

No. of employees under every manager

HashMap < String, ArrayList < String > > Integer;

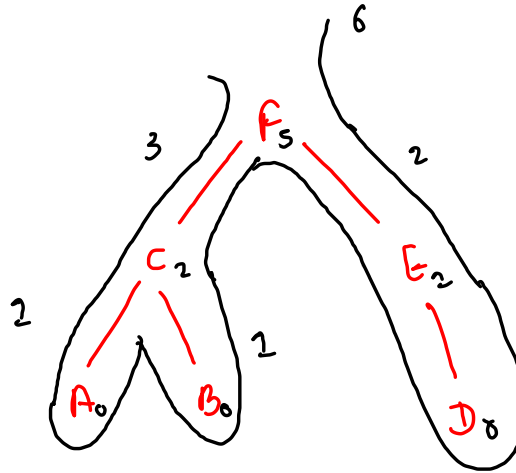
hierarchy tree  
(creation using  
HM)

A0B0C2D0  
E1F5

manager

direct employees

reporting manager



Ceo = "F"

(root)

C - A, B

E - D

F - C, E

A -

B -

D -

6  
AC  
BC  
CF  
DE  
EF  
FF

```

while(n-- > 0) {
    String emp = scn.next();
    String man = scn.next();

    if(emp.equals(man) == true) {
        ceo = man;
        if(GT.containsKey(man) == false) {
            GT.put(emp, new ArrayList<>());
        }
        continue;
    }

    if(GT.containsKey(man) == false) {
        ArrayList<String>list = new ArrayList<>();
        list.add(emp);
        GT.put(man, list);
    }
    else {
        ArrayList<String>list = GT.get(man);
        list.add(emp);
        GT.put(man, list);
    }

    if(GT.containsKey(emp) == false) {
        GT.put(emp, new ArrayList<>());
    }
}

```

```

public static int size(String root, HashMap<String, ArrayList<String>>GT, HashMap<String, Integer>ans) {
    int ts = 0;

    for(String child : GT.get(root)) {
        ts += size(child, GT, ans);
    }

    ans.put(root, ts);
    return ts+1;
}

```

emp	man
C	F ✓
D	E ✓
F	F ✓
A	C ✓
B	C ✓
E	F ✓

F → C, E

C → A, B

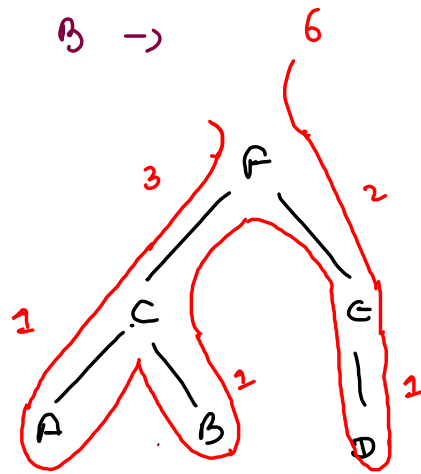
E → D

D →

A →

B →

ceo = F



A → 0

B → 0

C → 2

D → 0

E → 1

F → 5

Find itenary from tickets:  
└─> proper route

4

Chennai Bangalore  
Bombay Delhi  
Goa Chennai  
Delhi Goa

Bombay -> Delhi -> Goa -> Chennai -> Bangalore.

Chennai -> F

Bangalore -> F

Bombay -> T

Delhi -> F

Goa -> F

map

Chennai -> Bangalore

Bombay -> Delhi

Goa -> Chennai

Delhi -> Goa

Bombay -> Delhi -> Goa -> Chennai -> Bangalore

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Chennai Bangalore  
Bombay Delhi  
Goa Chennai  
Delhi Goa

map

stp |

```
HashMap<String, Boolean> stp = new HashMap<>(); //start point

for(String src : map.keySet()) {
    String dest = map.get(src);

    if(stp.containsKey(src) == false) {
        stp.put(src, true);
    }
    stp.put(dest, false);
}

String sp = "";
for(String src : stp.keySet()) {
    if(stp.get(src) == true) {
        sp = src;
        break;
    }
}

String temp = sp;
while(map.containsKey(temp) == true) {
    System.out.print(temp + " -> ");
    temp = map.get(temp);
}

System.out.println(temp + ".");
```

Chennai → T F

Bangalore → F

Bombay → T

Delhi → F

Goa → T F

sp = Bombay

temp = ~~Bombay~~ ~~Delhi~~ ~~Goa~~ ~~Chennai~~ Bangalore

Bombay → Delhi → Goa → Chennai → Bangalore.