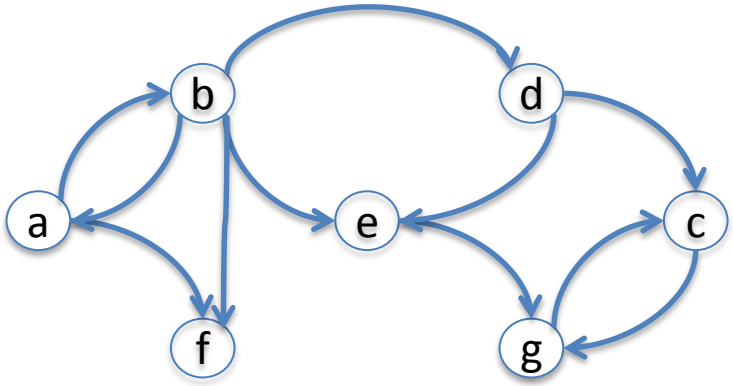
Graph Representations

- Edge Table



Source	Target
a	b
b	a
a	f
b	f
b	e
b	d
d	e
d	c
e	g
g	c
c	g

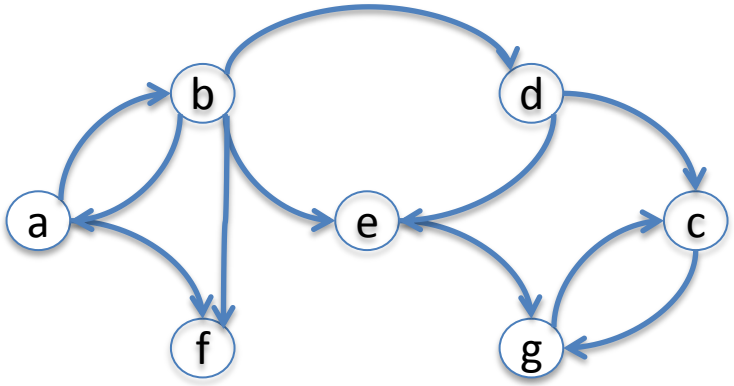
Example using Edge Table

Find top 5 highest in-degree vertices

```
SELECT top 5 target, incount
  FROM (
    SELECT target, count(source) as incount
      FROM edges
    GROUP BY target
)
ORDER BY incount
```

Graph Representations

- Adjacency List



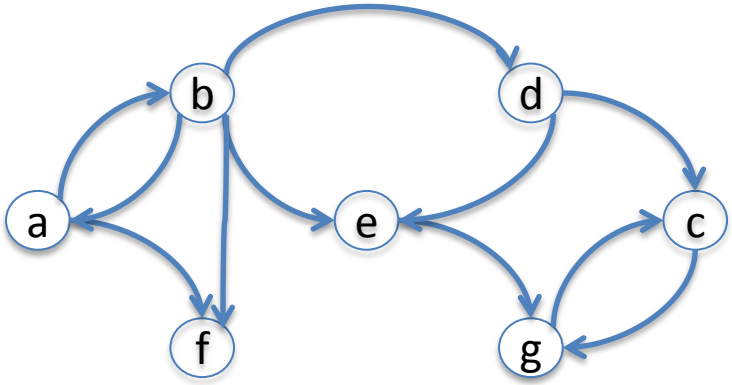
Source	Target
a	b, f
b	a, d, e, f
d	c, e
e	g
g	c
c	g

Example using Adjacency List (and MapReduce)

Find top 5 highest in-degree vertices

Map:
- Input key: vertex
- Input value: adjacency list
- Output key: adjacent vertex
- Output value: vertex

Reduce:
- Input key: vertex
- Input value: list of vertices
- Output key: vertex
- Output value: length of list



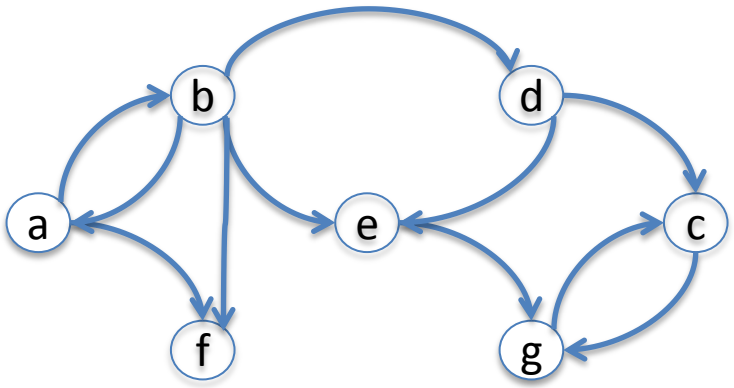
Source	Target
a	b, f
b	a, d, e
d	c, e
e	g
g	c
c	g

map

Source	Target
b	a
f	a
a	b
d	b
e	b
e	d
c	d
g	e
c	g
g	c

Graph Representations

- Adjacency Matrix



	a	b	c	d	e	f	g
a	0	1	0	0	0	1	0
b	1	0	0	1	1	1	0
c	0	0	0	1	0	0	1
d	0	0	1	0	1	0	0
e	0	0	0	0	0	0	1
f	0	0	0	0	0	0	0
g	0	0	1	0	0	0	0

Example using Adjacency Matrix

Find top 5 highest in-degree vertices

```
C = sum(A,1)
[B, IX] = sort(C)
[B, IX] = sort([5,6,4])
# B is [4,5,6]
# IX = [3,1,2]
Top = IX(1,5)
```

	a	b	c	d	e	f	g
a	0	1	0	0	0	1	0
b	1	0	0	1	1	1	0
c	0	0	0	1	0	0	1
d	0	0	1	0	1	0	0
e	0	0	0	0	0	0	1
f	0	0	0	0	0	0	0
g	0	0	1	0	0	0	0