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/*
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TICA MIHAI
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ACSL - Contest 3
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Junior Division
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```
*/
```

```
#include <fstream>
```

```
#include <vector>
```

```
#include <algorithm>
```

```
using namespace std;
```

```
ifstream fin("veitch.in");
```

```
ofstream fout("output.out");
```

```
struct tabel
```

```
{
```

```
    bool a=false, na=false, b=false, nb=false, c=false, nc=false;
```

```
};
```

```
void caută(bool v[10][10], bool semn)
```

```
{
```

```
    for(int j = 1; j <= 2; j++)
```

```
    {
```

```
        for(int i = 1; i <= 4; i++)
```

```
        {
```

```
            if(v[i][j])
```

```
            {
```

```
                tabel t;
```

```
                if(i==1 && j==1)
```

```
                {
```

```
                    t.a=true;
```

```
t.nc=true;
t.b=true;
}
if(i==2 && j==1)
{
t.a=true;
t.b=true;
t.c=true;
}
if(i==3 && j==1)
{
t.na=true;
t.b=true;
t.c=true;
}
if(i==4 && j==1)
{
t.na=true;
t.nc=true;
t.b=true;
}
if(i==1 && j==2)
{
t.a=true;
t.nc=true;
t.b=true;
}
if(i==2 && j==2)
{
t.a=true;
t.nb=true;
t.c=true;
}
```

```
if(i==3 && j==2)
{
  t.na=true;
  t.nb=true;
  t.c=true;
}
if(i==4 && j==2)
{
  t.na=true;
  t.nc=true;
  t.nb=true;
}
if(t.a && !t.na)
{
  if(!semn)
  {
    fout << " + ";
    semn=true;
  }
  fout << "A";
}
else if(!t.a && t.na)
{
  if(!semn)
  {
    fout << " + ";
    semn=true;
  }
  fout << "~A";
}
if(t.b && !t.nb)
{
  if(!semn)
```

```
{
    fout << " + ";
    semn=true;
}
fout << "B";
}
else if(!t.b && t.nb)
{
    if(!semn)
    {
        fout << " + ";
        semn=true;
    }
    fout << "~B";
}
if(t.c && !t.nc)
{
    if(!semn)
    {
        fout << " + ";
        semn=true;
    }
    fout << "C";
}
else if(!t.c && t.nc)
{
    if(!semn)
    {
        fout << " + ";
        semn=true;
    }
    fout << "~C";
}
```

```

        semn=false;
    }//
}
}
}

bool v[10][10];

int main()
{

    char c1, c2;
    int a=0, b=0, c=0;
    vector<int> b1, b2;
    fin >> c1 >> c2;
    if(c1=='F' && c2=='F')
    {
        fout<<"B + ~B";
        return 0;
    }
    if(c1=='0')
        b1.insert(b1.end(), {0,0,0,0});
    else if(c1=='1')
        b1.insert(b1.end(), {0,0,0,1});
    else if(c1=='2')
        b1.insert(b1.end(), {0,0,1,0});
    else if(c1=='3')
        b1.insert(b1.end(), {0,0,1,1});
    else if(c1=='4')
        b1.insert(b1.end(), {0,1,0,0});
    else if(c1=='5')
        b1.insert(b1.end(), {0,1,0,1});
    else if(c1=='6')

```

```
    b1.insert(b1.end(), {0,1,1,0});
else if(c1=='7')
    b1.insert(b1.end(), {0,1,1,1});
else if(c1=='8')
    b1.insert(b1.end(), {1,0,0,0});
else if(c1=='9')
    b1.insert(b1.end(), {1,0,0,1});
else if(c1=='A')
    b1.insert(b1.end(), {1,0,1,0});
else if(c1=='B')
    b1.insert(b1.end(), {1,0,1,1});
else if(c1=='C')
    b1.insert(b1.end(), {1,1,0,0});
else if(c1=='D')
    b1.insert(b1.end(), {1,1,0,1});
else if(c1=='E')
    b1.insert(b1.end(), {1,1,1,0});
else if(c1=='F')
    b1.insert(b1.end(), {1,1,1,1});

if(c2=='0')
    b2.insert(b2.end(), {0,0,0,0});
else if(c2=='1')
    b2.insert(b2.end(), {0,0,0,1});
else if(c2=='2')
    b2.insert(b2.end(), {0,0,1,0});
else if(c2=='3')
    b2.insert(b2.end(), {0,0,1,1});
else if(c2=='4')
    b2.insert(b2.end(), {0,1,0,0});
else if(c2=='5')
    b2.insert(b2.end(), {0,1,0,1});
else if(c2=='6')
```

```
    b2.insert(b2.end(), {0,1,1,0});
else if(c2=='7')
    b2.insert(b2.end(), {0,1,1,1});
else if(c2=='8')
    b2.insert(b2.end(), {1,0,0,0});
else if(c2=='9')
    b2.insert(b2.end(), {1,0,0,1});
else if(c2=='A')
    b2.insert(b2.end(), {1,0,1,0});
else if(c2=='B')
    b2.insert(b2.end(), {1,0,1,1});
else if(c2=='C')
    b2.insert(b2.end(), {1,1,0,0});
else if(c2=='D')
    b2.insert(b2.end(), {1,1,0,1});
else if(c2=='E')
    b2.insert(b2.end(), {1,1,1,0});
else if(c2=='F')
    b2.insert(b2.end(), {1,1,1,1});
```

```
for(int i = 0; i < b1.size(); i++)
```

```
{
    if(b1[i]==1)
        v[i+1][1]=true;
    else
        v[i+1][1]=false;
}
```

```
for(int i = 0; i < b2.size(); i++)
```

```
{
    if(b2[i]==1)
        v[i+1][2]=true;
    else
```

```

    v[i+1][2]=false;
}

if(v[1][1] && v[2][1] && v[3][1] && v[4][1])
{
    fout << "B";
    v[1][1]=v[2][1]=v[3][1]=v[4][1]=false;
    cauta(v, false);
    return 0;
}

if(v[1][2] && v[2][2] && v[3][2] && v[4][2])
{
    fout << "~B";
    v[1][2]=v[2][2]=v[3][2]=v[4][2]=false;
    cauta(v, false);
    return 0;
}

if(v[1][1] && v[1][2] && v[4][1] && v[4][2])
{
    fout << "~C";
    v[1][1]=v[1][2]=v[4][1]=v[4][2]=false;
    cauta(v, false);
    return 0;
}

for(int i = 1; i <= 3; i++)
{
    if(v[i][1] && v[i+1][1] && v[i][2] && v[i+1][2])
    {
        if(i==1)
            fout << "A";
    }
}

```



```
if(i==2)
    fout << "C";
if(i==3)
    fout << "~A";
v[i][1]=v[i+1][1]=v[i][2]=v[i+1][2]=false;
```

```
if(v[1][2] && v[4][2])
{
    fout << " + ~B~C";
    v[1][2]=v[4][2]=false;
    cauta(v, false);
    return 0;
}
```

```
for(int i = 1; i <= 4; i++)
{
    if(v[i][1] && v[i][2])
    {
        if(i==1)
            fout << " + A~C";
        if(i==2)
            fout << " + AC";
        if(i==3)
            fout << " + ~AC";
        if(i==4)
            fout << " + ~A~C";
        v[i][1]=v[i][2]=false;
        cauta(v, false);
        return 0;
    }
}
```

```
cauta(v, false);
return 0;
```

```

}
}

for(int i = 1; i <= 3; i++)
{
    if(v[i][1] && v[i+1][1])
    {
        if(i==1)
            fout << "AB";
        if(i==2)
            fout << "BC";
        if(i==3)
            fout << "~AB";
        v[i][1]=v[i+1][1]=false;
        for(int i = 1; i <= 3; i++)
        {
            if(v[i][2] && v[i+1][2])
            {
                if(i==1)
                    fout << " + A~B";
                if(i==2)
                    fout << " + A~BC";
                if(i==3)
                    fout << " + ~A~B";
                v[i][2]=v[i+1][2]=false;
            }
        }
        if(v[1][2] && v[4][2])
        {
            fout << " + ~B~C";
            v[1][2]=v[4][2]=false;
            cauta(v, false);
        }
    }
}

```

```

    return 0;
}

cauta(v, false);
return 0;
}
}
for(int i = 1; i <= 3; i++)
{
    if(v[i][2] && v[i+1][2])
    {
        if(i==1)
            fout << "A~B";
        if(i==2)
            fout << "A~BC";
        if(i==3)
            fout << "~A~B";
        v[i][2]=v[i+1][2]=false;

for(int i = 1; i <= 4; i++)
{
    if(v[i][1] && v[i][2])
    {
        if(i==1)
            fout << " + A~C";
        if(i==2)
            fout << " + AC";
        if(i==3)
            fout << " + ~AC";
        if(i==4)
            fout << " + ~A~C";
        v[i][1]=v[i][2]=false;
        cauta(v, false);

```

```
        return 0;
    }
}
cauta(v, false);
return 0;
}
```

```
for(int i = 1; i <= 4; i++)
{
    if(v[i][1] && v[i][2])
    {
        if(i==1)
            fout << "A~C";
        if(i==2)
            fout << "AC";
        if(i==3)
            fout << "~AC";
        if(i==4)
            fout << "~A~C";
        v[i][1]=v[i][2]=false;
        cauta(v, false);
        return 0;
    }
}
```

```
if(v[1][1] && v[4][1])
{
    fout << "B~C";
    v[1][1]=v[4][1]=false;
    cauta(v, false);
    return 0;
}
```

```
if(v[1][2] && v[4][2])  
{  
    fout << "~B~C";  
    v[1][2]=v[4][2]=false;  
    cauta(v, false);  
    return 0;  
}
```

```
cauta(v, false);  
return 0;  
}
```