Lab11 Questions

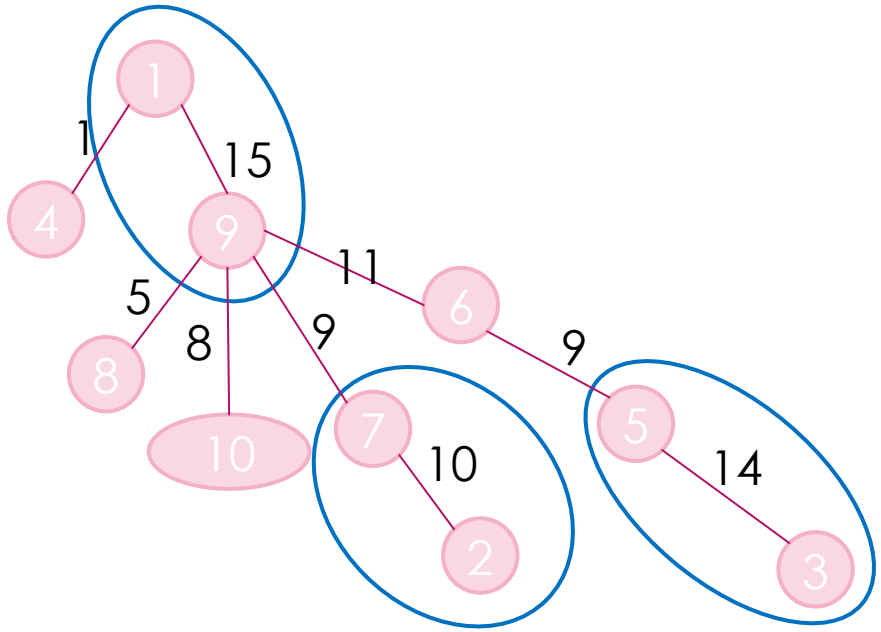
YAO ZHAO

Lab11.A: Match on Tree

- Yan got a tree as his birthday gift.
- The tree has N nodes and $N-1$ undirected weighted edges.
- Yan decided to find some matches on the tree. A match consists of a pair of nodes (u, v), such that there exists some edge connecting node u and node v. The value of this match is defined as the weight of that edge.
- Yan can make several matches, as long as **each node belongs to no more than 1 match**. Let S be the sum of values of all matches he makes. Help Yan find the maximum of S.

Sample Input

10
9 6 11
9 1 15
9 7 9
9 10 8
7 2 10
1 4 1
9 8 5
6 5 9
5 3 14



Sample Output

39

Lab11.B: Strange Courses

- ZT's college has N distinctive courses and M dependencies. Each dependency is described as (u, v), which means that a student must learn course v before learning course u.
- Strangely, those dependencies may form cycles, which is not reasonable for a modern college.
- Therefore, ZT plans to remove none, some, or all of those M dependencies. A removal is **good** if no cycle exists in the remaining dependencies.
- For a **good** removal, its **flexibility** is defined as the number of permutations of $1 \ldots N$, such that a student can learn the N courses following the order of permutation without violating the remaining dependencies.
- ZT wishes to know the sum of **flexibility** of all **good** removals, modulo $10^9 + 7$.

Sample 1 Input

2 2
1 2
2 1

remove 0 : have circle, not a good removal
remove 1 → 2: **flexibility=1** permutation:21
remove 2 → 1: **flexibility=1** permutation:12
remove 1 → 2 and 2→1: **flexibility=2** permutation: 12 and 21

the sum of flexibility of all good removals: **4**

Sample 1 Output

4