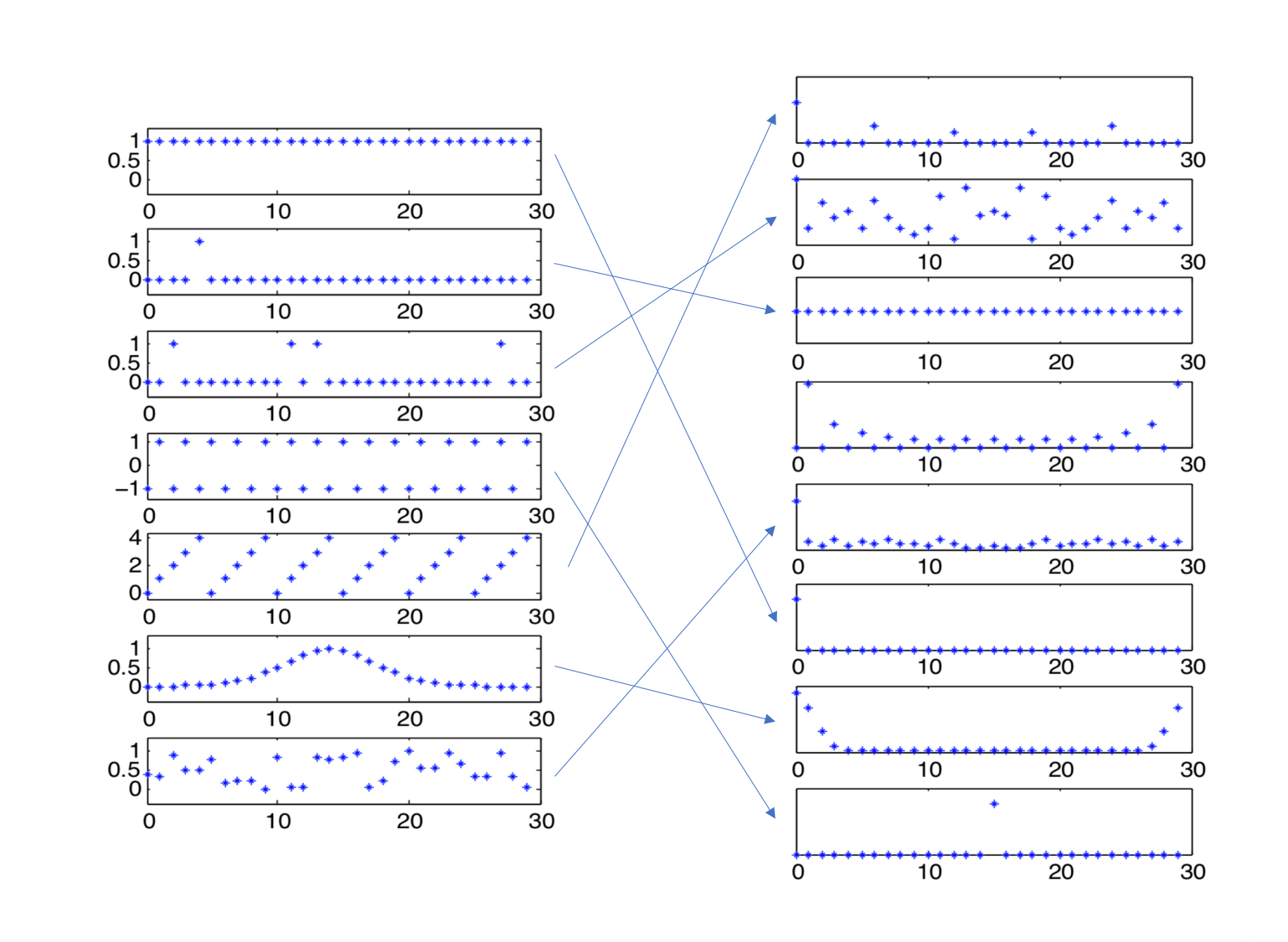
CS168 Miniproject 8

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Starting from the top left discrete vector and moving downward:

Vector 1: The Fourier Transform of a constant term is a Dirac Delta function. Here the left is a constant, horizontal set of points while the right is a Dirac Delta function.

Vector 2: The Fourier Transform of a Dirac Delta function is a constant term. It is the reverse of the previous transformation.

Vector 3: We can see that the left vector represents several different frequencies that are put together. When we take the Fourier Transform of this, we should see a complicated wave consisting of 4 different frequencies, which is like the vector we chose (2).

Vector 4: We can see that the left vector has a consistent frequency of 2, and we can match it to a Fourier Transform that represents that.

Vector 5: The left vector closely represents a sawtooth wave except in discrete form. A sawtooth wave can be broken down into many different waves (4-5 in this case), which is what the matched vector represents.

Vector 6: The Fourier Transform of a Gaussian distribution is also a Gaussian distribution where you must put the sides together. This is shown as the left vector is a Gaussian and the right is also a Gaussian.

Vector 7: The left vector appears to be noise around a constant value between 0 and 1. The Fourier Transform of this would be a high first coefficient and a stream of small coefficients afterwards.

1. A.

B.

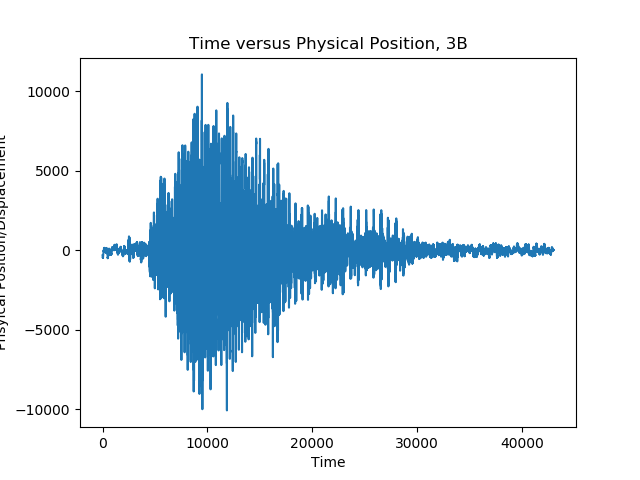
C.

D.

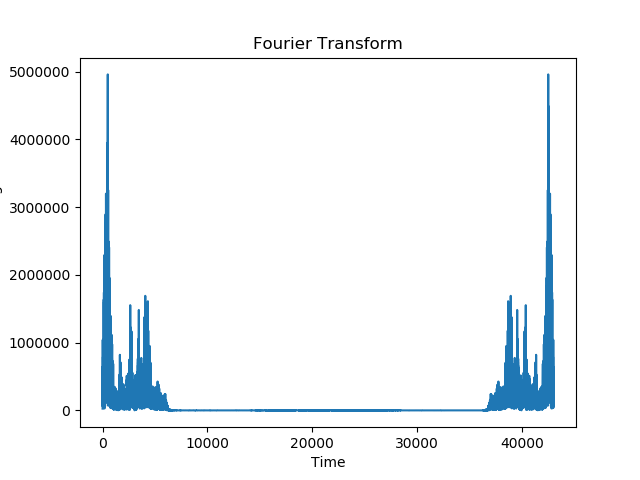
E.

1. A.

B.

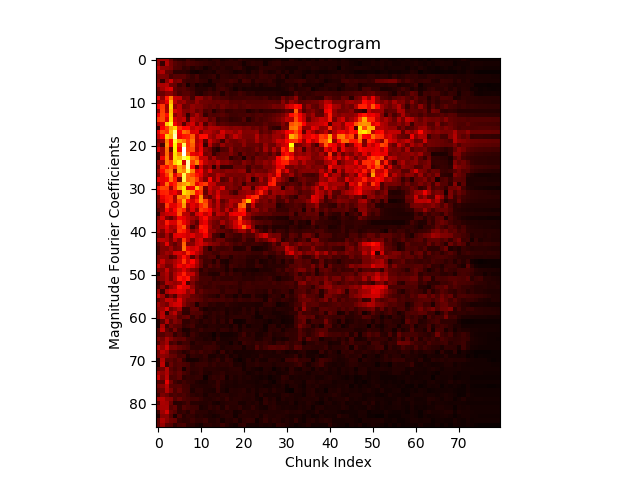


C.



From looking at the above Fourier Transform of the Laurel/Yanny clip, it seems like there is a grouping of high peaks and a grouping of low peaks on each side of the graph that most likely correspond to whether or not you hear Laurel or Yanny. The high peaks represent Yanny, so people more sensitive to those frequencies will likely hear that while the higher frequencies represent Laurel. This type of graph is expected since there is a large debate about which sound people hear.

D.



E. After trying several frequencies, we found that T = 42000 was the best choice for separating Yarry and Laurel. The Yarry audio was very clear and high pitched with this thresholding transform. On the other hand, the Laurel audio was low and much more like a murmur.

F.