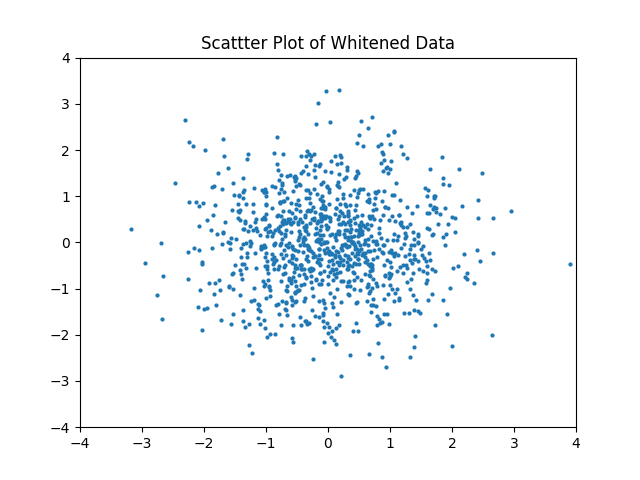
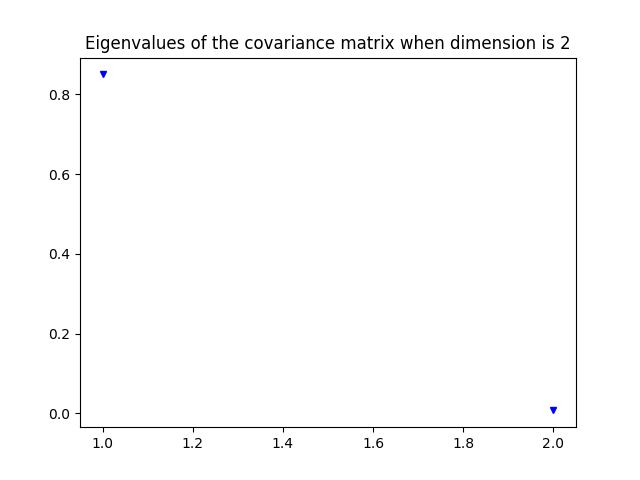
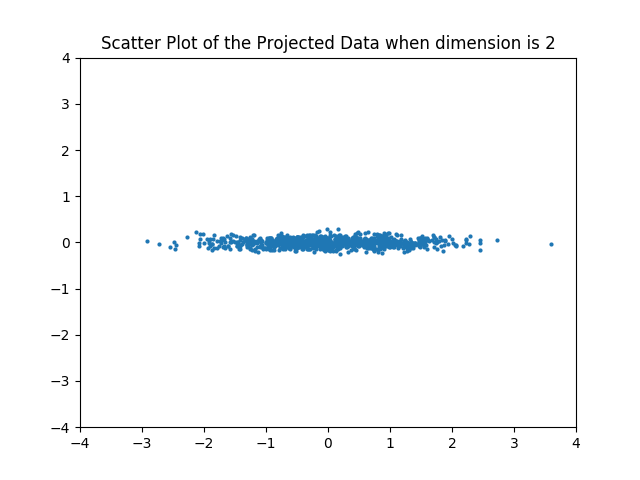
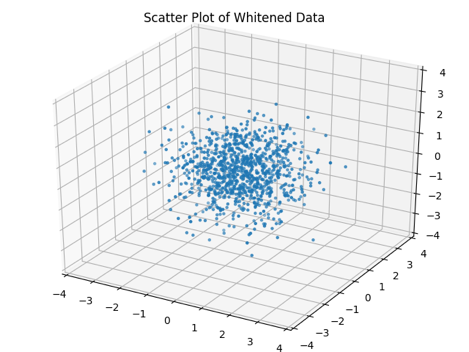
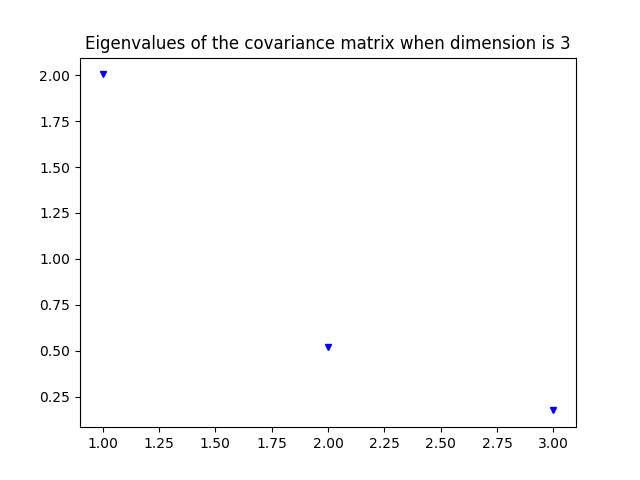
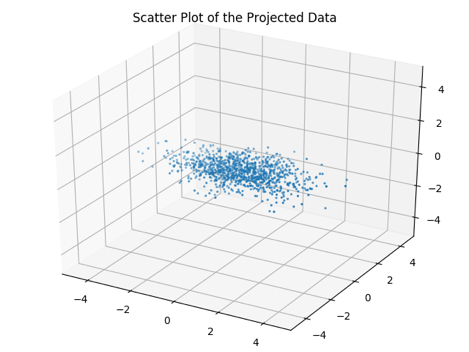
PCA Homework Report Hudanyun Sheng

1. (a)

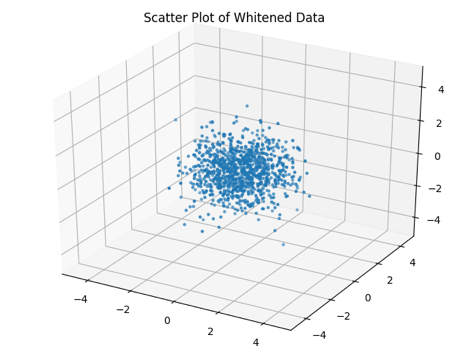
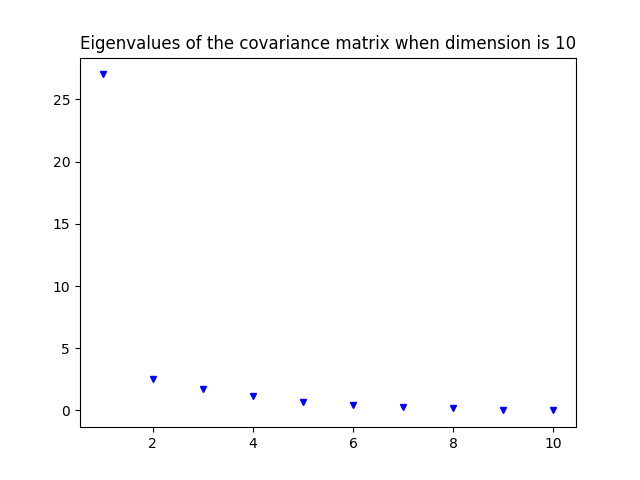
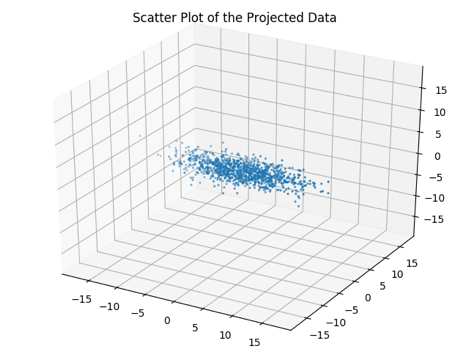
Case 1: B=2



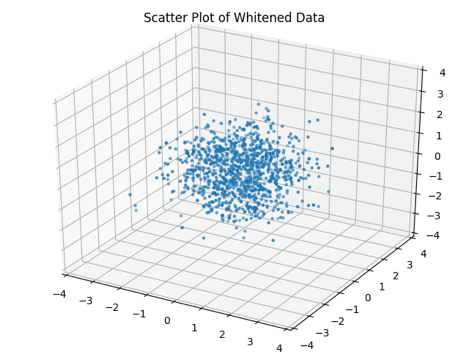
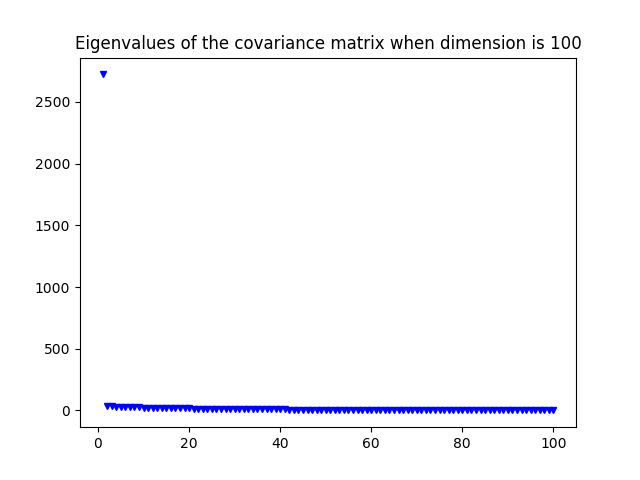
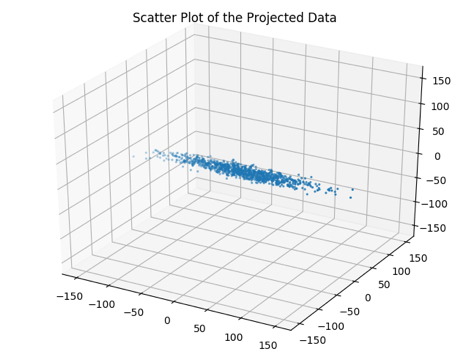
Case 2: B=3



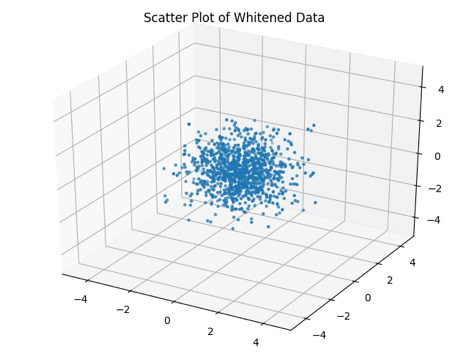
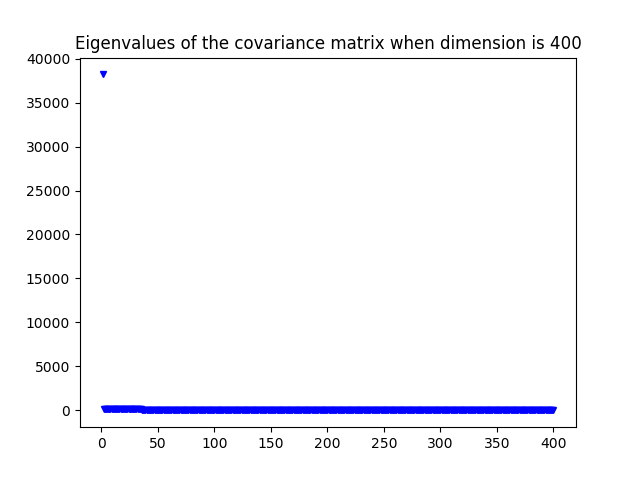
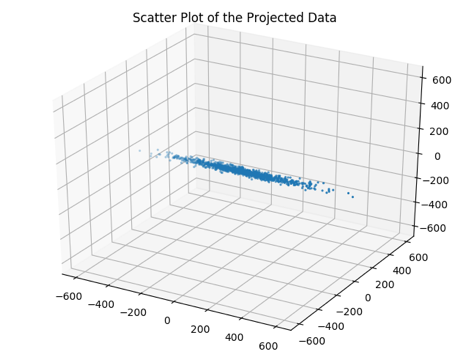
Case 3: B=10



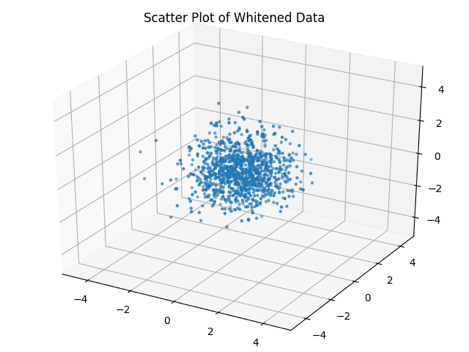
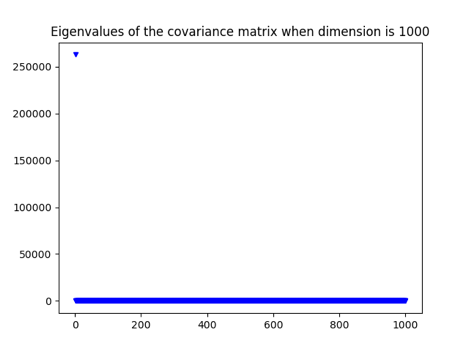
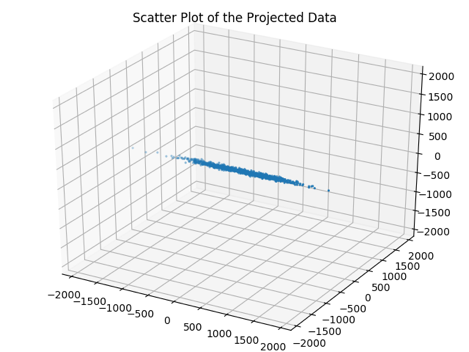
Case 4: B=100



Case 5: B=400

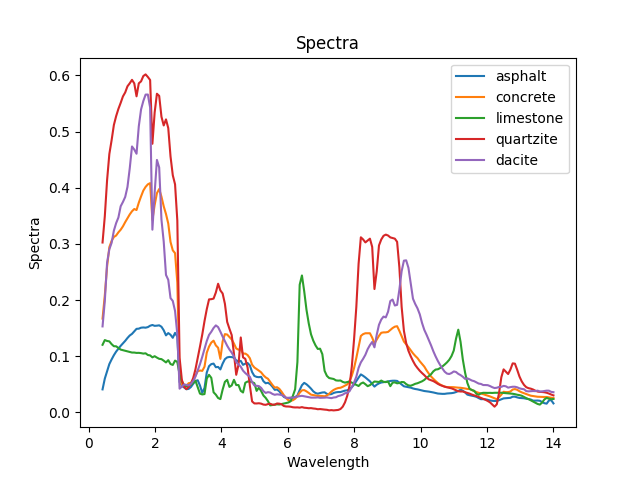


Case 6: 1000

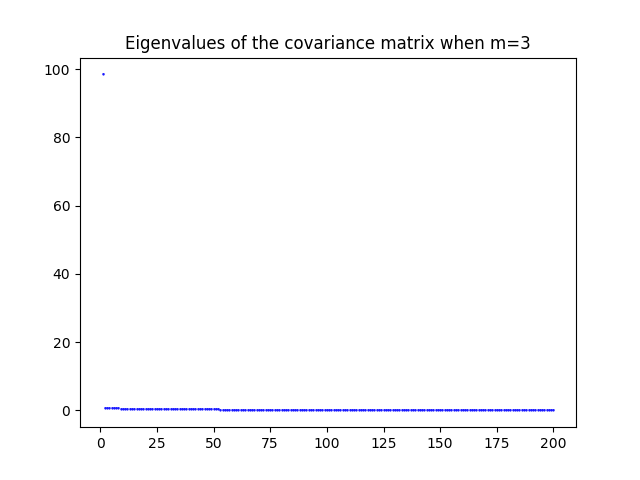
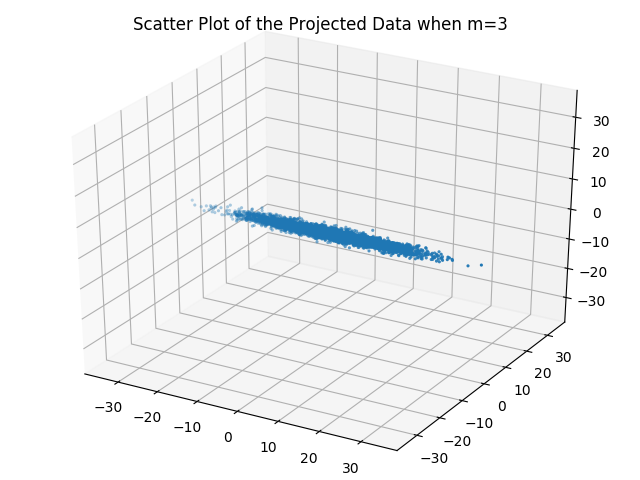


The principal component transformation of the data is actually projecting the data onto the desired number of spaces which preserved most of the original variances. The whitening transformation of the data actually makes the variances of every dimension of the data to be 1.

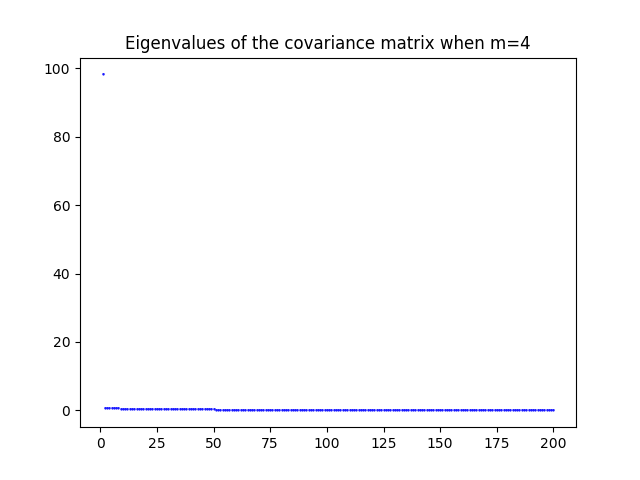
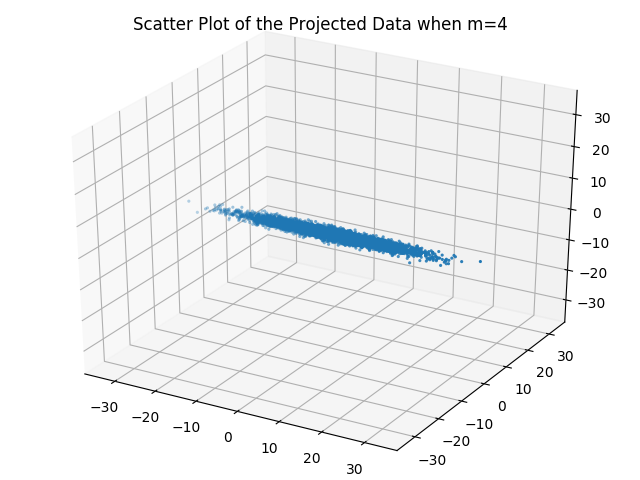
(b)The spectra plot is attached:



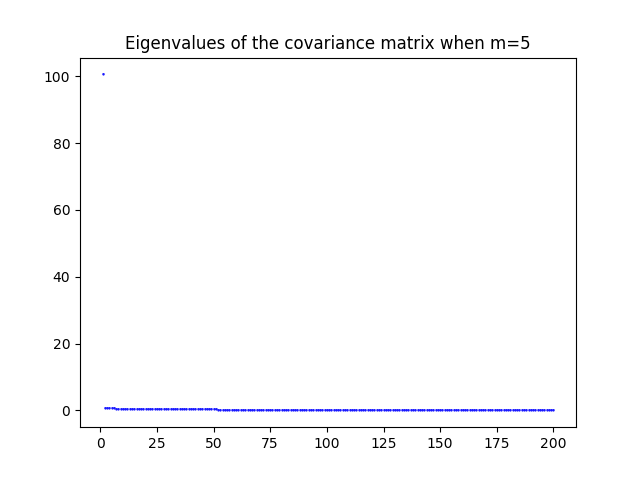
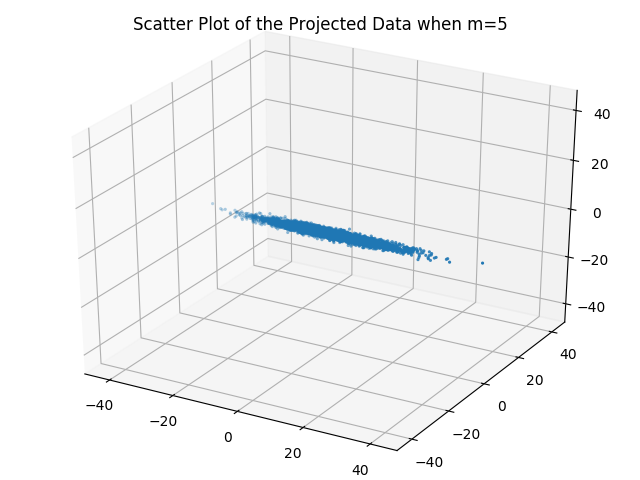
Case 1:



Case 2:

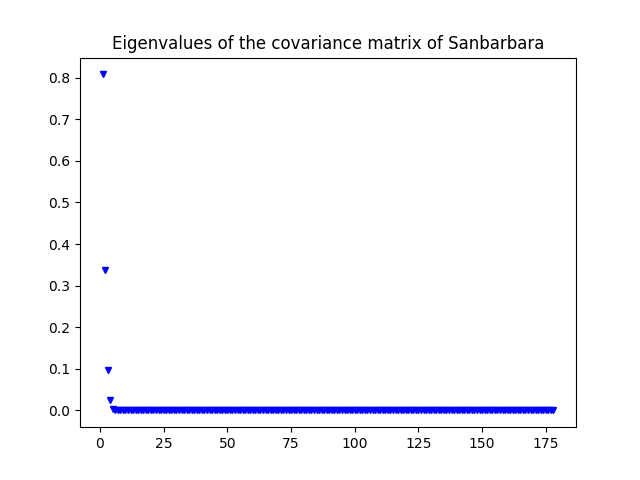
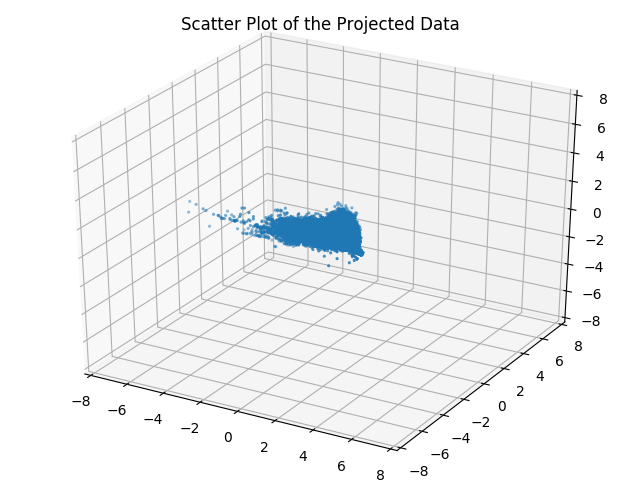


Case 3:



2. Data set X is generated as zero-mean Gaussian with a random covariance matrix. Principal component transform is performed on the data set X to get the transform data Y. It can be calculated that the variance of Y equals to the diagonal elements of . Code is shown to do all the calculation.

3. SanBara:



Gulf port:

