Operating System Labs July-Dec-2017
Assignment 5

Exercise 1: Write a C/C++ or Java program that determines if the graph contains a cycle. If it does contain a cycle, it should output all of the cycles but it should output each cycle only once.

Resource allocation graphs consist of processes and resources. For simplicity, processes will be represented by a single lowercase letter 'a'..'z' and resources will be represented by integers in the range 1..50.

Input to your program consists of lines read in from an ASCII text file. Edges in the graph are represented by each line in the file. For example, consider the following:

```
10 a
b  2
```

The line *10 a* is an edge from resource *10* to process *a* in the graph indicating that process *a* holds resource *10*. The line *b 2* is an edge from process *b* to resource *2* in the graph indicating that process *b* wants (is requesting) resource *2*. Note that this graph does not contain any cycles.

Here is another example:

```
d 1
1 c
c 2
2 d
```

which could also be represented by:

```
c 2
d 1
1 c
2 d
```

Note that the order of lines in the input file is arbitrary. These graphs contain a cycle.

Here is another example:

```
g 4
1 a
c 2
f 2
6 f
d 3
b 3
3 e
d 2
e 5
a 2
5 g
4 d
```

This graph contains a cycle.
Also prepare a text file that contains multiple cycles.

Hint: To represent a graph a simple method is to use a 2D array where *g[i][j]=1* indicates that an edge exists from i to j.