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

dataset = pd.read_csv('E:/sistem-cerdas/Customer.csv')
dataset.head()
```

Out[1]:

	IDPelanggan	Kelamin	Usia	Rating_belanja (1-100)	Pendapatan (juta Rp)
0	1	Perempuan	23	87	29
1	2	Laki	60	4	30
2	3	Perempuan	21	73	30
3	4	Laki	53	4	33
4	5	Laki	18	92	33

In [2]:
```
X = dataset.iloc[:10, [2,3,4]].values
X
```

Out[2]:
```
array([[23, 87, 29],
       [60,  4, 30],
       [21, 73, 30],
       [53,  4, 33],
       [18, 92, 33],
       [49, 14, 33],
       [21, 81, 33],
       [42, 17, 34],
       [30, 73, 34],
       [36, 26, 37]], dtype=int64)
```

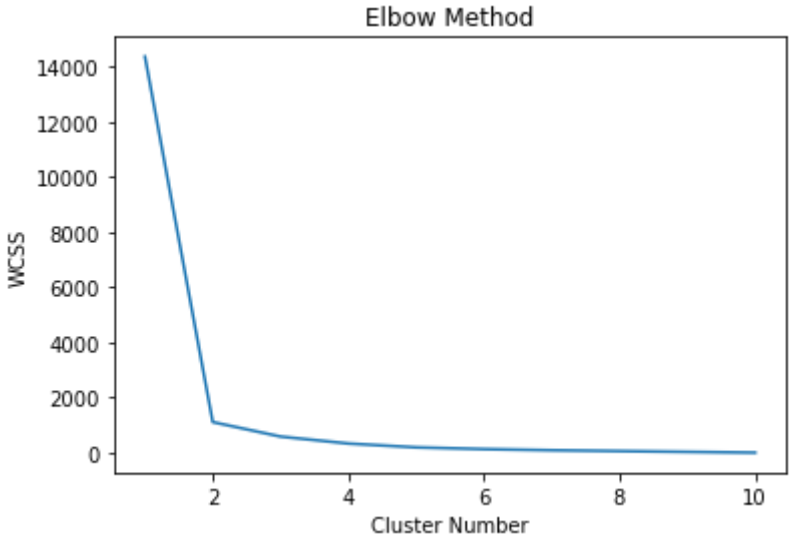
In [3]:
```
from sklearn.cluster import KMeans

wcss = []

for i in range(1, 11):
    kmeans = KMeans(n_clusters = i, init = 'k-means++', random_state = 42)
    kmeans.fit(X)
    wcss.append(kmeans.inertia_)

plt.plot(range(1, 11), wcss)
plt.title('Elbow Method')
plt.xlabel('Cluster Number')
plt.ylabel('WCSS')
plt.show()
```

```
D:\Program Files 2\Anaconda\lib\site-packages\sklearn\cluster\_kmeans.py:1038: UserW
arning: KMeans is known to have a memory leak on Windows with MKL, when there are le
ss chunks than available threads. You can avoid it by setting the environment variab
le OMP_NUM_THREADS=1.
  warnings.warn(
```



In [4]:

```
kmeans = KMeans(n_clusters = 1, init = 'k-means++', random_state = 42)
y_kmeans = kmeans.fit_predict(X)

plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 100, c = 'blue', label = '
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 300, c
plt.title('Consumers Cluster')
plt.xlabel('Yearly Salary')
plt.ylabel('Yearly expense rating (1-100)')
plt.legend()
plt.show()
```

```
D:\Program Files 2\Anaconda\lib\site-packages\sklearn\cluster\_kmeans.py:1038: UserW
arning: KMeans is known to have a memory leak on Windows with MKL, when there are le
ss chunks than available threads. You can avoid it by setting the environment variab
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  warnings.warn(
```
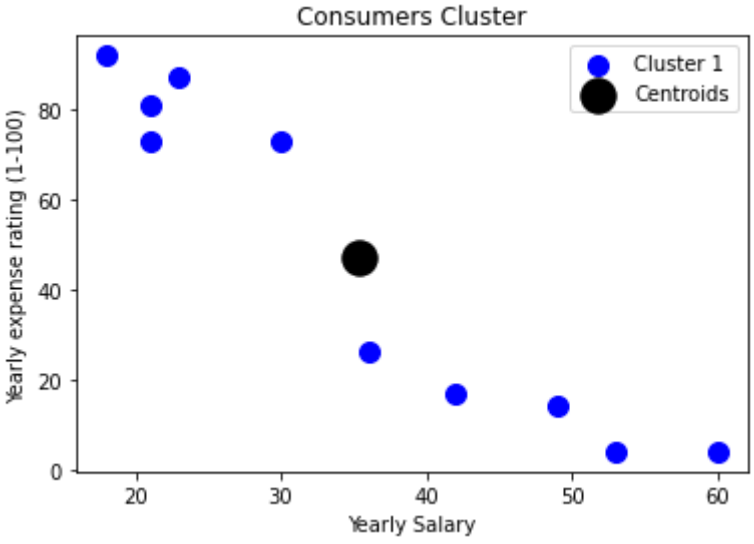
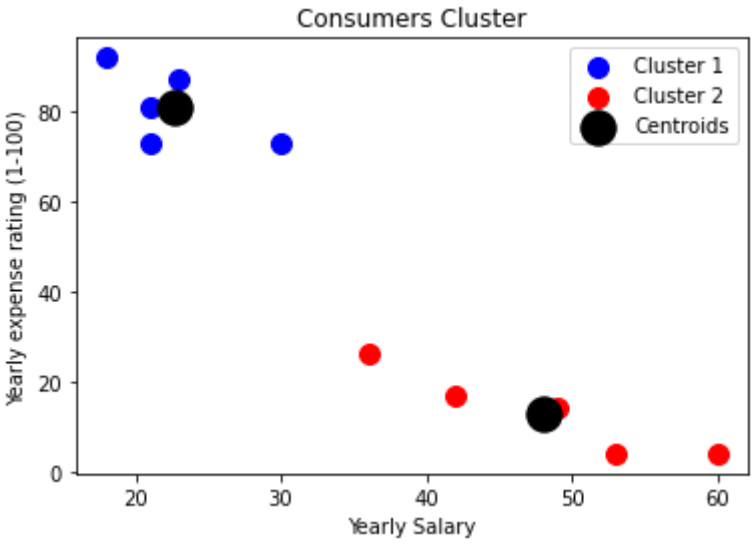



In [5]:

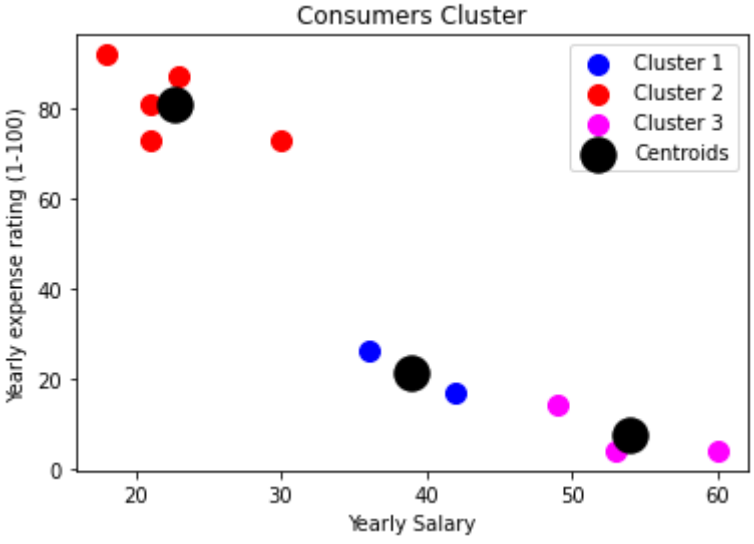
```
kmeans = KMeans(n_clusters = 2, init = 'k-means++', random_state = 42)
y_kmeans = kmeans.fit_predict(X)

plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 100, c = 'blue', label = '
plt.scatter(X[y_kmeans == 1, 0], X[y_kmeans == 1, 1], s = 100, c = 'red', label = 'C
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 300, c
plt.title('Consumers Cluster')
plt.xlabel('Yearly Salary')
plt.ylabel('Yearly expense rating (1-100)')
```

```
plt.legend()
plt.show()
```



In [6]:

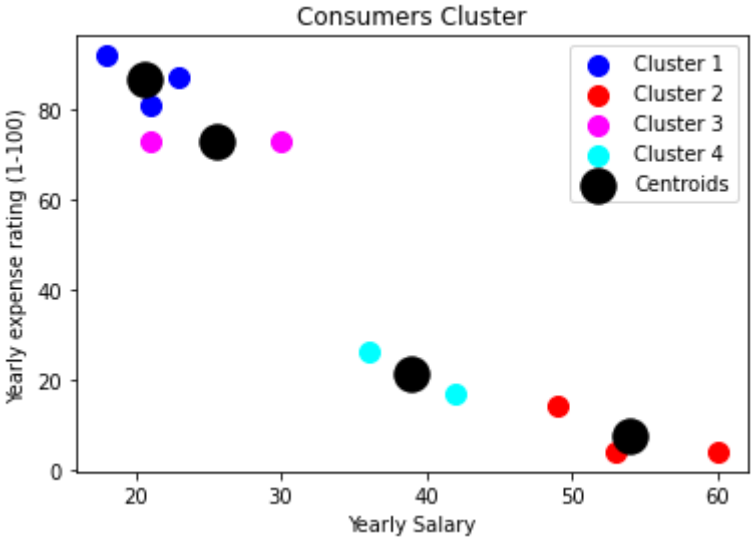
```
kmeans = KMeans(n_clusters = 3, init = 'k-means++', random_state = 42)
y_kmeans = kmeans.fit_predict(X)

plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 100, c = 'blue', label = '
plt.scatter(X[y_kmeans == 1, 0], X[y_kmeans == 1, 1], s = 100, c = 'red', label = 'C
plt.scatter(X[y_kmeans == 2, 0], X[y_kmeans == 2, 1], s = 100, c = 'magenta', label
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 300, c
plt.title('Consumers Cluster')
plt.xlabel('Yearly Salary')
plt.ylabel('Yearly expense rating (1-100)')
plt.legend()
plt.show()
```



In [7]:

```
kmeans = KMeans(n_clusters = 4, init = 'k-means++', random_state = 42)
y_kmeans = kmeans.fit_predict(X)

plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 100, c = 'blue', label = '
plt.scatter(X[y_kmeans == 1, 0], X[y_kmeans == 1, 1], s = 100, c = 'red', label = 'C
plt.scatter(X[y_kmeans == 2, 0], X[y_kmeans == 2, 1], s = 100, c = 'magenta', label
plt.scatter(X[y_kmeans == 3, 0], X[y_kmeans == 3, 1], s = 100, c = 'cyan', label = '
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 300, c
plt.title('Consumers Cluster')
plt.xlabel('Yearly Salary')
```

```
plt.ylabel('Yearly expense rating (1-100)')
plt.legend()
plt.show()
```



In [8]:

```
kmeans = KMeans(n_clusters = 5, init = 'k-means++', random_state = 42)
y_kmeans = kmeans.fit_predict(X)

plt.scatter(X[y_kmeans == 0, 0], X[y_kmeans == 0, 1], s = 100, c = 'blue', label = '
plt.scatter(X[y_kmeans == 1, 0], X[y_kmeans == 1, 1], s = 100, c = 'red', label = 'C
plt.scatter(X[y_kmeans == 2, 0], X[y_kmeans == 2, 1], s = 100, c = 'magenta', label
plt.scatter(X[y_kmeans == 3, 0], X[y_kmeans == 3, 1], s = 100, c = 'cyan', label = '
plt.scatter(X[y_kmeans == 4, 0], X[y_kmeans == 4, 1], s = 100, c = 'green', label =
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 300, c
plt.title('Consumers Cluster')
plt.xlabel('Yearly Salary')
plt.ylabel('Yearly expense rating (1-100)')
plt.legend()
plt.show()
```

In [ ]: