In [123]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
from sklearn.preprocessing import MinMaxScaler
import pylab as pl
from sklearn.cluster import KMeans
from sklearn.decomposition import PCA
```

In [124]:

```
dating_clean = pd.read_csv('/home/amybirdee/hobby_projects/dating_site/dating_clean.cs
v', delimiter = ',')
```

In [125]:

```
dating_clean.head()
```

Out[125]:

	age	body_type	diet	drinks	drugs	education	ethnicity	height	income
0	22	a little extra	strictly anything	socially	never	working on college/university	asian, white	75	-1
1	35	average	mostly other	often	sometimes	working on space camp	white	70	80000
2	38	thin	anything	socially	no response given	graduated from masters program	no response given	68	-1
3	23	thin	vegetarian	socially	no response given	working on college/university	white	71	20000
4	29	athletic	no response given	socially	never	graduated from college/university	asian, black, other	66	-1

5 rows × 21 columns

In [126]:

```
#dropping columns that won't be used in the model
dating_clean = dating_clean.drop(['body_type', 'diet', 'drinks', 'drugs', 'education', 'ethnicity', 'income', 'job',\
                                  'last_online', 'location', 'offspring', 'pets', 'religion','sign', 'orientation', \
                                  'speaks', 'status', 'smokes'], axis = 1)
```

In [127]:

```
dating_clean.head()
```

Out[127]:

	age	height	sex
0	22	75	m
1	35	70	m
2	38	68	m
3	23	71	m
4	29	66	m

In [128]:

```
#defining the scaler
scaler = MinMaxScaler()
```

In [129]:

```
#scaling the numerical columns for model
dating_clean[['age', 'height']] = scaler.fit_transform(dating_clean[['age', 'height']])
```

In [130]:

```
dating_clean.head()
```

Out[130]:

	age	height	sex
0	0.043478	0.787234	m
1	0.184783	0.734043	m
2	0.217391	0.712766	m
3	0.054348	0.744681	m
4	0.119565	0.691489	m

In [131]:

```
#using pd.get_dummies on categorical data
dating_encoded = pd.get_dummies(dating_clean, columns = ['sex'], drop_first = True)
dating_encoded.head()
```

Out[131]:

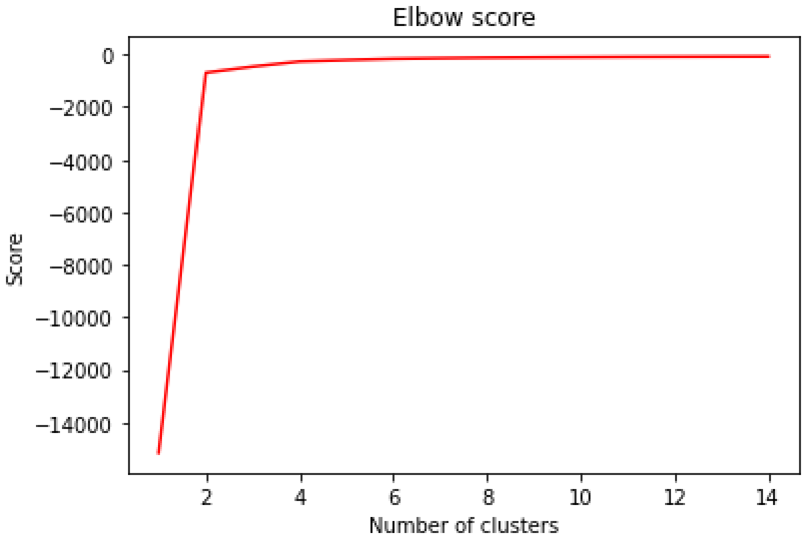
	age	height	sex_m
0	0.043478	0.787234	1
1	0.184783	0.734043	1
2	0.217391	0.712766	1
3	0.054348	0.744681	1
4	0.119565	0.691489	1

In [132]:

```
#create 15 clusters - K = 15
k = range (1, 15)

#instantiate and fit KMeans for clusters 1-15
kmeans = [KMeans(n_clusters = i) for i in k]
score = [kmeans[i].fit(dating_encoded).score(dating_encoded) for i in range(len(kmeans
))]

#plot the elbow method
pl.plot(k, score, color = 'red')
pl.xlabel('Number of clusters')
pl.ylabel('Score')
pl.title('Elbow score')
pl.show()
```



In [133]:

```
#choosing 2 clusters as that's when the curve starts to flatten
cluster = KMeans(n_clusters = 2)

#predict the cluster for all profiles
dating_encoded['cluster'] = cluster.fit_predict(dating_encoded)
cluster.labels_
```

Out[133]:

```
array([0, 0, 0, ..., 0, 0, 0], dtype=int32)
```

In [134]:

```
dating_encoded.head()
```

Out[134]:

	age	height	sex_m	cluster
0	0.043478	0.787234	1	0
1	0.184783	0.734043	1	0
2	0.217391	0.712766	1	0
3	0.054348	0.744681	1	0
4	0.119565	0.691489	1	0

In [135]:

```
#creating a new dataframe which excludes the cluster column so this column won't be included in the principle componenet\
#analysis
excl_cluster = dating_encoded.drop('cluster', axis = 1)
```

In [136]:

```
#performing PCA (princliple componenet analysis) to reduce the dimensions so we can visually see cluster segments.
#This will create a 2-dimensional picture
pca = PCA(n_components = 2)
dating_encoded['x'] = pca.fit_transform(excl_cluster)[:,0]
dating_encoded['y'] = pca.fit_transform(excl_cluster)[:,1]
dating_encoded.head()
```

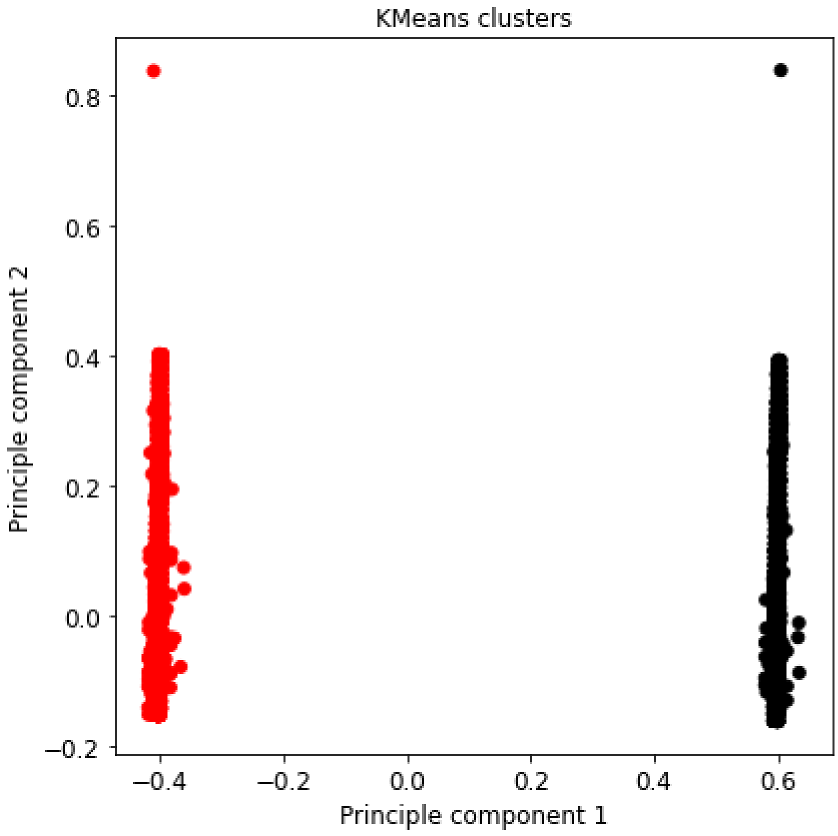
Out[136]:

	age	height	sex_m	cluster	x	y
0	0.043478	0.787234	1	0	-0.406745	-0.108589
1	0.184783	0.734043	1	0	-0.402433	0.032559
2	0.217391	0.712766	1	0	-0.400925	0.065106
3	0.054348	0.744681	1	0	-0.404223	-0.097840
4	0.119565	0.691489	1	0	-0.400602	-0.032776

In [163]:

```
#plotting the clusters
Kmeans_colors = ['red' if cluster == 0 else 'black' for cluster in cluster.labels_]

fig = plt.figure(figsize = (6, 6))
plt.scatter(x = 'x', y = 'y', data = dating_encoded, color = Kmeans_colors)
plt.xlabel('Principle component 1', fontsize = 12)
plt.ylabel('Principle component 2', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)
plt.title('KMeans clusters', fontsize = 12)
plt.tight_layout()
plt.savefig('kmeans_clusters')
```



In [142]:

```
#extracting the cluster data
dating_cluster = dating_encoded[['cluster']]
dating_cluster.head()
```

Out[142]:

	cluster
0	0
1	0
2	0
3	0
4	0

In [151]:

```
#merging dataframes based on index
merged = dating_clean.merge(dating_cluster, left_index = True, right_index = True)
merged.head()
```

Out[151]:

	age	height	sex	cluster
0	0.043478	0.787234	m	0
1	0.184783	0.734043	m	0
2	0.217391	0.712766	m	0
3	0.054348	0.744681	m	0
4	0.119565	0.691489	m	0

In [159]:

```
#grouping by clusters - the model created its clusters by sex - all males are in cluste
r 0 and all females in cluster 1
cluster_group = merged.groupby(['cluster', 'sex']).size()
cluster_group
```

Out[159]:

```
cluster  sex
0        m      35826
1        f      24117
dtype: int64
```

In [ ]: