E3G Swamp

题目描述

n 点 m 边的无向图，每条边权值 $h_{u,v}$，求从 1 开始走完所有点所经过的权值中最大值最小是多少

解题思路

看到 **最大值最小**，配合数据范围 $1 \le n \le 2 \times 10^5$ 可以确定该题为 <mark>二分答案</mark>

check 函数实现方式：判断参数为 **可以走的最大权值**，因此为在原图子图上边走DFS，判断是否可以到达每一个顶点即可

代码实现

时间复杂度：$O(n \log n)$

```cpp
#include <bits/stdc++.h>

using namespace std;

using ll = long long;
using db = long double;  // or double, if TL is tight
using str = string;
using u32 = unsigned int;
using u64 = unsigned long long;
using u128 = unsigned __int128;

using pii = pair<int, int>;
using pll = pair<ll, ll>;
using pdd = pair<db, db>;
#define fi first
#define se second

#define vc vector
using vi = vc<int>;
using vb = vc<bool>;
using vll = vc<ll>;
using vd = vc<db>;
using vs = vc<str>;
using vch = vc<char>;
using vpii = vc<pii>;
using vpll = vc<pll>;
using vpdd = vc<pdd>;
using vvi = vc<vc<int>>;
```

```cpp
using vvll = vc<vc<ll>>;
using vvch = vc<vc<char>>;
using vvb = vc<vc<bool>>;
using vvpii = vc<vc<pii>>;
using vvpll = vc<vc<pll>>;

const int mod = 998244353;  // 1e9 + 7;
const int INF = 0x3f3f3f3f;
const ll BIG = 1e18;  // not too close to LLONG_MAX
const db PI = acos((db)-1);
const int dx[4]{1, 0, -1, 0}, dy[4]{0, 1, 0, -1};  // for
every grid problem!!
mt19937
rng32((uint32_t)chrono::steady_clock::now().time_since_epo
ch().count());
mt19937_64
rng64((uint64_t)chrono::steady_clock::now().time_since_epo
ch().count());

#define cl(x, y) memset(x, y, sizeof(x))
#define de(x) cerr << #x << " = " << x << " "
#define del(x) cerr << #x << " = " << x << endl

#define overload3(a, b, c, d, ...) d
#define rep1(a) for(int i = 0; i < (a); i++)
#define rep2(i, a) for (int i = 0; i < (a); i++)
#define rep3(i, a, b) for (int i = (a); i <= (b); i++)
#define per1(a) for(int i = (a) - 1; i >= 0; i--)
#define per2(i, a) for (int i = (a) - 1; i >= 0; i--)
#define per3(i, a, b) for (int i = (a); i >= (b); i--)
#define rep(args...) overload3(args, rep3, rep2, rep1)
(args)
#define per(args...) overload3(args, per3, per2, per1)
(args)
#define for_subset(t, s) \
    for (ll t = (s); t >= 0; t = (t == 0 ? -1 : (t - 1) &
(s)))

#define co cout
#define dl '\n'
#define ret return
#define pb push_back
#define tcT template <class T
#define YES cout << "YES" << endl
#define Yes cout << "Yes" << endl
#define NO cout << "NO" << endl
#define No cout << "No" << endl
#define INT(args...) \
    int args;        \
    rd(args)
#define LL(args...) \
    ll args;        \
```

```cpp
    rd(args)

#define all(s) s.begin(), s.end()
#define rall(s) s.rbegin(), s.rend()
#define sz(v) int(v.size())
#define SUM(a) accumulate(all(a), 0ll)
#define MIN(v) (*min_element(all(v)))
#define MAX(v) (*max_element(all(v)))
#define unisort(v) \
    sort(all(v));  \
    v.resize(unique(all(v)) - v.begin())

int popcnt(int x) { return __builtin_popcount(x); }
int popcnt(u32 x) { return __builtin_popcount(x); }
int popcnt(ll x) { return __builtin_popcountll(x); }
int popcnt(u64 x) { return __builtin_popcountll(x); }

#define LOWBIT(x) ((x) & (-x))
// (0, 1, 2, 3, 4) -> (-1, 0, 1, 1, 2)
int topbit(int x) { return (x == 0 ? -1 : 31 -
__builtin_clz(x)); }
int topbit(u32 x) { return (x == 0 ? -1 : 31 -
__builtin_clz(x)); }
int topbit(ll x) { return (x == 0 ? -1 : 63 -
__builtin_clzll(x)); }
int topbit(u64 x) { return (x == 0 ? -1 : 63 -
__builtin_clzll(x)); }
// (0, 1, 2, 3, 4) -> (-1, 0, 1, 0, 2)
int lowbit(int x) { return (x == 0 ? -1 :
__builtin_ctz(x)); }
int lowbit(u32 x) { return (x == 0 ? -1 :
__builtin_ctz(x)); }
int lowbit(ll x) { return (x == 0 ? -1 :
__builtin_ctzll(x)); }
int lowbit(u64 x) { return (x == 0 ? -1 :
__builtin_ctzll(x)); }
tcT > T cdiv(T &a, T &b) {
    return a / b + ((a ^ b) > (T)(0) && a % b);
}  // divide a by b rounded up
tcT > T fdiv(T &a, T &b) {
    return a / b - ((a ^ b) < (T)(0) && a % b);
}  // divide a by b rounded down

tcT, class S > inline ostream &operator<<(ostream &i,
const pair<T, S> &a) { return i << a.first << ' ' <<
a.second; }
tcT, class S > inline istream &operator>>(istream &i,
pair<T, S> &a) { return i >> a.first >> a.second; }
tcT > inline ostream &operator<<(ostream &i, const
vector<T> &a) {
    if (a.size())
        i << a[0];
```

```cpp
        for (int j = 1; j < int(a.size()); j++)
            i << ' ' << a[j];
        return i;
    }
    tcT > inline istream &operator>>(istream &i, vector<T> &a)
    {
        for (auto &j : a)
            i >> j;
        return i;
    }
    void err(istream_iterator<string> it) {
    it.~istream_iterator(); }
    template <typename T, typename... Args>
    void err(istream_iterator<string> it, T a, Args... args) {
        cerr << *it << " = " << a << endl;
        err(++it, args...);
    }
    void wt() { cout << '\n'; }
    tcT, class... Args > void wt(const T &a, const Args
    &...args) {
        cout << a;
        (void)(cout << ... << (cout << ' ', args));
        cout << '\n';
    }
    tcT > void wt(vector<vector<T>> &a) {
        for (auto &i : a)
            wt(i);
    }
    tcT, class S > void wt(vector<pair<T, S>> &a) {
        for (auto &i : a)
            wt(i);
    }
    template <class... T>
    void rd(T &...a) { (cin >> ... >> a); }

    #define LOCAL_TEST freopen("out.txt", "w", stdout)
    #define IOS
    ios::sync_with_stdio(false);cin.tie(0);cout.tie(0)
    #define FIX(x) cout << fixed << setprecision(x)

    const int maxn = 1e5 + 5;

    inline void INIT() {

    }

    /*

    */

    inline void SOLVE() {
```

```cpp
    INT(n, m);
    vvpii edge(n + 1);
    rep(m) {
        INT(u, v, h);
        edge[u].pb(pii{v, h});
        edge[v].pb(pii{u, h});
    }

    auto check = [&](ll lim) -> bool {
        vb vis(n + 1);
        queue<int> q;
        vis[1] = true;
        q.push(1);
        while(!q.empty()) {
            int now = q.front();
            q.pop();
            for(auto ed: edge[now]) {
                if(vis[ed.first] || ed.second > lim)
continue;
                vis[ed.first] = true;
                q.push(ed.first);
            }
        }
        rep(i, 1, n) if(!vis[i]) return false;
        return true;
    };

    ll l = 0, r = (1ll << 31) - 1, ans = -1;
    while(l <= r) {
        ll mid = l + r >> 1;
        if(check(mid)) r = mid - 1, ans = mid;
        else l = mid + 1;
    }

    wt(ans);

}

int main() {

    IOS; FIX(20);

    INIT();
    int tt = 1;
    cin >> tt;
    while(tt--)
        SOLVE();

    // cout << "program ends..." << endl;
    // system("pause");
    return 0;
}
```