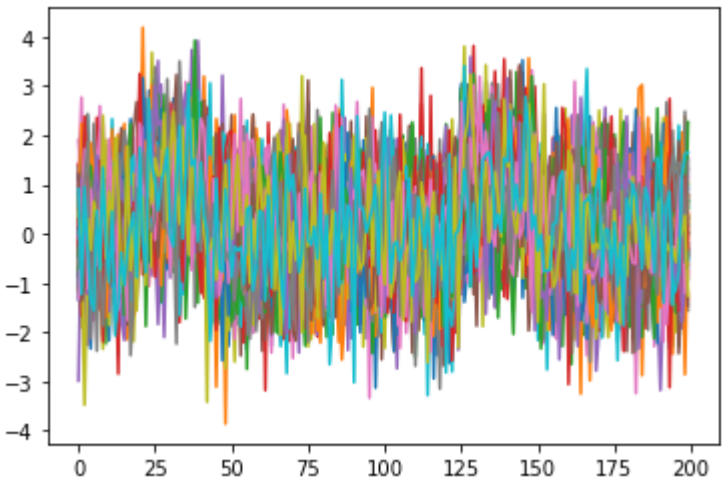
In [2]:
```
import matplotlib.pyplot as plt
import numpy as np
```

In [5]:
```
dataFromFile2 = np.load('datasets/009ExerciseFile2.npy')
```

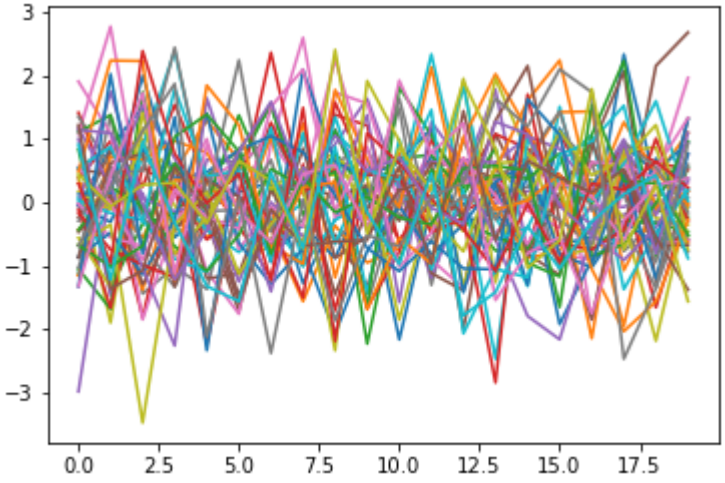
In [6]:
```
dataFromFile2
```

Out[6]:
```
array([[-0.05780945, -1.15635221,  0.83289835, ..., -0.68769352,
         0.44072387,  0.90667142],
       [ 0.86958537,  0.79687342, -1.35198716, ...,  0.2327891 ,
        -0.06611436, -1.22673412],
       [ 1.50718194,  0.98658403, -0.34370588, ...,  1.12328159,
         0.27233996,  0.95237437],
       ...,
       [ 1.1514689 ,  1.77104895, -1.2615818 , ...,  1.34543347,
         0.0320172 ,  1.16413553],
       [ 0.18435555, -0.58065761,  1.15234974, ..., -0.58143914,
         0.36937891,  1.62024492],
       [ 0.79733689, -0.61015534, -0.4714511 , ...,  1.46023593,
        -1.25682536,  1.64992101]])
```

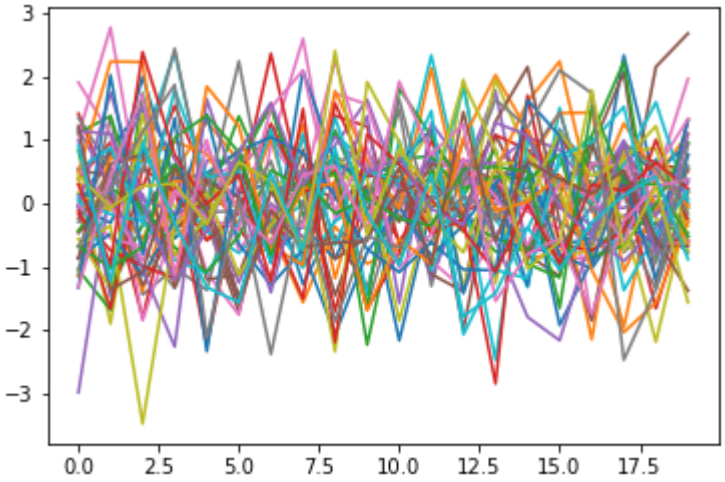
In [42]:
```
plt.plot(dataFromFile2);
```



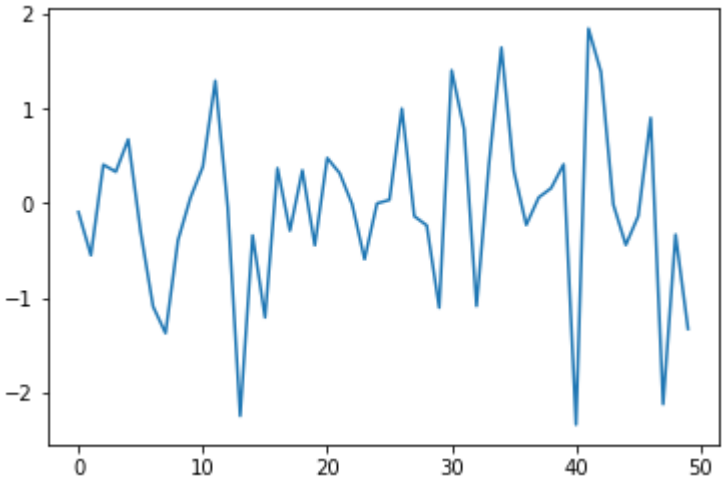
In [43]:
```
plt.plot(dataFromFile2[0:20, :]);
```



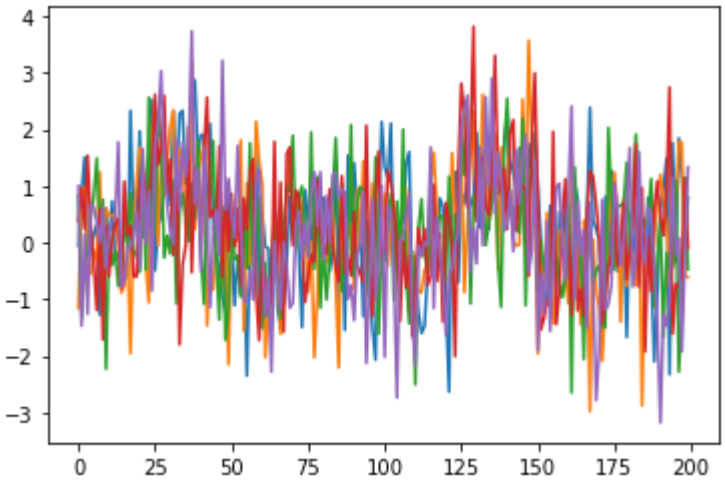
In [8]:
```
plt.plot(dataFromFile2[0:20, :]);
```



In [9]:
```
plt.plot(dataFromFile2[4, :]);
```

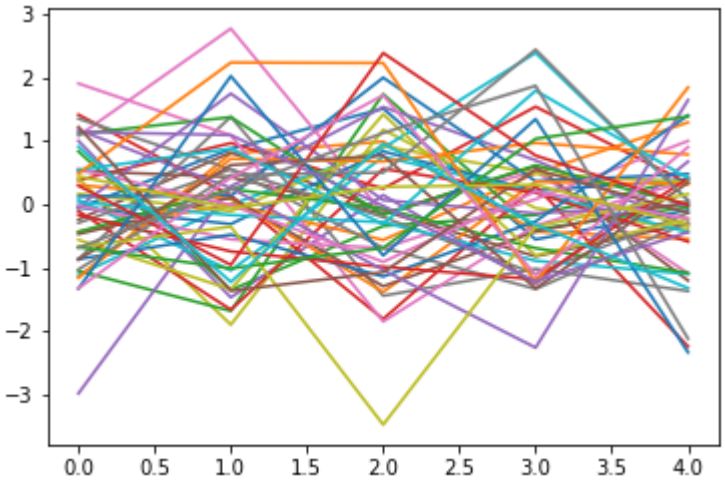


In [21]:
```
plt.plot(dataFromFile2[:,0:5]); #all the rows of the first 5 columns
```



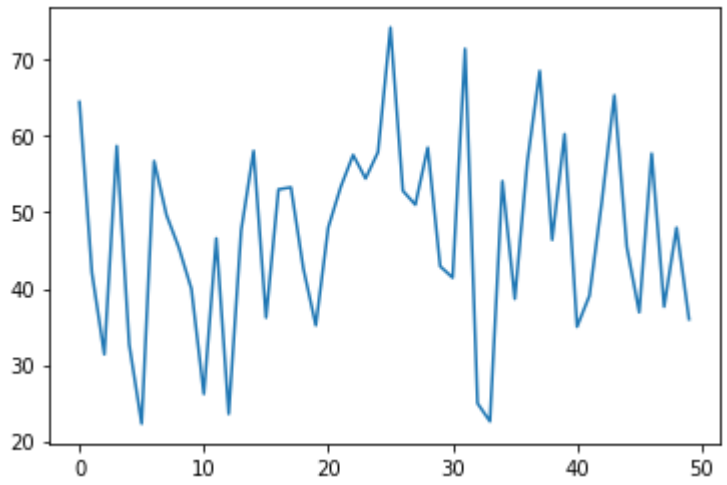
Starting to see a pattern around rows 40 and 130. Let's check the columns for any patterns

In [23]:
```
plt.plot(dataFromFile2[0:5,:]); #all the columns of the first 5 rows
```



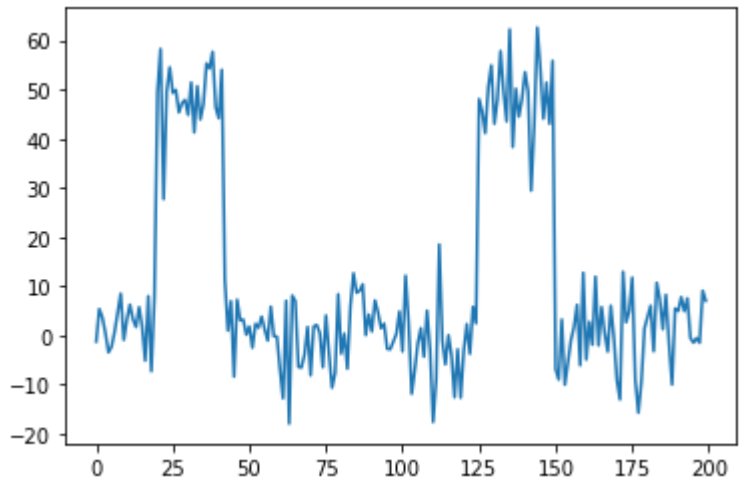
In [25]:
```
plt.plot(dataFromFile2.sum(0))
```

Out[25]:
```
[<matplotlib.lines.Line2D at 0x1b384b07250>]
```



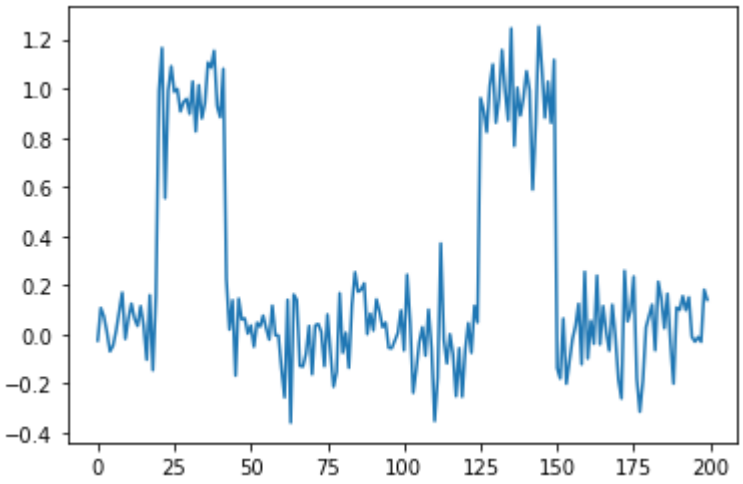
In [27]:
```
plt.plot(dataFromFile2.sum(1)) #sum of every column
```

Out[27]:
```
[<matplotlib.lines.Line2D at 0x1b384b95580>]
```



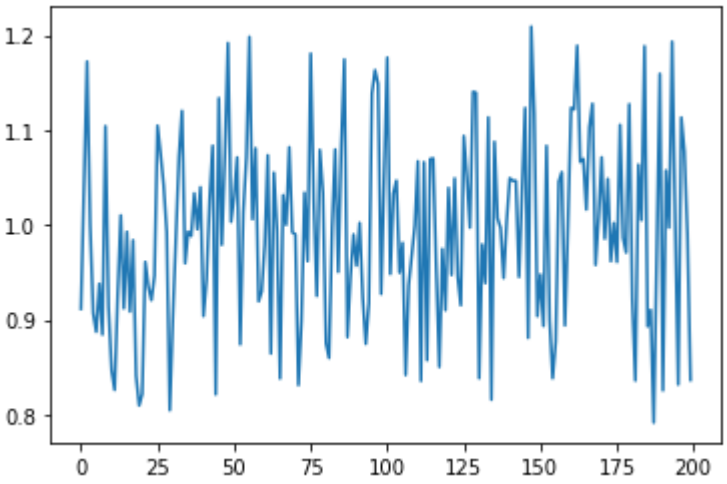
Now we see a pattern in the data that shows two significant sigams

In [46]:
```
plt.plot(dataFromFile2.mean(1))
rowMean = dataFromFile2.mean(1)
```



In [38]:
```
plt.plot(dataFromFile2.std(1))
```

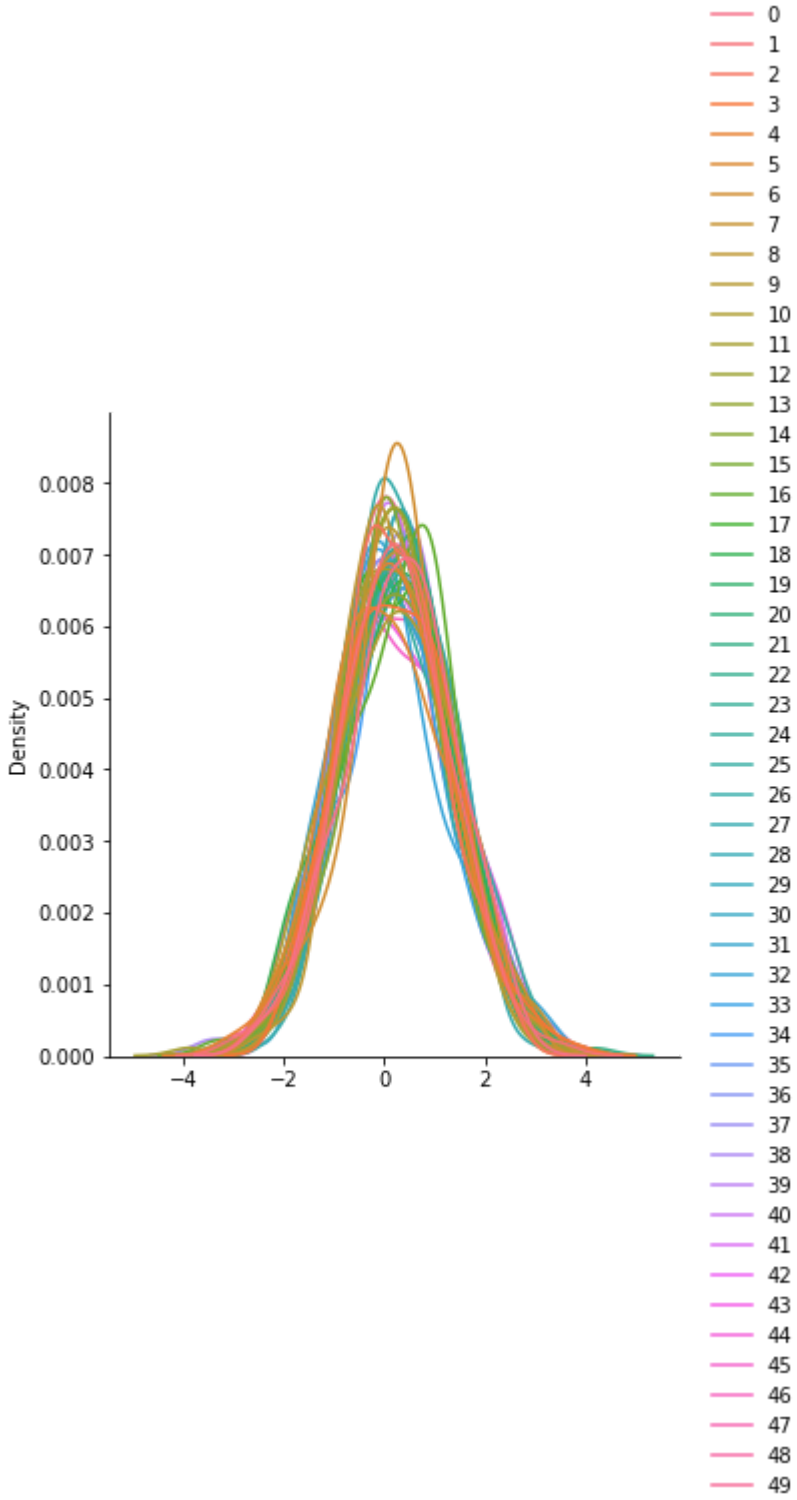
Out[38]: [<matplotlib.lines.Line2D at 0x1b383555a60>]



In [39]:
```
import seaborn as sns
```

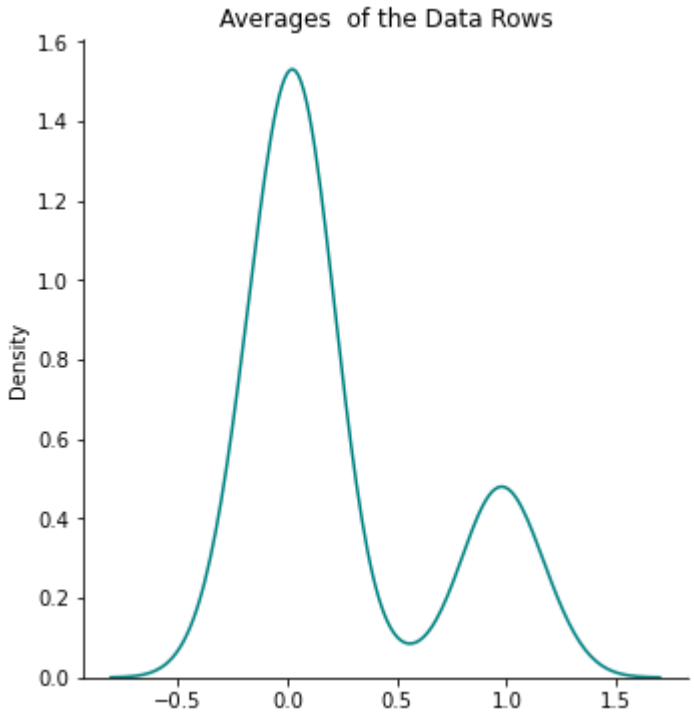
In [41]:
```
sns.displot(dataFromFile2, kind='kde')
```

Out[41]: <seaborn.axisgrid.FacetGrid at 0x1b38357ed90>



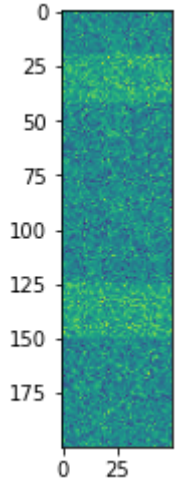
In [50]:
```
sns.displot(rowMean, kind='kde', color='teal')
plt.title("Averages  of the Data Rows")
```

Out[50]: Text(0.5, 1.0, 'Averages of the Data Rows')



In [7]:
```
plt.imshow(dataFromFile2)
```

Out[7]: <matplotlib.image.AxesImage at 0x2d0a7340520>



Going beyond, the next steps could be to group the data according the average of rows graph where the standard error is similiar. We could then calculate the variance, combine the variances for each group, then square root to get a more obeservable standard deviation.

In [ ]:
```
```