

SNAP(.py)

Basic Functions Demonstration

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Outline

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- 2. Graph Information
- 3. Node Degree
- 4. Edge Count
- 5. Graph Manipulation
- 6. Graph Generators
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Input and Output

- **LoadEdgeList(PGraph, InFNm, SrcColId, DstColId, Separator)**
- LoadedGraph = snap.LoadEdgeList(snap.PNGraph, "soc-Epinions1.txt", 0, 1, '\t')
- **SaveEdgeList(Graph, Filename, Description="")**
- snap.SaveEdgeList(LoadedGraph, "soc-Epinions2.txt", "same to 1")
- Line1: graph name
- Line2: description
- Line3: graph size
- Line4: in/out node (direction)
- >Line5: data

```
(ogb) [yfhou@proj55 ~/projects/snap/data]$ head soc-Epinions2.txt
# Directed graph: soc-Epinions2.txt
# same to 1
# Nodes: 75879 Edges: 508837
# FromNodeId    ToNodeId
0                4
0                5
0                7
0                8
0                9
0               10
```

```
(ogb) [yfhou@proj55 ~/projects/snap/data]$ head soc-Epinions1.txt
# Directed graph (each unordered pair of nodes is saved once): soc-Epinions
# Directed Epinions social network
# Nodes: 75879 Edges: 508837
```

Graph Information

- `PrintInfo(Graph, Desc, OutFNm="", Fast=True)`
- `snap.PrintInfo(LoadedGraph)`

```
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75879
Edges:          508837
Zero Deg Nodes: 0
Zero InDeg Nodes: 23922
Zero OutDeg Nodes: 15538
NonZero In-Out Deg Nodes: 36419
```

Node Degree

- **CntInDegNodes(Graph, NodeInDeg)**
- InCnt = snap.CntInDegNodes(LoadedGraph, 10)
- **CntOutDegNodes(Graph, NodeOutDeg)**
- InCnt = snap.CntInDegNodes(LoadedGraph, 10)

```
>>> InCnt = snap.CntInDegNodes(LoadedGraph, 10)
>>> InCnt
543
>>> OutCnt = snap.CntOutDegNodes(LoadedGraph, 10)
>>> OutCnt
596
```

Edge Count

- **CntSelfEdges(Graph)**
- `snap.CntSelfEdges(LoadedGraph)`
- **CntUniqBiDirEdges(Graph)**
- `snap.CntUniqBiDirEdges(LoadedGraph)`
- **CntUniqDirEdges(Graph)**
- `snap.CntUniqDirEdges(LoadedGraph)`
- **CntEdgesToSet(Graph, NId, NodeSet)**
- `NodeSet = snap.TIntSet()`
- `for nid in range(1, 100):`
 - `NodeSet.AddKey(nid)`
- `snap.CntEdgesToSet(LoadedGraph, 0, NodeSet)`

```
>>> snap.CntSelfEdges(LoadedGraph)
0
>>> snap.CntUniqBiDirEdges(LoadedGraph)
103097
>>> snap.CntUniqDirEdges(LoadedGraph)
508837
```

```
>>> snap.CntEdgesToSet(LoadedGraph, 0, NodeSet)
95
```

Graph Manipulation

- **AddSelfEdges(Graph)**
- `snap.AddSelfEdges(LoadedGraph)`
- **DelSelfEdges(Graph)**
- `snap.DelSelfEdges(LoadedGraph)`

```
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75879
Edges:          508837
Zero Deg Nodes: 0
Zero InDeg Nodes: 23922
Zero OutDeg Nodes: 15538
NonZero In-Out Deg Nodes: 36419
>>> snap.AddSelfEdges(LoadedGraph)
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75879
Edges:          584716
Zero Deg Nodes: 0
Zero InDeg Nodes: 0
Zero OutDeg Nodes: 0
NonZero In-Out Deg Nodes: 75879
>>> snap.DelSelfEdges(LoadedGraph)
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75879
Edges:          508837
Zero Deg Nodes: 0
Zero InDeg Nodes: 23922
Zero OutDeg Nodes: 15538
NonZero In-Out Deg Nodes: 36419
```

Graph Manipulation

- **DelZeroDegNodes(Graph)**
- `snap.DelZeroDegNodes(LoadedGraph)`
- **DelDegKNodes(Graph, OutDegK, InDegK)**
- `snap.DelDegKNodes(LoadedGraph, 1 , 1)`

```
Graph: Directed
Nodes:          75879
Edges:          508837
Zero Deg Nodes: 0
Zero InDeg Nodes: 23922
Zero OutDeg Nodes: 15538
NonZero In-Out Deg Nodes: 36419
>>> snap.DelZeroDegNodes(LoadedGraph)
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75879
Edges:          508837
Zero Deg Nodes: 0
Zero InDeg Nodes: 23922
Zero OutDeg Nodes: 15538
NonZero In-Out Deg Nodes: 36419
>>> snap.DelDegKNodes(LoadedGraph, 1 , 1)
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          30267
Edges:          433681
Zero Deg Nodes: 218
Zero InDeg Nodes: 5977
Zero OutDeg Nodes: 3969
NonZero In-Out Deg Nodes: 20539
```


Graph Manipulation

- `DelNodes(Graph, NIdV)`
- `V = snap TIntV()`
- `for i in range(10):`
 - `V.Add(i)`
- `snap.DelNodes(LoadedGraph, V)`

```
>>> V = snap.TIntV()
>>> for i in range(10):
...     V.Add(i)
...
0
1
2
3
4
5
6
7
8
9
```

```
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75879
Edges:          508837
Zero Deg Nodes: 0
Zero InDeg Nodes: 23922
Zero OutDeg Nodes: 15538
NonZero In-Out Deg Nodes: 36419
>>> snap.DelNodes(LoadedGraph, V)
>>>
>>> snap.PrintInfo(LoadedGraph)
Graph: Directed
Nodes:          75869
Edges:          505643
Zero Deg Nodes: 38
Zero InDeg Nodes: 23924
Zero OutDeg Nodes: 15585
NonZero In-Out Deg Nodes: 36398
```

Graph Generators

- **GenFull(GraphType, Nodes)**
- `snap.GenFull(snap.PNGraph, 10)`

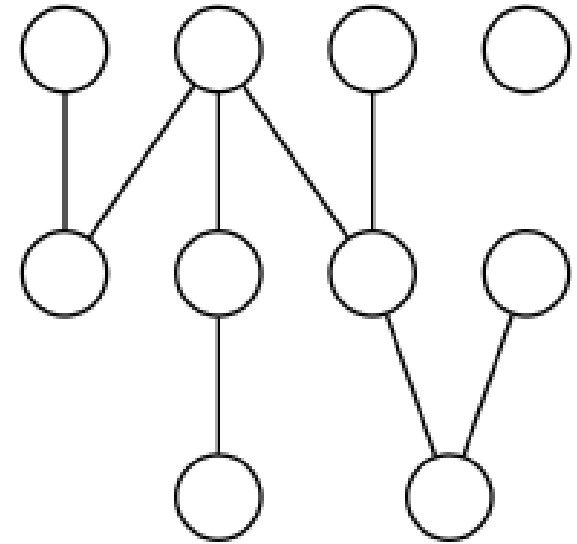
```
>>> GenGraph = snap.GenFull(snap.PNGraph, 10)
>>> snap.PrintInfo(GenGraph)
Graph: Directed
Nodes:          10
Edges:          90
Zero Deg Nodes: 0
Zero InDeg Nodes: 0
Zero OutDeg Nodes: 0
NonZero In-Out Deg Nodes: 10
```

- **GenRndPowerLaw(Nodes, PowerExp, ConfModel=True, Rnd=TRnd)**
- `snap.GenRndPowerLaw(10, 2)`

```
>>> GenGraph = snap.GenRndPowerLaw(10, 2)
10 nodes, 20 edges
configuration model: iter 9: edges: 9, left: 0
>>> snap.PrintInfo(GenGraph)
Graph:
Nodes:          10
Edges:          8
Zero Deg Nodes: 1
Zero InDeg Nodes: 1
Zero OutDeg Nodes: 1
NonZero In-Out Deg Nodes: 9
```

Plotting and Drawing

- **DrawGViz(Graph, Layout, PltFNm, Desc, NodeLabelH)**
- `snap.DrawGViz(GenGraph, snap.gvlDot, "demo_graph.png")`



- **PlotInDegDistr(Graph, FNmPref, DescStr, PlotCCdf=False, PowerFit=False)**
- `snap. PlotInDegDistr(GenGraph, "InDegDistr", "InDegreeDistribution")`

