

```
1  /*
2    | Centroid Decomposition |
3    Desc: Technique for path queries. Takes  $O(n \log(n))$  to build.
4    Source: KawakiMeido
5    State: Untested lmao
6  */
7
8  int sz[N];
9  int vis[N];
10
11 int findSize(int u, int p=0){
12     sz[u] = 1;
13     for (auto v:adj[u]){
14         if (vis[v] || v==p) continue;
15         sz[u] += findSize(v,u);
16     }
17     return sz[u];
18 }
19
20 int findCentroid(int u, int n, int p=0){
21     for (auto v:adj[u]){
22         if (vis[v] || v==p) continue;
23         if (sz[v]>n/2) return findCentroid(v,n,u);
24     }
25     return u;
26 }
27
28 void dfsCentroid(int u, int p, int depth=1){
29     for (auto v:adj[u]){
30         if (vis[v] || v==p) continue;
31         dfsCentroid(v,u,depth+1);
32     }
33 }
34
35 void buildCentroid(int s){
36     findSize(s);
37     int u = findCentroid(s,sz[s]);
38     vis[u] = true;
39
40     for (auto v:adj[u]){
41         if (vis[v]) continue;
42         dfsCentroid(v,u);
43     }
44
45     for (auto v:adj[u]){
46         if (vis[v]) continue;
47         buildCentroid(v);
48     }
49 }
```