**Code Walk-Through**

1. **Load the Data**: Read the CSV file to understand its structure and contents.
2. **Data Preprocessing**: Ensure that the data is clean and ready for analysis
   * **Data Cleaning**: checked null values
   * checked latitudes and longitudes values
   * Checked mmsi numbers and their length
3. **Distance Calculation Using Haversine Formula**: Implement the Haversine formula to calculate the distance between two points (latitude and longitude) on Earth.
4. **Identify Proximity Events**:
   * For each vessel, check its proximity to all other vessels within the same time frame.
   * Use efficient methods like vectorization or a spatial indexing technique (like Quadtree) to reduce computational complexity.
5. **Output the Results**: Generate a DataFrame with the required columns (mmsi, vessel\_proximity, and timestamp).
6. Plotted the positions of vessels
7. Plotted the proximity events for the vessels using 500m or 0.5Km as threshold value for proximity