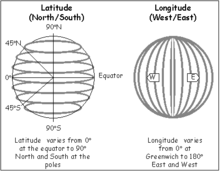
LATITUDE & LONGTITUDE

To draw maps, or draw points on maps, you have to know where things are.  Representing points on a globe is quite tricky, since the world is spherical and your computer screen is flat, but the most common way of representing where something is in the world is latitude and longitude.



**Longitude** measures how far east, or west, are you from the Prime Meridian. This is a arbitrary north-south line that runs through the UK, France and Spain in Europe and Algeria, Mali, Burkina, Faso, Tongo and Ghana in Africa. All longitudes are relative to this line, and can be values between -0 to -180 degrees W (note that longitudes west of the Prime Meridian are given as negative numbers), and from 0 to 180 degrees E.

So the Prime Meridian is at 0.  Minneapolis is west of the Prime Meridian, at about -93 degrees W (or west).   Tokyo is east of the meridian, and is at about 139 degrees E (or east).

180 degrees E is the same place as 180 degrees W, it is on the exact opposite side of the world from the Prime meridian at 0 degrees.

Longitude measurements, e.g. -93 degrees E for Minneapolis, technically only need the number (and - sign if appropriate), so the number -93 is enough to specify the longitude correctly. If you store longitude data, most likely you'll only store the number. But when longitudes are written, the E or W part is almost always included for clarity, and to help humans understand the meaning (and because it's easy to forget if negative values mean east... or west?)

**Latitude** measures how far above or below the equator is this place? Latitude is measured in degrees. The North Pole is at +90 degrees north, the equator is at 0 degrees, and the south pole is at -90 degrees south. Minneapolis is at about 45 degrees north (almost exactly half-way between the equator and the north pole!)

Like longitude, latitude measurements, e.g. +45 degrees N for Minneapolis, technically only need the number (and - sign if appropriate) so the number 45 is enough to specify the latitude correctly. If you store latitude data, most likely you'll only store the number. But when latitudes are written, the N or S part is almost always included for clarity.

**How to figure out what the latitude and longitude for a place is?**

A convenient converter is at

<http://www.latlong.net/>

It will also convert lat-long values into a place on the map. You can also paste lat-long into Google Maps to display the place. Here's MCTC, at a latitude of 44.9730099 North, longitude -93.28954403 west.

<https://www.google.com/maps/place/44%C2%B058'23.2%22N+93%C2%B016'59.7%22W/@44.973099,-93.2854403,17z/>

Some notes of working with Latitude and Longitude in code

* These are floating point numbers, so make sure you store them in a floating point variable, not an integer.
* lat and long are common abbreviations in many contexts but 'long' is a reserved word in many programming languages, so more common to use 'lat' and 'lng', or something that doesn't conflict, as variable names.
* Note the valid ranges of latitude (-90 to +90) and longitude (-180 to +180) which you may need for validation.

<https://en.wikipedia.org/wiki/Geographic_coordinate_system>