In [1]:
```
import pandas as pd
```

In [2]:
```
df  = pd.read_csv("Universities.csv")
```

In [3]:
```
df
```

Out[3]:

	Univ	SAT	Top10	Accept	SFRatio	Expenses	GradRate
0	Brown	1310	89	22	13	22704	94
1	CalTech	1415	100	25	6	63575	81
2	CMU	1260	62	59	9	25026	72
3	Columbia	1310	76	24	12	31510	88
4	Cornell	1280	83	33	13	21864	90
5	Dartmouth	1340	89	23	10	32162	95
6	Duke	1315	90	30	12	31585	95
7	Georgetown	1255	74	24	12	20126	92
8	Harvard	1400	91	14	11	39525	97
9	JohnsHopkins	1305	75	44	7	58691	87
10	MIT	1380	94	30	10	34870	91
11	Northwestern	1260	85	39	11	28052	89
12	NotreDame	1255	81	42	13	15122	94
13	PennState	1081	38	54	18	10185	80
14	Princeton	1375	91	14	8	30220	95
15	Purdue	1005	28	90	19	9066	69
16	Stanford	1360	90	20	12	36450	93
17	TexasA&M	1075	49	67	25	8704	67
18	UCBerkeley	1240	95	40	17	15140	78
19	UChicago	1290	75	50	13	38380	87
20	UMichigan	1180	65	68	16	15470	85
21	UPenn	1285	80	36	11	27553	90
22	UVA	1225	77	44	14	13349	92
23	UWisconsin	1085	40	69	15	11857	71
24	Yale	1375	95	19	11	43514	96

In [4]:
```
df1 = df.drop(['Univ'],axis=1)
```

In [5]:
```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
```

In [6]:
```
x_scaled = scaler.fit_transform(df1)
```

In [7]:
```
x_scaled
```

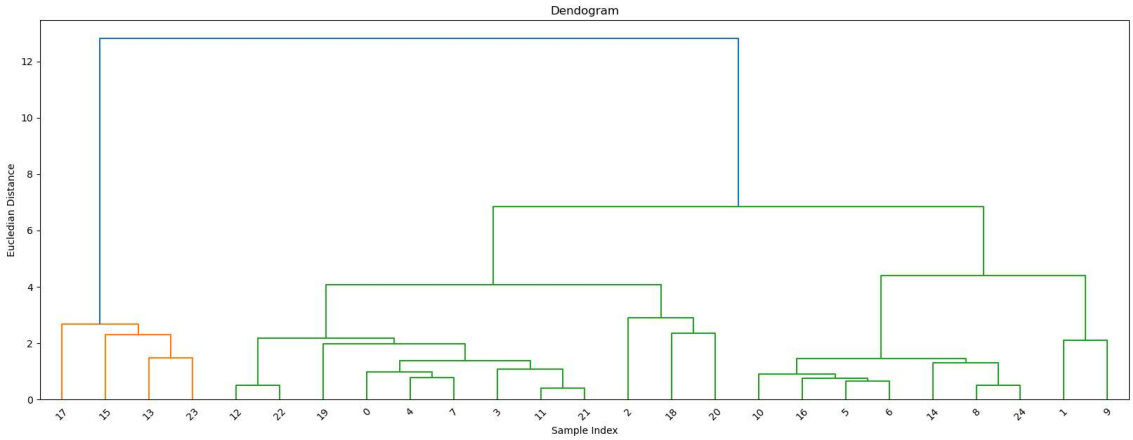
Out[7]:
```
array([[ 0.41028362,  0.6575195 , -0.88986682,  0.07026045, -0.33141256,
         0.82030265],
       [ 1.39925928,  1.23521235, -0.73465749, -1.68625071,  2.56038138,
        -0.64452351],
       [-0.06065717, -0.76045386,  1.02438157, -0.93346022, -0.16712136,
        -1.65863393],
       [ 0.41028362, -0.02520842, -0.78639393, -0.18066972,  0.29164871,
         0.14422904],
       [ 0.12771914,  0.34241431, -0.32076595,  0.07026045, -0.39084607,
         0.36958691],
       [ 0.69284809,  0.6575195 , -0.83813038, -0.68253005,  0.33778044,
         0.93298158],
       [ 0.4573777 ,  0.71003703, -0.47597528, -0.18066972,  0.29695528,
         0.93298158],
       [-0.10775125, -0.13024348, -0.78639393, -0.18066972, -0.51381683,
         0.59494478],
       [ 1.25797704,  0.76255456, -1.30375836, -0.43159988,  0.85874344,
         1.15833946],
       [ 0.36318954, -0.07772595,  0.24833493, -1.43532055,  2.21481798,
         0.0315501 ],
       [ 1.06960072,  0.92010716, -0.47597528, -0.68253005,  0.52938275,
         0.48226584],
       [-0.06065717,  0.44744937, -0.01034729, -0.43159988,  0.04698077,
         0.25690797],
       [-0.10775125,  0.23737924,  0.14486204,  0.07026045, -0.86787073,
         0.82030265],
       [-1.7466252 , -2.02087462,  0.76569936,  1.32491127, -1.21718409,
        -0.75720245],
       [ 1.02250664,  0.76255456, -1.30375836, -1.18439038,  0.20037583,
         0.93298158],
       [-2.46245521, -2.54604994,  2.6282113 ,  1.57584144, -1.29635802,
        -1.99667073],
       [ 0.88122441,  0.71003703, -0.9933397 , -0.18066972,  0.64117435,
         0.70762371],
       [-1.8031381 , -1.44318177,  1.43827311,  3.08142243, -1.32197103,
        -2.22202861],
       [-0.24903349,  0.97262469,  0.04138915,  1.07398111, -0.86659715,
        -0.98256032],
       [ 0.2219073 , -0.07772595,  0.55875358,  0.07026045,  0.77772991,
         0.0315501 ],
       [-0.81416244, -0.60290126,  1.49000956,  0.82305094, -0.84324827,
        -0.19380777],
       [ 0.17481322,  0.18486171, -0.16555662, -0.43159988,  0.01167444,
         0.36958691],
       [-0.39031573,  0.02730912,  0.24833493,  0.32119061, -0.99331788,
         0.59494478],
       [-1.70894994, -1.91583956,  1.541746  ,  0.57212078, -1.09888311,
        -1.77131286],
       [ 1.02250664,  0.97262469, -1.04507615, -0.43159988,  1.14098185,
         1.04566052]])
```

In [8]:
```
import scipy.cluster.hierarchy as sc
import matplotlib.pyplot as plt

plt.figure(figsize=(20,7))
plt.title("Dendograms")

sc.dendrogram(sc.linkage(x_scaled,method='ward'))
plt.title('Dendogram')
plt.xlabel('Sample Index')
plt.ylabel('Eucledian Distance')
```

Out[8]:
```
Text(0, 0.5, 'Eucledian Distance')
```



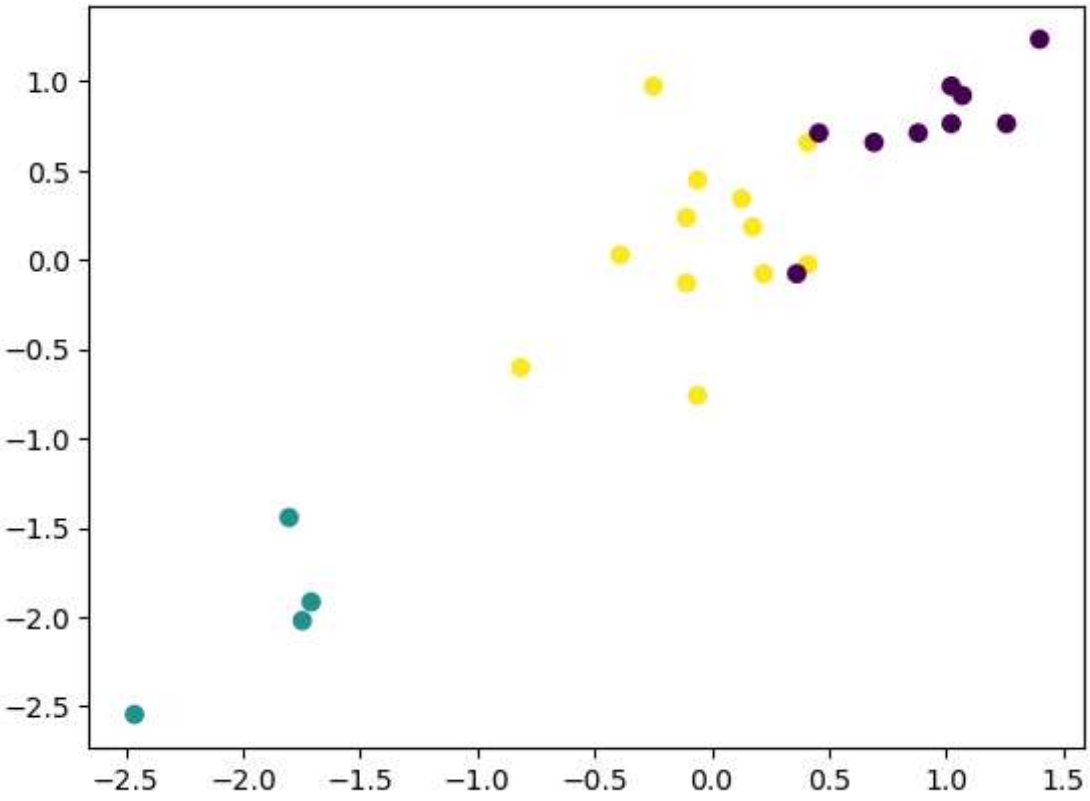
In [9]:
```
from sklearn.cluster import AgglomerativeClustering
cluster=AgglomerativeClustering(n_clusters=3,affinity='euclidean',linkage=
cluster.fit(x_scaled)
```

```
C:\Users\Dell\.conda\Lib\site-packages\sklearn\cluster\_agglomerative.py:
1005: FutureWarning: Attribute `affinity` was deprecated in version 1.2 a
nd will be removed in 1.4. Use `metric` instead
  warnings.warn(
```

Out[9]:
```
AgglomerativeClustering
AgglomerativeClustering(affinity='euclidean', n_clusters=3)
```

In [10]:
```
plt.scatter(x_scaled[:,0],x_scaled[:,1],c=cluster.labels_)
```

Out[10]:
```
<matplotlib.collections.PathCollection at 0x1c8f1c8ca90>
```



In [ ]: