

**Team: METAMINDS**

**Name: Saiteja Siripurapu**

**Student ID: 2291829**

## **Project: Seismic Acquisition 3D Mapping System**

### **Overview:**

Seismic acquisition involves generating seismic waves at the surface and recording how these waves travel through the subsurface. The goal of this project is to calculate and analyze the **multiplicity and offset curve** in a seismic survey, given the distance between geophones and the range of sources. These parameters are critical for optimizing the survey design and ensuring proper subsurface coverage for high-quality 3D seismic imaging.

### **Requirements:**

#### **1. User Input Parameters:**

Users will provide key seismic acquisition parameters:

- Distance between geophones: The distance between adjacent geophones in a seismic acquisition line.
- Distance between source points: The distance between source points.
- Range of geophones: The range of geophones to consider, defining the extent of the area for multiplicity and offset calculation.

#### **2. Multiplicity and Offset Calculation:**

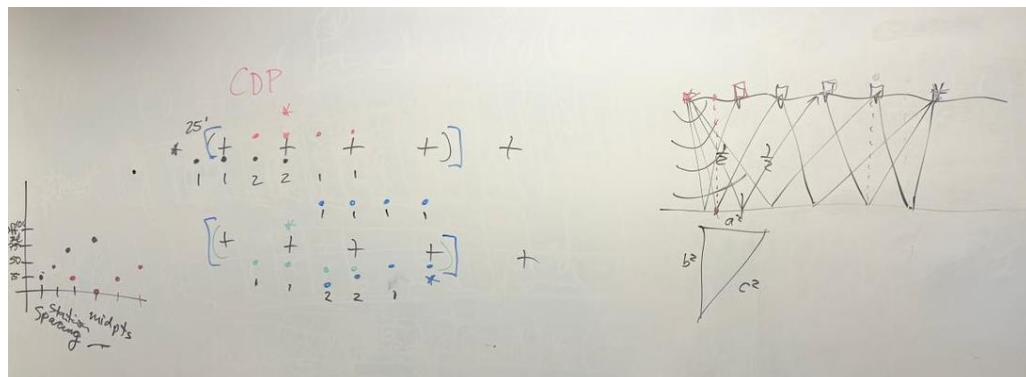
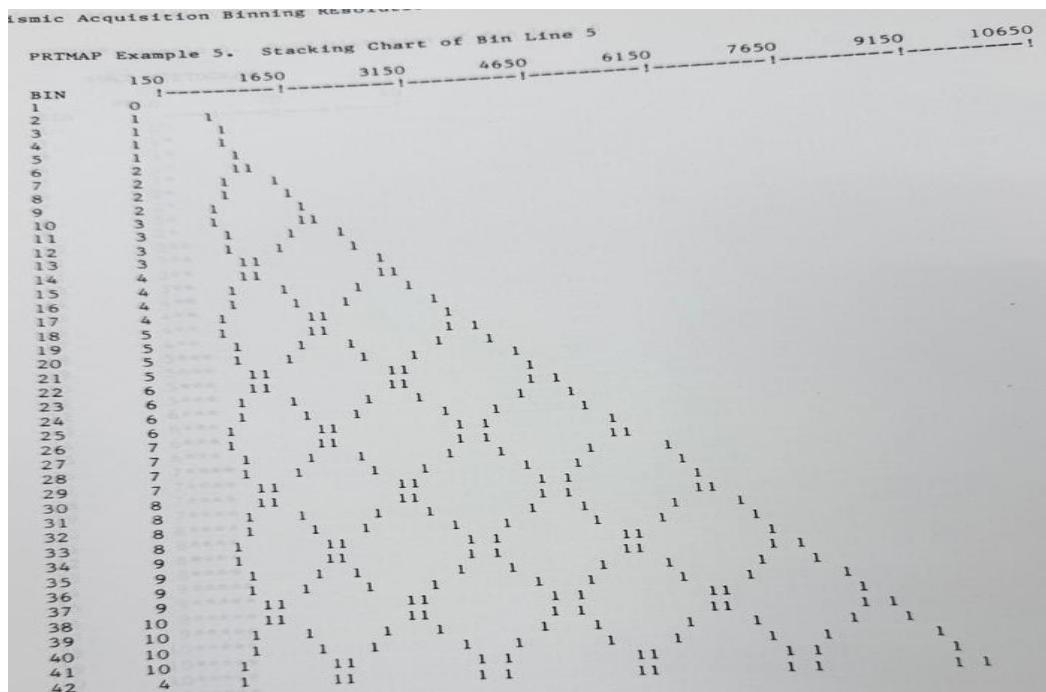
Based on user inputs, the system will compute the following:

- Multiplicity Curve: Determine the multiplicity factor, which shows the redundancy of seismic data, based on the spacing between geophones and source points.
- Offset Curve: Generate offset curves that illustrate the variation in source-to-geophone distances within the specified range, highlighting the distribution of offsets which enables the users in analysing the range of collected seismic data.

#### **3. Output Visualization:**

- Multiplicity Curve: A plot showing the multiplicity values for each geophone or a series of geophones within the specified range.
- Offset Curve: A plot showing the distribution of offsets for each source-geophone pair within the specified range.

## Example diagrams:



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PRTMAP Example 4. Fold Map Display

BIN      5   10   15   20   25   30   35   40   45   50   55   60   65   70
LINE
1
2
3
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5
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43
44
45
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49
50
LINE
      !-----!-----!-----!-----!-----!-----!-----!-----!-----!-----!-----!
      1.     2.     3.     4.     5.     6.     7.     8.     9.     10.    11.    12.    13.    14.    15.    16.    17.    18.    19.    20.    21.    22.    23.    24.    25.    26.    27.    28.    29.    30.    31.    32.    33.    34.    35.    36.    37.    38.    39.    40.    41.    42.    43.    44.    45.    46.    47.    48.    49.    50.    51.    52.    53.    54.    55.    56.    57.    58.    59.    60.    61.    62.    63.    64.    65.    66.    67.    68.    69.    70.

Fold range: 1. - 2.   * = Fold range: 17. - 18.
Fold range: 3. - 4.   A = Fold range: 19. - 20.
Fold range: 5. - 6.   B = Fold range: 21. - 22.
Fold range: 7. - 8.   C = Fold range: 23. - 24.
Fold range: 9. - 10.  D = Fold range: 25. - 26.
Fold range: 11. - 12. E = Fold range: 27. - 28.
Fold range: 13. - 14. F = Fold range: 29. - 30.
Fold range: 14. - 16.  * = More than 30. Fold
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