Operating System Labs July-Dec-2017

Assignment 5

Exercise 1: Write a C/C++ or Java program that creates a resource allocation graph and rejects a resource demand request if accepting the request results into a cycle in the graph.

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. **You need to reject the resource demand request that may results into 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
```

Again you need to reject the resource demand request that may results into a cycle.

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.