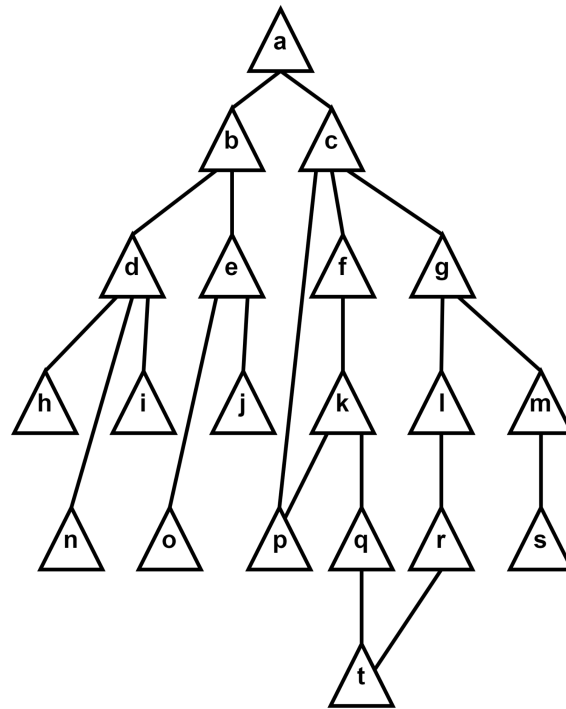


Fall 2023
CSE 221 Lab Final
Total Marks: 20
Time: 1 hour

There's a planet named CRAT, where gravity works opposite to Earth's gravity, which means that gravity pulls upward in contrast to downward. Hence, their buildings are constructed in a hanging manner.



In the above picture, there is a building constructed on the CRAT planet. Now, they hired you to design two lifts in that building. They want those lifts to reach each floor in an alternate way, such as they wish **lift1 to reach even level floors** and **lift2 to reach odd level floors**. As mentioned earlier, the planet level is calculated from top to bottom. For example, in the above building, the '**a**' floor is on level 0, '**b**' and '**c**' floors are on level 1 and '**d**', '**e**', '**f**', '**g**', '**p**' are on level 2 and so on. Your task is to help them find which levels are going to be reached by lift1 and which floors are going to be reached by lift2.

Q1 (Marks 2): Read the graph inputs from a text (.txt) file following the given format.

Q2 (Marks 4): Show inputs (which you have taken from the text file) in the adjacency matrix or adjacency list [you may use a dictionary] to represent the graph. Generate an **output file** of the adjacency matrix or list you created.

Q3 (Marks 9): Apply a suitable algorithm by which you can find the levels of the floors and, based on that, find which floors will be reached by lift1 and which will be reached by lift2.

Input:

The first line contains two integers N and M separated by a space, denoting the number of nodes and edges in the graph, respectively.

The following M lines each contain two characters(the nodes) and indicate their connection.

The last line will contain the floor name on level 0 and from where both lifts will start.

Output:

*Output should be in an **output file**

1st line: Name of the floors which will be reached by **lift1**. [**Even** level]

2nd line: Name of the floors which will be reached by **lif2**. [**Odd level**]

Sample Input	Sample Output
20 21 a^b a^c b^d b^e c^f c^g d^h d^n d^i e^o e^j c^p f^k g^l g^m k^p k^q l^r m^s q^t r^t a	Lift 1: d,e,f,g,p,q,r,s Lift 2: b,c,h,i,j,k,l,m,n,o,t

**The output order does not matter; the floor's names should be in their respective list as shown in the output.*

Q4 (Marks 5): Recently, a massive cratquake happened in CRAT planet, and due to that, some of the floors of that building have crashed. Those floors are 'g' and 'r'. As those floors no longer exist in the building, the lifts can not reach them, and those floors that were reachable by only 'g' or 'r' are also not reachable by those lifts. Now, Your task is to help them find which levels are going to be reached by lift1 and which floors are going to be reached by lift2 after the crash.

Hint: You will consider those inaccessible floors as they don't exist on the graph.

Input:

You will use the input from the Q3 for the graph reference.

Output:

*Output should be in an **output file**

1st line: Updated Name of the floors which will be reached by **lift1**. [**Even level**]

2nd line: Name of the floors which will be reached by **lif2**. [**Odd level**]

Sample Input	Sample Output
	Lift 1: d,e,f,p,q Lift 2: b,c,h,i,j,k,n,o,t

**The output order does not matter; the floor's names should be in their respective list as shown in the output.*