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#include<bits/stdc++.h>
using namespace std;
int next_queen;
void place_queen(int,int,int,vector<vector<int> >&,vector<int>&);

void print(int N,vector<vector<int> >&v,vector<int>&state){
    cout<<"\n\n\n";
    for (int i = 0; i < N; i++) {
        for(int j=0; j<N; j++){
            cout<<v[i][j]<<" ";
        }
        cout<<"\n\n";
    }
    cout<<"\nState ";<<endl;
    for(int i=0; i<N; i++){
        cout<<state[i]<<" ";
    }
    cout<<endl;
}

int check(int r,int c ,int n,vector<vector<int> >&v,vector<int>&state ){
    int flag=0;
    for(int i=0; i<n; i++){
        if(state[i]==-1){
            flag=0;
            break;
        }
        else if(state[i]==c){
            flag=1;
            break;
        }
        else if(abs(state[i]-c)==abs(i-r)){
            flag=1;
            break;
        }
    }
    if(flag==0){
        return 1;
    }
    else{
        return 0;
    }
}

void backtrack(int r,int n,vector<vector<int> >&v,vector<int>&state){
    int c=state[r];
    state[r]=-1;
    v[r][c]=0;
    next_queen--;
    //print(n,v,state);
    place_queen(r,c+1,n,v,state);
}

void place_queen(int r,int c,int n,vector<vector<int> >&v,vector<int>&state){
    if(r==n){
        return;
    }
    int flag=0;
    for(int i=c; i<n; i++){
        if(check(r,i,n,v,state)){

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        flag=1;
        v[r][i]=next_queen;
        next_queen++;
        state[r]=i;
        print(n,v,state);
        //cout<<"col "<<" "<<i<<endl;
        break;
    }
}
if(flag==1){
    //print(n,v,state);
    place_queen(r+1,0,n,v,state);
}
else{
    backtrack(r-1,n,v,state);
}
}

int main(){
    int n;
    cout<<"\nEnter Number of Queens "<<endl;
    cin>>n;
    vector<vector<int> > v(n , vector<int> (n,0));
    vector<int>state(n,-1);
    v[0][0]=1;
    next_queen=2;
    state[0]=0;
    place_queen(1,0,n,v,state);
    //print(n,v,state);
    return 0;
}

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