

# Assignment:1

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### Problem statement

Given a representation of graph convert it into other forms. The different form of representing graphs are adjacency matrix, adjacency list , Incident matrix. Our task is to convert:

1. Adjacency matrix to adjacency list
2. Adjacency matrix to Incidence matrix
3. Adjacency list to adjacency matrix
4. Adjacency list to incidence matrix
5. Incidence matrix to adjacency matrix
6. Incidence matrix to adjacency list

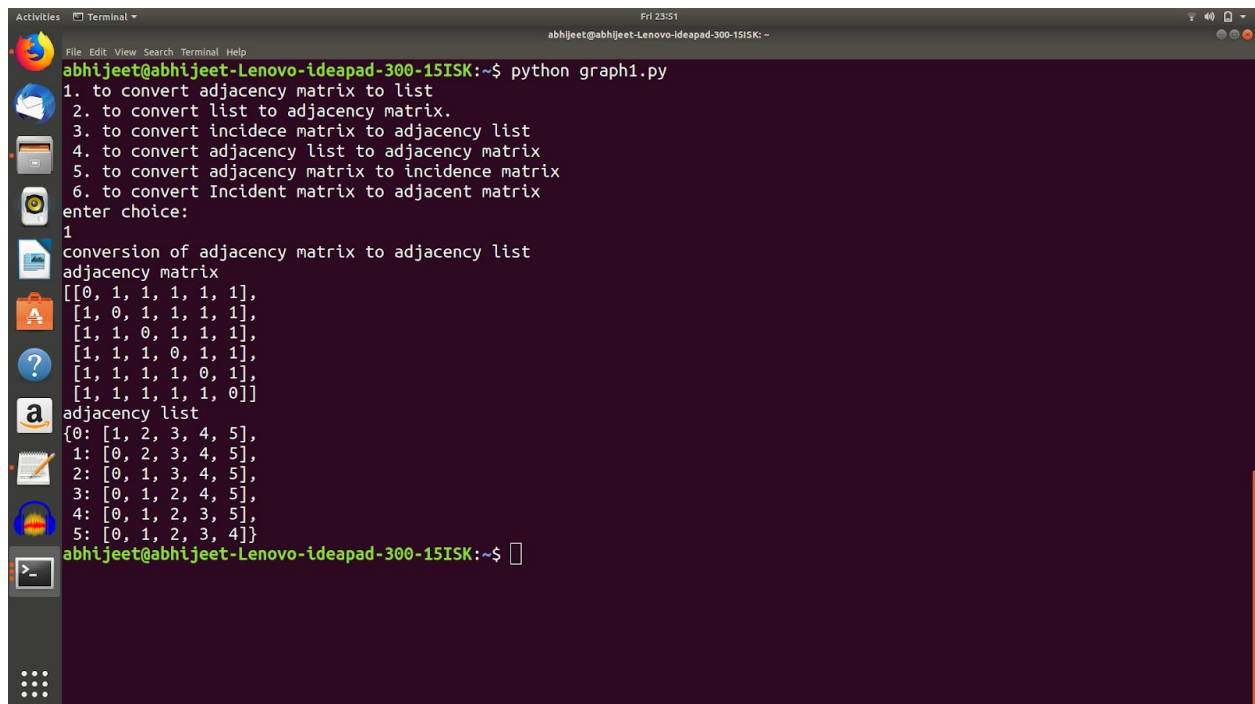
### HYPOTHESIS

I am taking undirected graph. Language used is python2

## PROCEDURE

1. I have defined two file graph\_conversion\_assignment1\_abhijeet.py and another input.py
2. One file contains six function i.e six possible combinations of conversion which are possible. There are six modules defined inside file . The first module is defined for conversion of adjacency matrix to list. Second module is defined for converting adjacency list to adjacency matrix. Third module is for converting incidence matrix to adjacency list. Fourth module is for adjacency list to adjacency matrix. Fifth module is for adjacency matrix to incidence matrix and sixth module is for Incidence matrix to adjacency matrix.
3. In the second file I am importing all the defined function of first file and giving input and simply calling function which are defined in the first file.
4. The matrix input are in the format of 2D array and list input are in the format of a dictionary.
5. The user has to enter input for which the answer will be displaced.

## Screenshot of the result:



```
abhiijeet@abhijeet-Lenovo-ideapad-300-15ISK:~$ python graph1.py
1. to convert adjacency matrix to list
2. to convert list to adjacency matrix.
3. to convert incidence matrix to adjacency list
4. to convert adjacency list to adjacency matrix
5. to convert adjacency matrix to incidence matrix
6. to convert Incident matrix to adjacent matrix
enter choice:
1
conversion of adjacency matrix to adjacency list
adjacency matrix
[[0, 1, 1, 1, 1, 1],
 [1, 0, 1, 1, 1, 1],
 [1, 1, 0, 1, 1, 1],
 [1, 1, 1, 0, 1, 1],
 [1, 1, 1, 1, 0, 1],
 [1, 1, 1, 1, 1, 0]]
adjacency list
{0: [1, 2, 3, 4, 5],
 1: [0, 2, 3, 4, 5],
 2: [0, 1, 3, 4, 5],
 3: [0, 1, 2, 4, 5],
 4: [0, 1, 2, 3, 5],
 5: [0, 1, 2, 3, 4]}
```

```
Activities Terminal
Fri 23:51
abhijeet@abhijeet-Lenovo-ideapad-300-15ISK:~$ python graph1.py
1. to convert adjacency matrix to list
2. to convert list to adjacency matrix.
3. to convert incidence matrix to adjacency list
4. to convert adjacency list to adjacency matrix
5. to convert adjacency matrix to incidence matrix
6. to convert Incident matrix to adjacent matrix
enter choice:
2
convert adjacency list to adjacency matrix
adjacency list
{0: [1, 2, 3, 4, 5],
1: [0, 2, 3, 4, 5],
2: [0, 1, 3, 4, 5],
3: [0, 1, 2, 4, 5],
4: [0, 1, 2, 3, 5],
5: [0, 1, 2, 3, 4]}
adjacency matrix
[[0, 1, 1, 1, 1, 1],
[1, 0, 1, 1, 1, 1],
[1, 1, 0, 1, 1, 1],
[1, 1, 1, 0, 1, 1],
[1, 1, 1, 1, 0, 1],
[1, 1, 1, 1, 1, 0]]
abhijeet@abhijeet-Lenovo-ideapad-300-15ISK:~$
```

```
Activities Terminal
Fri 23:52
abhijeet@abhijeet-Lenovo-ideapad-300-15ISK:~$
2. to convert list to adjacency matrix.
3. to convert incidence matrix to adjacency list
4. to convert adjacency list to adjacency matrix
5. to convert adjacency matrix to incidence matrix
6. to convert Incident matrix to adjacent matrix
enter choice:
3
convert incidence matrix to adjacency list
incidence matrix
[[1, 1, 0, 0, 0, 0],
[1, 0, 1, 0, 0, 0],
[1, 0, 0, 1, 0, 0],
[1, 0, 0, 0, 1, 0],
[1, 0, 0, 0, 0, 1],
[0, 1, 1, 0, 0, 0],
[0, 1, 0, 1, 0, 0],
[0, 1, 0, 0, 1, 0],
[0, 1, 0, 0, 0, 1],
[0, 0, 1, 1, 0, 0],
[0, 0, 1, 0, 1, 0],
[0, 0, 1, 0, 0, 1],
[0, 0, 0, 1, 1, 0],
[0, 0, 0, 1, 0, 1],
[0, 0, 0, 0, 1, 1]]
adjacency list
{0: [1, 2, 3, 4, 5],
1: [0, 2, 3, 4, 5],
2: [0, 1, 3, 4, 5],
3: [0, 1, 2, 4, 5],
4: [0, 1, 2, 3, 5],
5: [0, 1, 2, 3, 4]}
abhijeet@abhijeet-Lenovo-ideapad-300-15ISK:~$
```

```
Activities Terminal Fri 23:52
abhiijeet@abhiijeet-Lenovo-ideapad-300-15ISK:~$ python graph1.py
1. to convert adjacency matrix to list
2. to convert list to adjacency matrix.
3. to convert incidence matrix to adjacency list
4. to convert adjacency list to adjacency matrix
5. to convert adjacency matrix to incidence matrix
6. to convert Incident matrix to adjacent matrix
enter choice:
4
adjacency list to adjacency matrix
adjacency list
{0: [1, 2, 3, 4, 5],
 1: [0, 2, 3, 4, 5],
 2: [0, 1, 3, 4, 5],
 3: [0, 1, 2, 4, 5],
 4: [0, 1, 2, 3, 5],
 5: [0, 1, 2, 3, 4]}
adjacency matrix
[[0, 1, 1, 1, 1, 1],
 [1, 0, 1, 1, 1, 1],
 [1, 1, 0, 1, 1, 1],
 [1, 1, 1, 0, 1, 1],
 [1, 1, 1, 1, 0, 1],
 [1, 1, 1, 1, 1, 0]]
abhiijeet@abhiijeet-Lenovo-ideapad-300-15ISK:~$
abhiijeet@abhiijeet-Lenovo-ideapad-300-15ISK:~$
```

```
Activities Terminal Fri 23:52
abhiijeet@abhiijeet-Lenovo-ideapad-300-15ISK:~$
2. to convert list to adjacency matrix.
3. to convert incidence matrix to adjacency list
4. to convert adjacency list to adjacency matrix
5. to convert adjacency matrix to incidence matrix
6. to convert Incident matrix to adjacent matrix
enter choice:
5
adjacent matrix to incidence matrix
adjacent matrix
[[0, 1, 1, 1, 1, 1],
 [1, 0, 1, 1, 1, 1],
 [1, 1, 0, 1, 1, 1],
 [1, 1, 1, 0, 1, 1],
 [1, 1, 1, 1, 0, 1],
 [1, 1, 1, 1, 1, 0]]
Incident matrix
[[1, 1, 0, 0, 0, 0],
 [1, 0, 1, 0, 0, 0],
 [1, 0, 0, 1, 0, 0],
 [1, 0, 0, 0, 1, 0],
 [1, 0, 0, 0, 0, 1],
 [0, 1, 1, 0, 0, 0],
 [0, 1, 0, 1, 0, 0],
 [0, 1, 0, 0, 1, 0],
 [0, 1, 0, 0, 0, 1],
 [0, 0, 1, 1, 0, 0],
 [0, 0, 1, 0, 1, 0],
 [0, 0, 1, 0, 0, 1],
 [0, 0, 0, 1, 1, 0],
 [0, 0, 0, 1, 0, 1],
 [0, 0, 0, 0, 1, 1]]
abhiijeet@abhiijeet-Lenovo-ideapad-300-15ISK:~$
```

```
Activities Terminal
Fri 23:52
abhijeet@abhijeet-Lenovo-Ideapad-300-15ISK: ~

2. to convert list to adjacency matrix.
3. to convert incidence matrix to adjacency list
4. to convert adjacency list to adjacency matrix
5. to convert adjacency matrix to incidence matrix
6. to convert Incident matrix to adjacent matrix
enter choice:
6
Incident matrix to adjacent matrix
Incident Matrix
[[1, 1, 0, 0, 0, 0],
 [1, 0, 1, 0, 0, 0],
 [1, 0, 0, 1, 0, 0],
 [1, 0, 0, 0, 1, 0],
 [1, 0, 0, 0, 0, 1],
 [0, 1, 1, 0, 0, 0],
 [0, 1, 0, 1, 0, 0],
 [0, 1, 0, 0, 1, 0],
 [0, 1, 0, 0, 0, 1],
 [0, 0, 1, 1, 0, 0],
 [0, 0, 1, 0, 1, 0],
 [0, 0, 1, 0, 0, 1],
 [0, 0, 0, 1, 1, 0],
 [0, 0, 0, 1, 0, 1],
 [0, 0, 0, 0, 1, 1]]
adjacent matrix
[[0, 1, 1, 1, 1, 1],
 [1, 0, 1, 1, 1, 1],
 [1, 1, 0, 1, 1, 1],
 [1, 1, 1, 0, 1, 1],
 [1, 1, 1, 1, 0, 1],
 [1, 1, 1, 1, 1, 0]]
abhijeet@abhijeet-Lenovo-ideapad-300-15ISK: ~$
```