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1  /** Gym100886G - Maximum Product:
2  Find the number from the range [a,b] which has the maximum product of the digits.
3  The first line contains two positive integers a and b(1≤a≤b≤10^18).
4  Print the number with the maximum product of the digits from the range [a,b].
5  If there are several possible answers, print any one of them.
6  */
7
8  #include<bits/stdc++.h>
9  using namespace std;
10 #define ll long long int
11 string sa,sb,res;
12 ll sz,dp[20][2][2][2];
13 ll fun(int pos,int choto,int boro,int suru){
14     if(pos==sz){
15         if(suru) return 1LL;
16         else return 0LL;
17     }
18     if(dp[pos][choto][boro][suru]!=-1) return dp[pos][choto][boro][suru];
19
20     int lo=0,hi=9; if(!boro) lo=sa[pos]-'0'; if(!choto)hi=sb[pos]-'0';
21     ll ret = 0;
22     for(ll i=lo; i<=hi; i++){
23         if(suru==0&&i==0){
24             ret = max(ret,fun(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0)));
25         }else{
26             ret = max(ret,i*fun(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0)));
27         }
28     }
29     return dp[pos][choto][boro][suru] = ret;
30 }
31 void path(int pos,int choto,int boro,int suru){
32     if(pos==sz)return;
33
34     ll maxx = fun(pos,choto,boro,suru);
35
36     int lo=0,hi=9; if(!boro) lo=sa[pos]-'0'; if(!choto)hi=sb[pos]-'0';
37
38     for(ll i=lo; i<=hi; i++){
39         if(suru==0&&i==0){
40             ll ret = fun(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0));
41             if(ret==maxx){
42                 path(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0));
43                 break;
44             }
45         }else{
46             ll ret = i*fun(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0));
47             if(ret==maxx){
48                 res+=(i+'0');
49                 path(pos+1,choto|(i<hi),boro|(i>lo),suru|(i>0));
50                 break;
51             }
52         }
53     }
54 }
55 int main(){
56     ll a,b; cin>>a>>b; if(a>b)swap(a,b);
57
58     char aa[25], bb[25];
59     sprintf(bb,"%lld",b); sb = bb; sz = sb.size();
60     sprintf(aa,"%lld",a);
61     int d = sz-strlen(aa);
62     sa=""; for(int i=1; i<=d; i++)sa+='0';
63     sa += aa;
64
65     memset(dp,-1,sizeof(dp));
66     ll ans = fun(0,0,0,0); //cout<<ans<<endl;
67     path(0,0,0,0);
68     cout<<res<<endl;
69 }

```