K-means clustering

Import libraries

In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

Import dataset

In [2]:
```
dataset = pd.read_csv("datasets/Mall_Customers.csv")
X = dataset.iloc[ : , [3, 4]].values

print(X)
```

```
[[ 15  39]
 [ 15  81]
 [ 16   6]
 [ 16  77]
 [ 17  40]
 [ 17  76]
 [ 18   6]
 [ 18  94]
 [ 19   3]
 [ 19  72]
 [ 19  14]
 [ 19  99]
 [ 20  15]
 [ 20  77]
 [ 20  13]
 [ 20  79]
 [ 21  35]
 [ 21  66]
 [ 23  29]
 [ 23  98]
 [ 24  35]
 [ 24  73]
 [ 25   5]
 [ 25  73]
 [ 28  14]
 [ 28  82]
 [ 28  32]
 [ 28  61]
 [ 29  31]
 [ 29  87]
 [ 30   4]
 [ 30  73]
 [ 33   4]
 [ 33  92]
 [ 33  14]
 [ 33  81]
 [ 34  17]
 [ 34  73]
 [ 37  26]
 [ 37  75]
 [ 38  35]
 [ 38  92]
 [ 39  36]
 [ 39  61]
 [ 39  28]
 [ 39  65]
 [ 40  55]
 [ 40  47]
 [ 40  42]
 [ 40  42]
 [ 42  52]
 [ 42  60]
 [ 43  54]
 [ 43  60]
 [ 43  45]
 [ 43  41]
 [ 44  50]
 [ 44  46]
 [ 46  51]
```

```
[ 46  46]
[ 46  56]
[ 46  55]
[ 47  52]
[ 47  59]
[ 48  51]
[ 48  59]
[ 48  50]
[ 48  48]
[ 48  59]
[ 48  47]
[ 49  55]
[ 49  42]
[ 50  49]
[ 50  56]
[ 54  47]
[ 54  54]
[ 54  53]
[ 54  48]
[ 54  52]
[ 54  42]
[ 54  51]
[ 54  55]
[ 54  41]
[ 54  44]
[ 54  57]
[ 54  46]
[ 57  58]
[ 57  55]
[ 58  60]
[ 58  46]
[ 59  55]
[ 59  41]
[ 60  49]
[ 60  40]
[ 60  42]
[ 60  52]
[ 60  47]
[ 60  50]
[ 61  42]
[ 61  49]
[ 62  41]
[ 62  48]
[ 62  59]
[ 62  55]
[ 62  56]
[ 62  42]
[ 63  50]
[ 63  46]
[ 63  43]
[ 63  48]
[ 63  52]
[ 63  54]
[ 64  42]
[ 64  46]
[ 65  48]
[ 65  50]
[ 65  43]
[ 65  59]
```

```
[ 67  43]
[ 67  57]
[ 67  56]
[ 67  40]
[ 69  58]
[ 69  91]
[ 70  29]
[ 70  77]
[ 71  35]
[ 71  95]
[ 71  11]
[ 71  75]
[ 71   9]
[ 71  75]
[ 72  34]
[ 72  71]
[ 73   5]
[ 73  88]
[ 73   7]
[ 73  73]
[ 74  10]
[ 74  72]
[ 75   5]
[ 75  93]
[ 76  40]
[ 76  87]
[ 77  12]
[ 77  97]
[ 77  36]
[ 77  74]
[ 78  22]
[ 78  90]
[ 78  17]
[ 78  88]
[ 78  20]
[ 78  76]
[ 78  16]
[ 78  89]
[ 78   1]
[ 78  78]
[ 78   1]
[ 78  73]
[ 79  35]
[ 79  83]
[ 81   5]
[ 81  93]
[ 85  26]
[ 85  75]
[ 86  20]
[ 86  95]
[ 87  27]
[ 87  63]
[ 87  13]
[ 87  75]
[ 87  10]
[ 87  92]
[ 88  13]
[ 88  86]
[ 88  15]
```

```
 [ 88  69]
 [ 93  14]
 [ 93  90]
 [ 97  32]
 [ 97  86]
 [ 98  15]
 [ 98  88]
 [ 99  39]
 [ 99  97]
 [101  24]
 [101  68]
 [103  17]
 [103  85]
 [103  23]
 [103  69]
 [113   8]
 [113  91]
 [120  16]
 [120  79]
 [126  28]
 [126  74]
 [137  18]
 [137  83]]
```

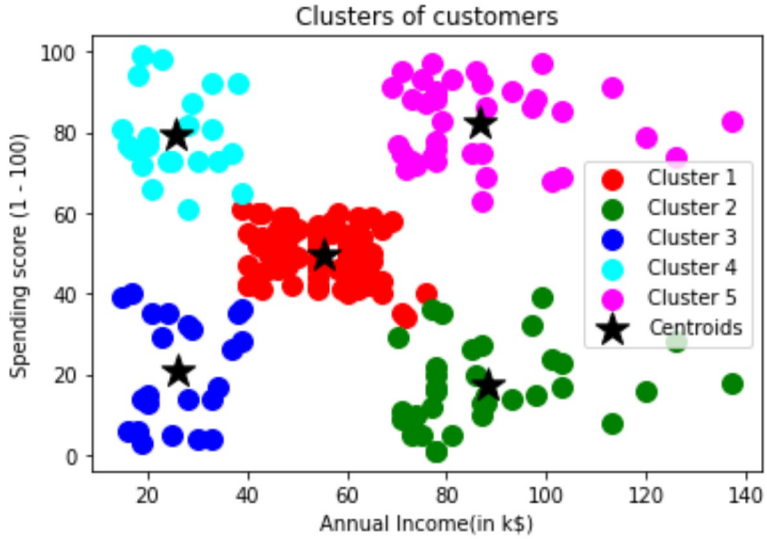
Train the model on the dataset

In [3]:
```
from sklearn.cluster import KMeans

k_means = KMeans(n_clusters = 5, init = "k-means++", random_state = 42)
y = k_means.fit_predict(X)

print(y)
```

```
[2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2
 3 2 3 2 3 2 0 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 4 1 4 0 4 1 4 1 4 0 4 1 4 1 4 1 4 1 4 0 4 1 4 1 4
 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1
 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4]
```

Visualise results

In [4]:
```
color = ("red", "green", "blue", "cyan", "magenta")

for i in range(5):
    plt.scatter(X[y == i, 0], X[y == i, 1], s = 100, c = color[i],
                label = "Cluster " + str(i + 1))
plt.scatter(k_means.cluster_centers_[:, 0], k_means.cluster_centers_[:, 1],
            s = 300, c = 'black', marker = "*", label = 'Centroids')
plt.title("Clusters of customers")
plt.xlabel("Annual Income(in k$)")
plt.ylabel("Spending score (1 - 100)")
plt.legend()
plt.show()
```


Clusters of customers
Spending score (1 - 100)
Annual Income(in k$)
Cluster 1
Cluster 2
Cluster 3
Cluster 4
Cluster 5
Centroids
0
20
40
60
80
100
20
40
60
80
100
120
140

In [ ]: