1(e)

In [1]:

```
import networkx as nx
import matplotlib.pyplot as plt
```

In [15]:

```
# The Watts-Strogatz Model
N = 1000
kavg = 10
pset = [0.]
```

In [16]:

```
for i in range(1,10):
    pset.append(0.0001*i)
    pset.append(0.001*i)
    pset.append(0.01*i)
    pset.append(0.1*i)
pset.append(1.)
pset.sort()

Cavgset = []
davgset = []
```

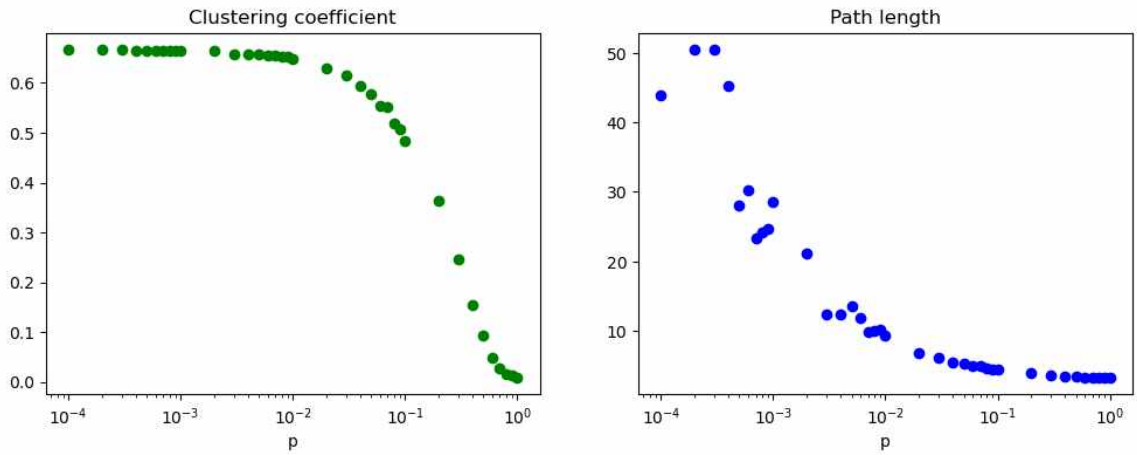
In [17]:

```
for p in pset:
    G = nx.watts_strogatz_graph(n=N, k=kavg, p=p)
    Cavg = nx.average_clustering(G, nodes=None, weight=None, count_zeros=True)
    Cavgset.append(Cavg)
    davg = nx.average_shortest_path_length(G, weight=None, method=None)
    davgset.append(davg)
```

In [18]:

```
fig, (ax1, ax2) = plt.subplots(1, 2, figsize=(12, 4))
for i in range(len(pset)):
    ax1.plot(pset[i], Cavgset[i], marker='o', linestyle='', color='green')
    ax2.plot(pset[i], davgset[i], marker='o', linestyle='', color='blue')
ax1.set_xscale('log')
ax1.set_xlabel('p')
ax1.set_title('Clustering coefficient')
ax2.set_xscale('log')
ax2.set_xlabel('p')
ax2.set_title('Path length')

plt.show()
```



In [19]:

```
# average clustering coefficient when p = 0.03
Cavgset[pset.index(0.03)]
```

Out[19]:

0.6147125541125512

In [20]:

```
# average distanace when p = 0.03
davgset[pset.index(0.03)]
```

Out[20]:

6.131833833833833