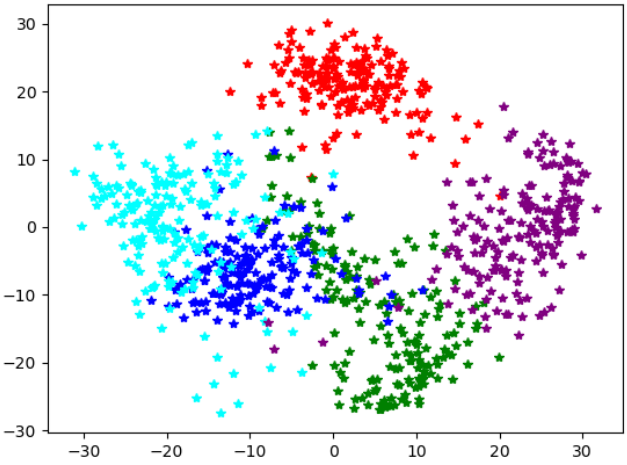
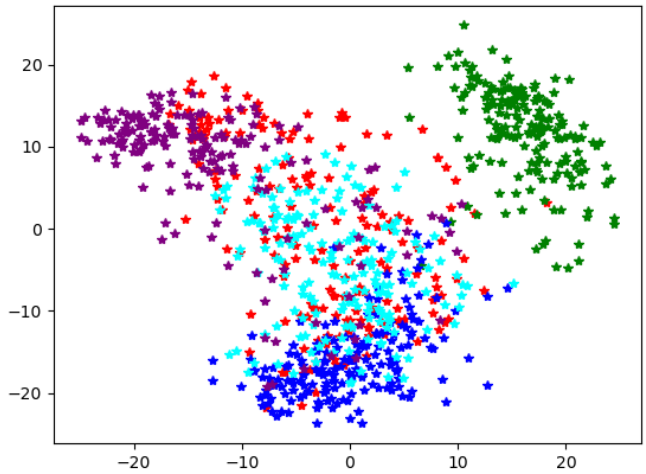
Q6)

We are asked to reduce the dimetionality of handwritten dataset from 64 to 2 using PCA algorithm that does not belong to the scikit. After implementing the algorithm and acquaring PC1 and PC2 I had a chance to observe the reflections on two dimentional space and came up with the following plots of different digits.

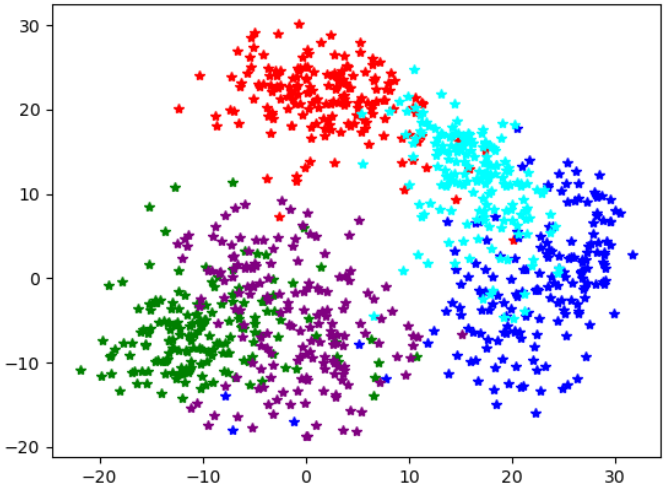
a) We have asked to plot the first 5 digits. They can be seen in the plot with following color codes; 0: Red, 1: Green, 2: Dark Blue, 3: Cyan, 4: Purple. As it can be seen in the plot, 0's are seperated from the rest of the digits and the others are really close to each other yet not completely mixed. 2's and 3's are a little bit mixed and some of the 1 are in the range of 2's.



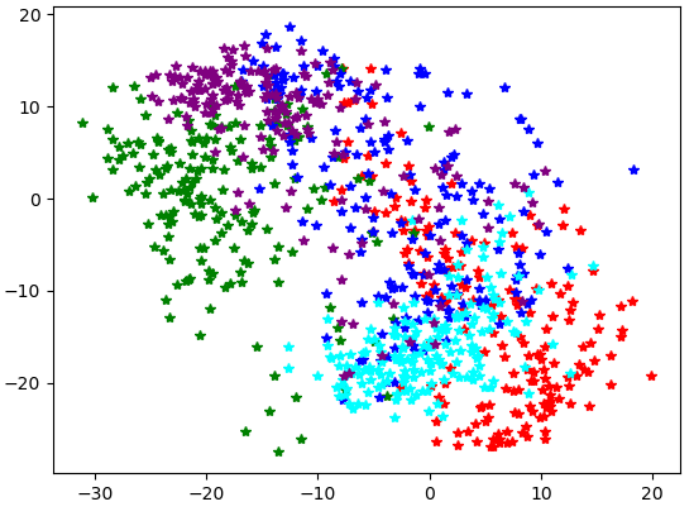
b) We have asked to plot the last 5 digits. They can be seen in the plot with following color codes; 5: Red, 6: Green, 7: Dark Blue, 8: Cyan, 9: Purple. As it can be seen in the plot, 6's are isoleted from the rest of the digits and the others are mixed up heavily. 5's are mixed up with 7's ,8's and 9's.



c) We have asked to plot the even digits. They can be seen in the plot with following color codes; 0: Red, 2: Green, 4: Dark Blue, 6: Cyan, 8: Purple. This plot is the same as the given one. As it can be seen in the plot, 0's are isoleted from the rest of the digits. 2's are mixed up with 8's ,and 4's and 6's. Additionally, some of the 4 are in 2's and 8's region.



d) We have asked to plot the odd digits. They can be seen in the plot with following color codes; 1: Red, 3: Green, 5: Dark Blue, 7: Cyan, 9: Purple. As it can be seen in the plot, it is really hard to identify any isolation. 5's are mixed up with all digits except the 3. 3's are grouped with 9's and 7's are grouped with 1's.



e) We have asked to plot the digits that are multiple of 3. They can be seen in the plot with following color codes; 0: Red, 3: Green, 6: Dark Blue, 9: Cyan. As it can be seen in the plot, all of the digits are relatively isolated from each other. Some of the 9 samples are spread in a large region and some them are in 3's region.