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Lab 6. Creating a network graph and perform graph operations

In this lab you will create a network graph and calculate the centrality measures of a graph

Create a network graph using the networkx package

In [1]:
```
import networkx as nx
# Create a directed graph
g = nx.DiGraph()
# Add an edge to the directed graph from X to Y
g.add_edge('X', 'Y')
# Print some statistics about the graph
print(nx.info(g))
```

```
Name:
Type: DiGraph
Number of nodes: 2
Number of edges: 1
Average in degree:   0.5000
Average out degree:   0.5000
```

In [2]:
```
# Get the nodes and edges from the graph
print("Nodes:", g.nodes())
print("Edges:", g.edges())
print()
# Get node properties
print("X props:", g.node["X"])
print("Y props:", g.node["Y"])
print()
# Get edge properties
print("X=>Y props:", g["X"]["Y"])
print()
```

```
Nodes: ['X', 'Y']
Edges: [('X', 'Y')]

X props: {}
Y props: {}

X=>Y props: {}
```

In [3]:
```
g.node["X"].update({'prop1':'value1'})  # Update a node property
print('X props:', g.node['X'])
print()
# Update an edge property
g['X']['Y'].update({'label' : 'label1'})
print("X=>Y props:", g['X']['Y'])
```

```
X props: {'prop1': 'value1'}

X=>Y props: {'label': 'label1'}
```

Constructing an ego graph of a repository and its stargazers

In [7]:
```
from github import Github
ACCESS_TOKEN = "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"
USER = 'ptwobrussell'
REPO = 'Mining-the-Social-Web'
##REPO = 'Mining-the-Social-Web-2nd-Edition'
client = Github(ACCESS_TOKEN, per_page=100)
user = client.get_user(USER)
repo = user.get_repo(REPO)
stargazers = [ s for s in repo.get_stargazers() ]
print("Number of stargazers", len(stargazers))
```

```
Number of stargazers 1203
```

In [8]:
```
g = nx.DiGraph()
g.add_node(repo.name + '(repo)', type='repo', lang=repo.language, owner=user.logi
for sg in stargazers:
    g.add_node(sg.login + '(user)', type='user')
    g.add_edge(sg.login + '(user)', repo.name + '(repo)', type='gazes')
```

Perform handy graph operations

In [9]:
```
print(nx.info(g))
print(g.node['Mining-the-Social-Web(repo)'])
print(g.node['ptwobrussell(user)'])
print(g['ptwobrussell(user)']['Mining-the-Social-Web(repo)'])
print(g['ptwobrussell(user)'])
print(g['Mining-the-Social-Web(repo)'])
print(g.in_edges(['ptwobrussell(user)']))
print(g.out_edges(['ptwobrussell(user)']))
```

```
Name:
Type: DiGraph
Number of nodes: 1204
Number of edges: 1203
Average in degree:   0.9992
Average out degree:   0.9992
{'type': 'repo', 'lang': 'JavaScript', 'owner': 'ptwobrussell'}
{'type': 'user'}
{'type': 'gazes'}
{'Mining-the-Social-Web(repo)': {'type': 'gazes'}}
{}
[]
[('ptwobrussell(user)', 'Mining-the-Social-Web(repo)')]
```

In [10]:
```
print(g.in_edges(['Mining-the-Social-Web(repo)']))
```

```
[('rdempsey(user)', 'Mining-the-Social-Web(repo)'), ('prb(user)', 'Mining-the
-Social-Web(repo)'), ('mcroydon(user)', 'Mining-the-Social-Web(repo)'), ('twl
eung(user)', 'Mining-the-Social-Web(repo)'), ('kevinchiu(user)', 'Mining-the-
Social-Web(repo)'), ('nikolay(user)', 'Mining-the-Social-Web(repo)'), ('tswic
egood(user)', 'Mining-the-Social-Web(repo)'), ('ngpestelos(user)', 'Mining-th
e-Social-Web(repo)'), ('darron(user)', 'Mining-the-Social-Web(repo)'), ('brun
ojm(user)', 'Mining-the-Social-Web(repo)'), ('rgaidot(user)', 'Mining-the-Soc
ial-Web(repo)'), ('openweb(user)', 'Mining-the-Social-Web(repo)'), ('shanlali
t(user)', 'Mining-the-Social-Web(repo)'), ('hoffmann(user)', 'Mining-the-Soci
al-Web(repo)'), ('nacht(user)', 'Mining-the-Social-Web(repo)'), ('hectoregm(u
ser)', 'Mining-the-Social-Web(repo)'), ('tzuryby(user)', 'Mining-the-Social-W
eb(repo)'), ('marksands(user)', 'Mining-the-Social-Web(repo)'), ('wbzyl(use
r)', 'Mining-the-Social-Web(repo)'), ('sou(user)', 'Mining-the-Social-Web(rep
o)'), ('magnum(user)', 'Mining-the-Social-Web(repo)'), ('suzuki(user)', 'Mini
ng-the-Social-Web(repo)'), ('tertsch(user)', 'Mining-the-Social-Web(repo)'),
('ymirpl(user)', 'Mining-the-Social-Web(repo)'), ('sebasmagri(user)', 'Mining
-the-Social-Web(repo)'), ('galvez(user)', 'Mining-the-Social-Web(repo)'), ('p
aulbersch(user)', 'Mining-the-Social-Web(repo)'), ('georgebellos(user)', 'Min
ing-the-Social-Web(repo)'), ('acadopia(user)', 'Mining-the-Social-Web(rep
```

In [11]:
```
print(g.out_edges(['Mining-the-Social-Web(repo)']))
```

```
[]
```