect intervals:



The Minor and Diminished Intervals

We don't have to go step by step through a minor scale in order to see these intervals because the minor scales actually contains many of the same intervals as the major scale (for example, the perfect fifth). We can however see how to transform any major interval into a corresponding **minor interval**, and any perfect interval to a corresponding **diminished interval**.

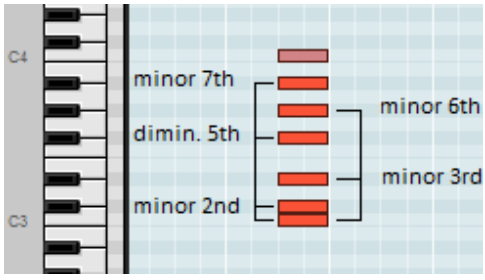
The formula for doing this is very simple: decrease the interval by one half step. A quick glance back at our recap however raises an interesting question: what happens when there is already another interval that is one half step smaller (for example, the major third and the perfect fourth)? The answer is that we can have potentially two (or more names) for the exact same interval. While this might be useful in a theoretical sense we are only going to concern ourselves with the intervals that don't have other, more standard names.

Using our formula, we can quickly construct a new set of minor and diminished intervals from our previous intervals:

Major second → Minor second (1 half step)
Major third →Minor third (3 half steps)
Perfect fifth → Diminished fifth (6 half steps)
Major sixth → Minor sixth (8 half steps)
Major seventh → Minor seventh (10 half steps)

The minor second is interesting because it is actually just a half step. It is perhaps one of the most dissonant intervals when played harmonically, and should be avoided in your songs unless you're aiming for an intentionally and obviously dissonant sound (which could be useful to create a suspenseful mood). The minor third is useful in the same way as the major third – it is actually a consonant interval and creates very nice harmonies. After the minor second, the diminished fifth is another extremely dissonant interval – it is also known as the **tritone** and is exactly half of one octave.

Our previous list produced only one diminished interval, which seems kind of useless. However, minor intervals can also be transformed into diminished intervals by shrinking them another half step. While this produces a lot of strange theoretical intervals, like the diminished second (just a unison), it can still be useful in certain situations. For example, it is common to refer to the **diminished seventh** (analogous to the major sixth) when talking about **diminished chords**, which are made by placing minor thirds in top of each other (root, minor third, diminished fifth, diminished seventh). Here's a recap of the common minor and diminished intervals:



Using Intervals While Composing

Being able to understand intervals and their properties is crucial when creating harmonies. When we're composing within a certain scale (or key) it's often useful to think of intervals simply in terms of the difference in scale degrees. A good exercise is to try is harmonizing a melody by simply adding the third scale degree above each note, regardless of major or minor. Think about what would happen if we did this for the first three notes in an ascending C-major scale. The first interval, C and E, is of course a major third, but the next two (D/F and E/G) are actually minor thirds. This is not a problem, even though we're in a major key – the intervals are still consonant. This is why it's often useful to think of intervals in terms of consonance and dissonance rather than just major/minor/perfect/diminished.

Using your knowledge of intervals you can begin experimenting with **chords** (typically sets of 3 or more simultaneous notes). Three-note chords (or **triads**) are in essence sets of 3 intervals (1st to 2nd, 2nd to 3rd, and 1st to 3rd), so they are understandably more complex. If you're interested in learning more about chords, talk to the music TA for some helpful resources.

Try to pay attention to the intervals you're creating as you add more instruments to your song. You can create moments of tension by using dissonant intervals, and then resolve them by moving to consonant intervals. Again, remember to try and remain in the given scale, at least when starting out. Once you get a better feel for composing you can selectively deviate from this convention. Good luck, and remember that the best way to learn is by **doing**!