

```

1  const int MAXN = 100010;
2  const int LOGMAXN = 18;
3  vi adj[MAXN];
4  int par[MAXN], l[MAXN];
5  int p[MAXN][LOGMAXN];
6  int n;
7
8  void dfs(int src) {
9      if(src) l[src] = l[par[src]] + 1;
10     TRAV(it,adj[src]) if(par[*it]==-1) {
11         par[*it] = src;
12         dfs(*it);
13     }
14 }
15
16 void preproc() {
17     SET(par);
18     l[0] = 0;
19     par[0]=0;
20     dfs(0);
21     SET(p);
22     for(int j=0; (1<=j)<n; ++j) FOR0(i,n) {
23         if(!j) p[i][j] = par[i];
24         else if(p[i][j-1]!=-1) {
25             p[i][j] = p[p[i][j-1]][j-1];
26         }
27     }
28 }
29
30 int lca(int x, int y) {
31     if(x==y) return x;
32     if(l[x]>l[y]) swap(x,y);
33
34     int log = 0;
35     while((1<=(log+1)) <= l[y]) ++log;
36
37     int dl = l[y] - l[x];
38     if(dl) {
39         for(int i=log; i>=0; --i) {
40             if(dl&(1<=i)) y = p[y][i];
41         }
42     }
43     if(x==y) return x;
44
45     for(int i=log; i>=0; --i) {
46         if(p[x][i]!=p[y][i]) {
47             x = p[x][i];
48             y = p[y][i];
49         }
50     }
51     return p[x][0];
52 }
53

```