**Data Source**

The earthquake data for this project was retrieved from the **U.S. Geological Survey (USGS)** Earthquake Feed API.

The GeoJSON data includes various attributes for each earthquake, such as:

* Magnitude (mag)
* Depth (geometry.coordinates[2])
* Location (properties.place)

**Map Setup**

1. **Base Map**:
   * The base map for this project is provided by OpenTopoMap. The tile layer is loaded using **Leaflet.js**, a powerful open-source JavaScript library for interactive maps.
   * The map is centered on geographical coordinates [40.7, -94.5] (approximate center of the U.S.) with an initial zoom level of 5.
   * OpenTopoMap's tile layer is used as the background, which is a topographic map layer with detailed elevation data.
2. **Adding Layers**:
   * The project uses a **GeoJSON layer** to add earthquake markers to the map. Each earthquake is displayed as a **circle marker** with a radius and color depending on its **magnitude** and **depth**.
   * A **legend** is also included to visually represent the color coding of earthquake depths on the map. The colors range from green (shallow earthquakes) to red (deep earthquakes).

**Earthquake Visualization**

1. **Marker Styling**:
   * Each earthquake is visualized using a **circle marker** with styles based on two main features:
     + **Color**: The color of the circle is determined by the depth of the earthquake. The color coding is as follows:
       - Green: Depth <= 10 km (Shallow)
       - Yellow: Depth <= 30 km (Intermediate)
       - Orange: Depth <= 50 km (Moderate)
       - Red-Orange: Depth <= 70 km (Deep)
       - Red: Depth > 70 km (Very Deep)
     + **Radius**: The radius of the circle marker is based on the magnitude of the earthquake. Larger magnitudes have larger circles to indicate their relative strength. The magnitude is multiplied by a factor (e.g., magnitude \* 4) to determine the circle size.
2. **Popup Information**:
   * Each circle marker is interactive and has a popup that displays the earthquake's **magnitude**, **depth**, and **location**. This allows users to easily access more detailed information about each event.

**Legend**

* The legend displays a color gradient representing earthquake depths. It allows users to interpret the color of each circle marker in terms of its depth, with different colors representing different depth ranges.

**Interaction**

* The map is interactive, allowing users to zoom in and out, as well as hover over and click on markers to get more information via popups.
* The **leaflet.js** library takes care of map rendering, and the **D3.js** library is used to fetch and handle the GeoJSON data asynchronously.

**Tools and Libraries Used**

1. **Leaflet.js**: A JavaScript library used to display interactive maps. It is used for creating the map, adding the tile layers, and placing interactive markers.
2. **D3.js**: A JavaScript library used for fetching and handling GeoJSON data. It allows asynchronous data loading from the USGS API and facilitates dynamic generation of the map's elements.
3. **GeoJSON Format**: A widely used format for encoding geographic data structures. The USGS Earthquake data is in GeoJSON format and is processed using **D3.js** to generate the markers and other map elements.