Music is written on a grid of five parallel lines called a staff.

The position of a note on the staff (either directly on one of the lines or in one of the spaces between the lines) determines the note's name. In English, we use a musical alphabet (consisting of the first seven letters of the written alphabet) to name notes. This series of letters repeats endlessly in both directions like the points on a line:

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C D E F G A B C D E F G A B C D E
```

etc. C D E F G A B C D E F G A B C D E etc.

However, a staff by itself is useless, since it has no fixed point of reference. To provide those points of reference, musicians use clefs. There are three clefs in common usage today:

The treble (or G) clef, which is a stylized form of the letter G. This clef encircles the second line of the staff. As you might expect, then, this clef identifies the note G (specifically, G above middle C).

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G D E F G A B C D E F G
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The bass (or F) clef, which is a stylized form of the letter F. This clef surrounds the fourth line of the staff with its two dots. As you also might expect, this clef identifies the note F (specifically, F below middle C).

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F F G A B C D E F G AB
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Another family of clefs are the C clefs, which are (you guessed it) stylized forms of the letter C. This clef pinches any one of the lines of the staff and identifies the note C (specifically, middle C). However, this clef is movable; each position on a different line gives the clef a different name. When the clef pinches the middle line of the staff, it's called an alto clef. When it pinches the fourth line of the staff, it's called a tenor clef. These are the two most common varieties of the C clef used today.

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E C D E F G A B C D E F
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E C D E F G A B C D E F
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It is sometimes necessary to write notes higher or lower than those available on the staff in a given clef. In order to extend the range of a staff, we use ledger lines which act as continuations of the staff. To read ledger lines, simply continue reading through the musical alphabet (remember, A follows G♯), allowing one letter name for each line or space.

So far we’ve dealt with the identification of pitch (the vertical axis of notation). The duration of the notes is conveyed through a variety of ways: the shape of the note; the shape of the note; whether the note has a stem; whether the note has a tail (or flag), and if so, how many tails; whether the note is followed by dot or connected to another note with an arc. Despite all the complications the basic principles are relatively simple.

In America we refer to the rhythmic value of notes in a system derived from the Germans. This system is based on fractions, and follows the arithmetic you learned in primary school exactly.

An unfilled (white) notehead, without a stem, is called a whole note. An unfilled notehead with a stem is called a half note. It takes two half notes to equal one whole note. (Because $\frac{1}{2} + \frac{1}{2} = 1$, of course!) A filled (black) notehead, with a stem, is called a quarter note. It takes two quarter notes to equal one half note, and four quarter notes to equal one whole note. ($\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$, and $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$) A filled notehead with a stem and a tail (or flag) is called an eighth note. (I’ll let you do your own arithmetic from here on.) As you can see, there is a pattern here: the shorter a note’s value, the more complicated it is to write, and the higher the denominator of the fraction becomes.

There are 16th notes (filled, stem, two tails), 32nd notes (filled, stem, three tails), 64th notes (filled, stem, four tails), and even 128th notes (filled, stem, five tails), and, theoretically, shorter notes than that are possible, but they are just too ungainly to write or read. In an effort to keep music legible, any of the note values with tails (i.e., 8th through 128th notes), in groups, may be written with connecting beams instead of tails. The number of beams is the same as the number of tails would be for the individual note, and different note values can be combined under the same beam. This is a lot easier to read and write.

Of course, notes indicate that a sound is supposed to happen. Music sometimes requires silence, which also must be measured. We use the exact same system to name rests, or durations of silence. A whole rest is a small shaded rectangle. Because it is so long, it is heavy and hangs down from any line on the staff. A half rest looks just like a whole rest, except that it floats above any line on the staff. A quarter rest looks like, well, what does it look like? An eighth rest has a hook and a slash, a 16th rest two hooks and a slash, a 32nd rest has three hooks and a slash, and so on.
Here is a table of equivalent rhythmic values for notes and rests.

<table>
<thead>
<tr>
<th>NOTES</th>
<th>RESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>whole</td>
<td>whole</td>
</tr>
<tr>
<td>half</td>
<td>half</td>
</tr>
<tr>
<td>quarter</td>
<td>quarter</td>
</tr>
<tr>
<td>eighth</td>
<td>eighth</td>
</tr>
<tr>
<td>16th</td>
<td>16th</td>
</tr>
<tr>
<td>32nd</td>
<td>32nd</td>
</tr>
<tr>
<td>64th</td>
<td>64th</td>
</tr>
</tbody>
</table>

Occasionally it is necessary to indicate a note or rest duration that falls between the values described above. In that case, a dot can be placed after any note or rest; the dot means that the note or rest is to continue for the written note's full value plus half that much. Putting a dot after a half note, for example, means that the note is now held for a half note's value plus a quarter note's worth (because \( \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \)). The half note with the dot is referred to as a *dotted half note*; the same convention applies to any type of note followed by a dot.

Even dotting has its limitations, however. (How would you go about indicating a note value that should be held for five eight notes, for instance?) That's where the *tie* comes in. A tie is a simple arc that connects two noteheads and indicates that their values are combined. A tie connects two notes of the same pitch. It is not possible to tie an A to a B, for example. Rests are never tied.

These note and rest durations generally do not occur in a random stream, but instead are organized in recurring patterns of strong and weak beats which we call *meter*. A single pattern of meter is called a *measure* or *bar*, which is delineated by a vertical line completely through the staff, called a *bar line*.

A *time signature* is normally found at the beginning of a piece of music; it looks like a fraction without a horizontal line, with the numerator indicating the number of beats per measure and the denominator indicating the type of note that receives one beat. There are also shorthand symbols for two time signatures. The first looks like the letter C, and is referred to as common time. It is equivalent to the 4/4 time signature. The second looks like the letter C with a vertical slash through it; it is called *alla breve* and is the same as 2/2 time. Whatever the time signature of a piece, it is written only on the first staff of music.

Some examples of time signatures:
Music 100
Assignment #1

NAME THE NOTES

IN THE EXAMPLES BELOW, NAME THE NOTES BELOW THE STAFF. FILL IN AN APPROPRIATE TIME SIGNATURE.