Implementation:

1) For PCA part: the Data structure I used is dataframe in pandas, according to the formula, I first calculate the eigenvalues and its corresponding eigenvectors. And then I sort the eigenvalues and choose the first two corresponding eigenvectors with bigger eigenvalues.

2) For Fast Map part: firstly, I identified the fairest pair, and then calculate each node’s corresponding coordinates when it maps onto the fairest pair. The next step is to calculate the new distance between every two nodes. Recursive above steps twice to get each node’s x-axis coordinates and y-axis.

Challenge:

1) At the beginning, I was confused about what the x-axis and y-axis represent, how many iterations should I loop to reduce those words into the 2D plot. finally, I realized that the inputs are the distances between each two words, we need to map/stretch those distances into the 2D plot, every node in the 2Dplot image represents a word which the node’s coordinates are the fittest position when we map the word into this 2D plot. And I need to loop 2 twice, first loop to compute the X-axis coordinate and the second loop to compute the Y-axis coordinate for each node.