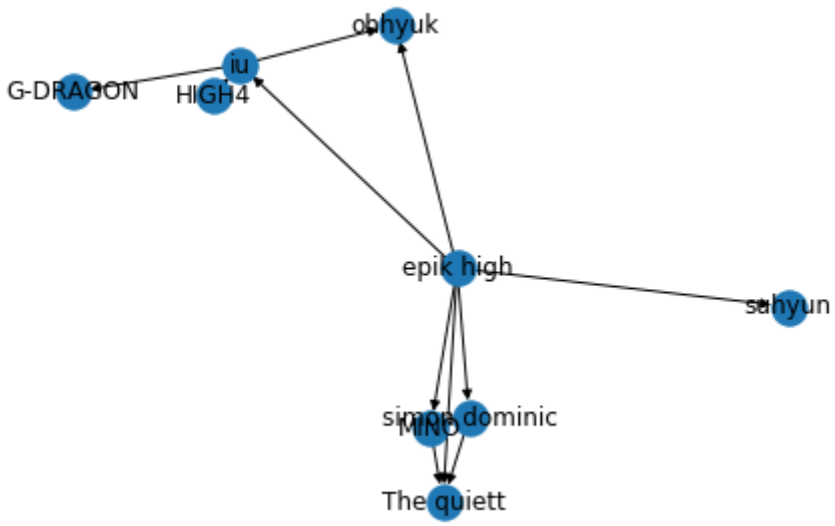
In [1]:
```
import networkx as nx
import matplotlib.pyplot as plt
%matplotlib inline
import warnings; warnings.simplefilter('ignore')
```

In [2]:
```
import numpy as np
import pandas as pd
from pandas import DataFrame
from pandas import Series

data_table = pd.read_csv('https://docs.google.com/uc?id=12k0lvO7ZoQf_wv7nGemIAqzOHtFCxI1e&export=download')
print(data_table)
```

```
              from             to
0               iu       G-DRAGON
1       epik high             iu
2       epik high         ohhyuk
3               iu         ohhyuk
4           HIGH4             iu
5       epik high           MINO
6       epik high  simon dominic
7       epik high     The quiett
8       epik high         suhyun
9            MINO  simon dominic
10           MINO     The quiett
11  simon dominic     The quiett
```

강의노트 featuring.csv사용

In [3]:
```
g = nx.from_pandas_edgelist(data_table, 'from', 'to', create_using = nx.DiGraph())
nx.draw(g, with_labels=True)
```

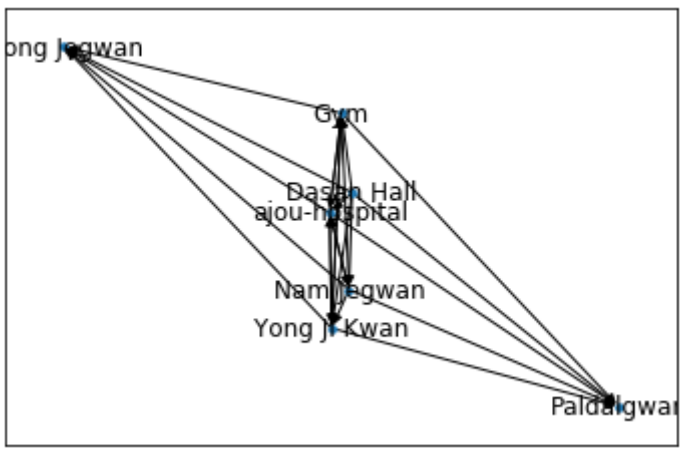


추가적인 데이터(본인 데이터 사용)

In [30]:
```
data_table1 = pd.read_csv('https://docs.google.com/uc?id=1nkzL83fHJ_AOv9s8MVahEbBcTsXRLUjZ&export=download')
print(data_table1)
```

```
              from             to   total
0       Dasan Hall     Nam Jegwan    3500
1       Dasan Hall            Gym     205
2       Dasan Hall    Hong Jegwan      30
3       Dasan Hall  ajou-hospital      90
4       Dasan Hall     Paldalgwan     110
5       Dasan Hall   Yong Ji Kwan      13
6     Yong Ji Kwan            Gym      60
7     Yong Ji Kwan    Hong Jegwan      30
8     Yong Ji Kwan     Paldalgwan     300
9     Yong Ji Kwan  ajou-hospital      90
10  ajou-hospital     Nam Jegwan      80
11  ajou-hospital            Gym      30
12  ajou-hospital    Hong Jegwan     220
13  ajou-hospital     Paldalgwan      10
14  ajou-hospital   Yong Ji Kwan     399
15            Gym    Hong Jegwan  300000
16            Gym  ajou-hospital      10
17            Gym     Paldalgwan      70
18            Gym   Yong Ji Kwan      79
19     Nam Jegwan            Gym       9
20     Nam Jegwan    Hong Jegwan     300
21     Nam Jegwan  ajou-hospital       1
22     Nam Jegwan     Paldalgwan    8000
23     Nam Jegwan   Yong Ji Kwan       5
```

In [46]:
```
gg = nx.from_pandas_edgelist(data_table1,source='from',target='to',edge_attr='total',create_using=nx.DiGraph())
nx.draw_networkx(gg,node_size=12)
```



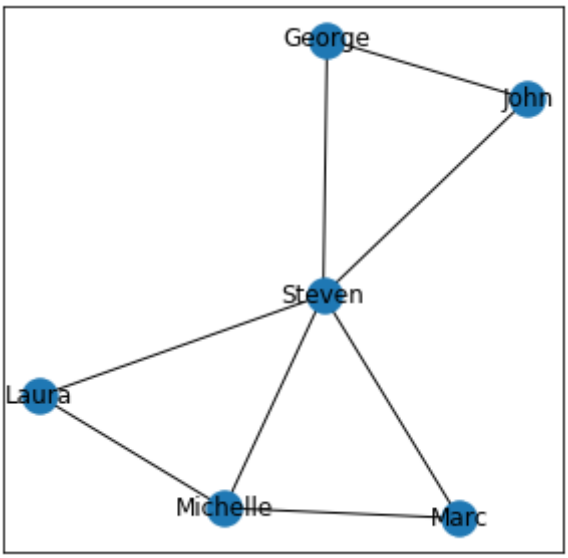
인터넷 예제

In [38]:
```
G_symmetric = nx.Graph()

G_symmetric.add_edge('Steven',  'Laura')
G_symmetric.add_edge('Steven',  'Marc')
G_symmetric.add_edge('Steven',  'John')
G_symmetric.add_edge('Steven',  'Michelle')
G_symmetric.add_edge('Laura',   'Michelle')
G_symmetric.add_edge('Michelle','Marc')
G_symmetric.add_edge('George',  'John')
G_symmetric.add_edge('George',  'Steven')
```

In [39]:
```
print(nx.info(G_symmetric))
```

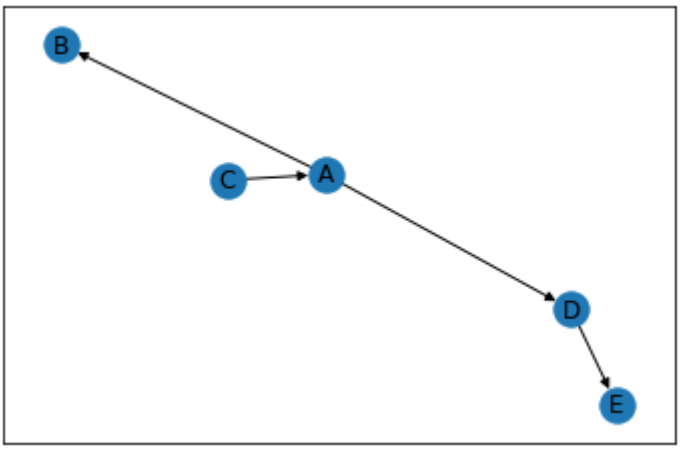
```
Name:
Type: Graph
Number of nodes: 6
Number of edges: 8
Average degree:   2.6667
```

In [40]:
```
plt.figure(figsize=(5,5))
nx.draw_networkx(G_symmetric);
```



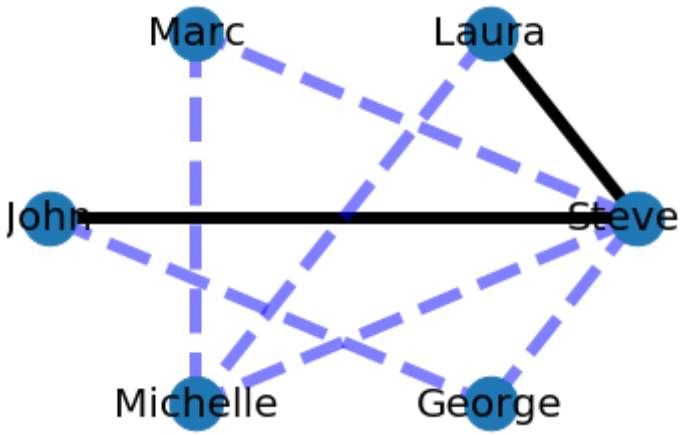
In [41]:
```
G_asymmetric = nx.DiGraph()
G_asymmetric.add_edge('A','B')
G_asymmetric.add_edge('A','D')
G_asymmetric.add_edge('C','A')
G_asymmetric.add_edge('D','E')
```

In [42]:
```
nx.spring_layout(G_asymmetric)
nx.draw_networkx(G_asymmetric)
```



In [43]:
```
G_weighted = nx.Graph()

G_weighted.add_edge('Steven',  'Laura',   weight=25)
G_weighted.add_edge('Steven',  'Marc',    weight=8)
G_weighted.add_edge('Steven',  'John',    weight=11)
G_weighted.add_edge('Steven',  'Michelle',weight=1)
G_weighted.add_edge('Laura',   'Michelle',weight=1)
G_weighted.add_edge('Michelle','Marc',    weight=1)
G_weighted.add_edge('George',  'John',    weight=8)
G_weighted.add_edge('George',  'Steven',  weight=4)
```

In [44]:
```
elarge = [(u, v) for (u, v, d) in G_weighted.edges(data=True) if d[
'weight'] > 8]
esmall = [(u, v) for (u, v, d) in G_weighted.edges(data=True) if d[
'weight'] <= 8]

pos = nx.circular_layout(G_weighted)  # positions for all nodes

# nodes
nx.draw_networkx_nodes(G_weighted, pos, node_size=700)

# edges
nx.draw_networkx_edges(G_weighted, pos, edgelist=elarge,width=6)
nx.draw_networkx_edges(G_weighted, pos, edgelist=esmall,width=6, alp
ha=0.5, edge_color='b', style='dashed')

# labels
nx.draw_networkx_labels(G_weighted, pos, font_size=20, font_family=
'sans-serif')

plt.axis('off')
plt.show();
```



In [ ]: