Critical Connections Vvery Importnat.

Given an undirected Connected graph of V vertices and E edges.
A critical connection is an edge that, if removed, will make some nodes unable to reach some other nodes. Find all critical connections in the graph.
Note: There are many possible orders for the answer. You are supposed to print the edges in sorted order, and also an edge should be in sorted order too. So if there's an edge between node 1 and 2, you should print it like (1,2) and not (2,1).

Example 1:

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0 1

0 2

Explanation:

```
Both the edges in the graph are Crtical
connections.
```

Example 2:

```
Input: ![]
```
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kSuQmCC) Output:
2 3
Explanation:

```
The edge between nodes 2 and 3 is the only
Critical connection in the given graph.
```

Your task:
You don’t need to read input or print anything. Your task is to complete the function **criticalConnections()** which takes the integer V denoting the number of vertices and an adjacency list adj as input parameters and returns a list of lists containing the Critical connections in the sorted order.

Expected Time Complexity: O(V + E)
Expected Auxiliary Space: O(V)

Constraints:
$1 \leq V, E \leq 10^4$

```
from collections import defaultdict
class Solution:
    def criticalConnections(self, V, graph):
        # code here
        def dfs(u, ap, time):
            dis[u] = time
            low[u] = time
            time = time + 1
            visited[u] = True
            for v in graph[u]:
                if parent[u] == v:
                    continue
                elif visited[v] is True:
                    low[u] = min(low[u], dis[v])
                else:
                    parent[v] = u
                    dfs(v, ap, time)
                    low[u] = min(low[u], low[v])
                    if low[v]>dis[u]:
                        if u<v:
                            ap.append([u,v])
                        else:
                            ap.append([v,u])
        # graph = defaultdict(list)
        # for u, v in edges:
        #     graph[u].append(v)
        #     graph[v].append(u)
        parent = [-1] * V
        dis = [-1] * V
        low = [-1] * V
```

```
        visited = [False] * V
        ap = []
        dfs(0, ap, 0)
        return sorted(ap,key=lambda x: (x[0],x[1]))
```

```
from collections import defaultdict


def articulationPoints(edges):
    graph = defaultdict(list)
    for u, v in edges:
        graph[u].append(v)
        graph[v].append(u)
    dfs(0, graph, 0)


def dfs(u, graph, time):
    dis[u] = time
    low[u] = time
    time = time + 1
    visited[u] = True

    for v in graph[u]:
        if parent[u] == v:
            continue
        elif visited[v] is True:
            low[u] = min(low[u], dis[v])
        else:
            parent[v] = u

            dfs(v, graph, time)
            low[u] = min(low[u], low[v])
        if low[v]>=dis[u]:
            ap.append([u,v])
    return ap
```