

## Lightoj-1140-How Many Zeros

```
#define ll long long
char s[15];
int sz,dp[20][2][2][30];
int fun(int pos,int choto,int suru,int cnt)
{
    if(pos==sz) return cnt;
    if(dp[pos][choto][suru][cnt]!=-1) return dp[pos][choto][suru][cnt];

    int ret = 0;
    int lo=0,hi=9;
    if(!choto)hi=s[pos]-'0';

    for(int i=lo; i<=hi; i++){
        ret += fun(pos+1,choto|(i<hi),suru|(i>0),(i==0&&suru)+cnt);
    }
    return dp[pos][choto][suru][cnt] = ret;
}
int main()
{
    ll m,n;
    int t,ks=0; scanf("%d",&t);
    while(t--)
    {
        scanf("%lld %lld",&m,&n);
        if(m==0&&n==0){
            printf("Case %d: 1\n",++ks); continue;
        }

        m--;
        ll cntm,cntn;

        if(m<0) cntm = 0;
        else{
            sprintf(s,"%lld",m);
            sz = strlen(s);
            memset(dp,-1,sizeof(dp));
            cntm = fun(0,0,0,0)+1;
        }
        sprintf(s,"%lld",n);
        sz = strlen(s);
        memset(dp,-1,sizeof(dp));
        cntn = fun(0,0,0,0)+1;

        int ans = cntn-cntm;
        printf("Case %d: %lld\n",++ks,ans);
    }
    return 0;
}
```

### Another Code:

```
#define ll long long
string sm,sn;
int sz,dp[20][2][2][2][30];
int fun(int pos,int choto,int boro,int suru,int cnt)
{
    if(pos==sz) return cnt;

    if(dp[pos][choto][boro][suru][cnt]!=-1)
        return dp[pos][choto][boro][suru][cnt];

    int ret = 0;
    int lo=0,hi=9;
    if(!boro)lo = sm[pos]-'0';
    if(!choto)hi = sn[pos]-'0';

    for(int i=lo; i<=hi; i++){
        ret+=fun(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0),(suru&& i==0)+cnt);
    }
    return dp[pos][choto][boro][suru][cnt] = ret;
}

int main()
{
    ll m,n;
    int t,ks=0; scanf("%d",&t);
    while(t--){
        scanf("%lld %lld",&m,&n);
        if(m==0&&n==0){
            printf("Case %d: 1\n",++ks); continue;
        }

        char s[15];
        sprintf(s,"%lld",n);
        sn = s;
        sz = sn.size();
        sprintf(s,"%lld",m);
        int d = sz - strlen(s);
        sm = "";
        for(int i=1; i<=d; i++) sm+='0';
        sm += s;

        memset(dp,-1,sizeof(dp));
        ll ans = fun(0,0,0,0,0)+(m==0);

        printf("Case %d: %lld\n",++ks,ans);
    }
    return 0;
}
```