DBSCAN (density based spatial clustering of application with noise)

In [14]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import NearestNeighbors
from sklearn.cluster import DBSCAN
```

In [3]:
```
#import dataset
data = pd.read_csv(r'C:\Users\ASUS\Downloads\penguins.csv')
```

In [4]:
```
data.head()
```

Out[4]:

	y	bill_length_mm	bill_depth_mm	flipper_length_mm	body_mass_g
0	Adelie	39.1	18.7	181.0	3750.0
1	Adelie	39.5	17.4	186.0	3800.0
2	Adelie	40.3	18.0	195.0	3250.0
3	Adelie	36.7	19.3	193.0	3450.0
4	Adelie	39.3	20.6	190.0	3650.0

In [6]:
```
data_1=data.drop(columns=['y'])
```

In [10]:
```
data_1
```

Out[10]:

	bill_length_mm	bill_depth_mm	flipper_length_mm	body_mass_g
0	39.1	18.7	181.0	3750.0
1	39.5	17.4	186.0	3800.0
2	40.3	18.0	195.0	3250.0
3	36.7	19.3	193.0	3450.0
4	39.3	20.6	190.0	3650.0
...	...	...	...	...
337	55.8	19.8	207.0	4000.0
338	43.5	18.1	202.0	3400.0
339	49.6	18.2	193.0	3775.0
340	50.8	19.0	210.0	4100.0
341	50.2	18.7	198.0	3775.0

342 rows × 4 columns

In [11]:
```
#NORMALIZING DATA USING STANDARDSCALER
dataScaled= StandardScaler().fit_transform(data_1)
```

In [12]:
```
dataScaled
```

Out[12]:
```
array([[-0.88449874,  0.78544923, -1.41834665, -0.56414208],
       [-0.81112573,  0.1261879 , -1.06225022, -0.50170305],
       [-0.66437972,  0.43046236, -0.42127665, -1.18853234],
       ...,
       [ 1.04154272,  0.53188718, -0.56371522, -0.53292256],
       [ 1.26166175,  0.93758646,  0.64701263, -0.1270689 ],
       [ 1.15160224,  0.78544923, -0.20761879, -0.53292256]])
```

In [18]:
```
dataScaled_df= pd.DataFrame(dataScaled, columns= data_1.columns)
```

In [19]:
```
dataScaled_df
```

Out[19]:

	bill_length_mm	bill_depth_mm	flipper_length_mm	body_mass_g
0	-0.884499	0.785449	-1.418347	-0.564142
1	-0.811126	0.126188	-1.062250	-0.501703
2	-0.664380	0.430462	-0.421277	-1.188532
3	-1.324737	1.089724	-0.563715	-0.938776
4	-0.847812	1.748985	-0.777373	-0.689020
...	...	...	...	...
337	2.178824	1.343286	0.433355	-0.251947
338	-0.077396	0.481175	0.077258	-1.001215
339	1.041543	0.531887	-0.563715	-0.532923
340	1.261662	0.937586	0.647013	-0.127069
341	1.151602	0.785449	-0.207619	-0.532923

342 rows × 4 columns

In [20]:
```
#finding the Epsilon values when min points are k=7  WITH THE HELP OF KNN algorithm

knn = NearestNeighbors(n_neighbors= 7)
```

In [21]:
```
knn.fit(dataScaled_df)
```

Out[21]:
```
NearestNeighbors(n_neighbors=7)
```

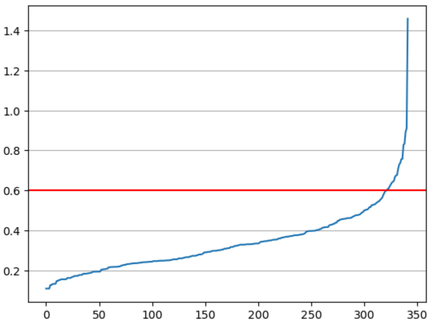
In [22]:
```
dist,ind = knn.kneighbors(dataScaled_df)
```

In [23]:
```
#sort the distance
dist = np.sort(dist,axis=0)
```

In [24]:
```
dist= dist[:,1]#finding all the min distance
```

In [25]:
```
#plot the min dist
plt.plot(dist)
plt.grid(axis='y')
plt.axhline(y=0.6, color='r',ls='-')
```

Out[25]:
```
<matplotlib.lines.Line2D at 0x22fca2d9af0>
```



In [26]:
```
#from the above k distance graph we got eps value = 0.6 when the min points are 7

#train the DBSCAN
dbscan=DBSCAN(eps=0.6,min_samples=7)
```

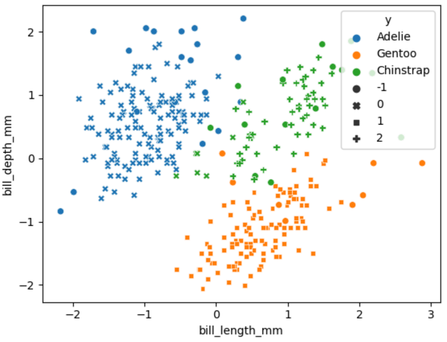
In [27]:
```
dbscan.fit(dataScaled_df)
```

Out[27]:
```
DBSCAN(eps=0.6, min_samples=7)
```

In [28]:
```
#visualize the cluster
sns.scatterplot(dataScaled_df['bill_length_mm'],dataScaled_df['bill_depth_mm'],hue=y,style=dbscan.labels_)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variables as keyword args: x, y. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[28]:
```
<AxesSubplot:xlabel='bill_length_mm', ylabel='bill_depth_mm'>
```



In [ ]:
```
```