1412 – Visiting Islands

There are **N** islands and **M** bridges. All the bridges are setup between two islands and to pass a bridge you have to give a toll of **$1**. The bridges are built in such a way that there is not more than one path among two islands. Now, you want to visit at least **K** different islands. You may choose the starting island of your choice, but you want to visit at least **K** different islands in minimum cost (starting island is considered to be already visited).

Input

Input starts with an integer **T (≤ 10)**, denoting the number of test cases.

Each case starts with two integers **N, M (1 ≤ N ≤ 10^5, 0 ≤ M < N)**. Each of the next **M** lines contains two integers **u v (1 ≤ u, v ≤ N, u ≠ v)** meaning that there is a bridge between island **u** and **v**. No bridge will be reported more than once.

The next line contains an integer **q (1 ≤ q ≤ 50000)** denoting the number of queries. Each of the next **q** lines contains one integer **K (1 ≤ K ≤ 10^5)**.

Output

For each case, print the case number first. Then for each query, print the minimum amount of toll you need to pay to visit at least **K** different islands. If it is not possible, print **"impossible"**.

Sample Input	Output for Sample Input
2 2 1 1 2 3 1 2 3 5 4 1 2 2 3 2 4 2 5 2 3 2	Case 1: 0 1 impossible Case 2: 2 1

Notes

1. Dataset is huge, use faster I/O methods.
2. For the first case, for **K = 1**, which ever island we start with, we visit this. So without giving any toll we can visit one island. For **K = 2**, we choose island 1 to start. So we visit island 2 using the only bridge. So it costs $1. For **K = 3**, as there are only 2 islands in total so we cannot visit 3 islands.