Problem E. Spanning Tree Game

Input file:	`standard input`
Output file:	`standard output`
Memory limit:	512 megabytes

Alice and Bob are playing a game on an undirected graph with n vertices and m edges. The vertices are labeled by $1, 2, \ldots, n$. The edges are labeled by $1, 2, \ldots, m$. The i-th edge connects the u_i-th vertex and the v_i-th vertex directly, and its weight will be chosen from the given two values a_i and b_i.

First, Alice needs to assign weights to all the m edges such that there are exactly k edges whose weights are taken from a while the weights of other $m - k$ edges are taken from b. Then, Bob needs to choose exactly $n - 1$ edges from the graph such that every pair of different vertices are connected by these $n - 1$ edges directly or indirectly.

The final score of the game is equal to the total weights of the $n - 1$ edges chosen by Bob. Alice wants to maximize the score while Bob wants to minimize it. Please write a program to predict the final score for $k = 0, 1, 2, \ldots, m$ if both of the players play optimally.

Input

The first line contains a single integer T ($1 \le T \le 20$), the number of test cases. For each test case:

The first line contains two integers n and m ($2 \le n \le 9$, $n - 1 \le m \le 30$), denoting the number of vertices and the number of edges.

Each of the following m lines contains four integers u_i, v_i, a_i and b_i ($1 \le u_i, v_i \le n$, $u_i \ne v_i$, $1 \le a_i, b_i \le 1\,000\,000$), describing an edge.

It is guaranteed that the graph is connected.

Output

For each test case, output $m + 1$ lines, the i-th ($1 \le i \le m + 1$) of which containing an integer, denoting the final score when $k = i - 1$.

Example

standard input	standard output
1 3 3 1 2 4 6 1 3 2 7 2 3 3 5	11 9 7 5