In [16]:

```
from scipy import sparse
import numpy as np
```

In [19]:

```
IA = np.array([1,2,3,1,4,0,4,2])
JA = np.array([1,3,4,2,5,0,4,1])
V =  np.array([1,2,5,2,4,7,6,2], dtype=float)

A = sparse.coo_matrix((V,(IA,JA)),shape=(5,6))
```

In [8]:

```
print(A)
```

```
  (1, 1)        1.0
  (2, 3)        2.0
  (3, 4)        5.0
  (1, 2)        2.0
  (4, 5)        4.0
  (0, 0)        7.0
  (4, 4)        6.0
  (2, 1)        2.0
```

In [9]:

```
print(A.todense())
```

```
[[ 7.  0.  0.  0.  0.  0.]
 [ 0.  1.  2.  0.  0.  0.]
 [ 0.  2.  0.  2.  0.  0.]
 [ 0.  0.  0.  0.  5.  0.]
 [ 0.  0.  0.  0.  6.  4.]]
```

In [10]:

```
print(A.nnz)
```

```
8
```

In [14]:

```
print(A.data.nbytes)
print(A.row.nbytes)
print(A.col.nbytes)
```

```
64
32
32
```

In [ ]: