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/*
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Division: Junior
Contest 3
*/

#include <iostream>
#include <bits/stdc++.h>
#include <string>

using namespace std;

string HexToBin(char hexdec)
{
    long int i = 0;

    while (hexdec) {

        switch (hexdec)
        {
            case '0':
                return "0000";
                break;
            case '1':
                return "0001";
                break;
            case '2':
                return "0010";
                break;
            case '3':
                return "0011";
                break;
            case '4':
                return "0100";
                break;
            case '5':
                return "0101";
                break;
            case '6':
                return "0110";
                break;
            case '7':
                return "0111";
                break;
            case '8':
                return "1000";
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        break;
    case '9':
        return "1001";
        break;
    case 'A':
    case 'a':
        return "1010";
        break;
    case 'B':
    case 'b':
        return "1011";
        break;
    case 'C':
    case 'c':
        return "1100";
        break;
    case 'D':
    case 'd':
        return "1101";
        break;
    case 'E':
    case 'e':
        return "1110";
        break;
    case 'F':
    case 'f':
        return "1111";
        break;
    }
}
}
int main()
{
    int A=1,B=1,C=1,NA=-1,NB=-1,NC=-1;
    string hex,bin,output[8];
    long int sum=0,j=0;
    cin>>hex;
    bin=HexToBin(hex[0]);
    bin+=HexToBin(hex[1]);

    //cout<<bin<<endl;
    string answer[8]={"AB~C","ABC","~ABC","~AB~C","A~B~C","A~BC","~A~BC","~A~B~C"};
    for (int i=0;i<8;i++)
    {
        if (bin[i]-'0'==1)
        {
            sum++;
        }
    }
}

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if (sum==8)
{
    cout<<"1"<<endl;
}
else if (sum==0)
{
    cout<<"0"<<endl;
}
else
{
    for (int i=0;i<3;i++)
    {
        if (bin[i]=='1'&&bin[i+1]=='1'&&bin[i+4]=='1'&&bin[i+5]=='1')
        {
            if (i==0)
            {
                output[j]="A";
            }
            else if (i==1)
            {
                output[j]="C";
            }
            else
            {
                output[j]="~A";
            }
            j++;
            bin[i]='0';
            bin[i+1]='0';
            bin[i+4]='0';
            bin[i+5]='0';
        }
    }

    if (bin[0]=='1'&&bin[1]=='1'&&bin[2]=='1'&&bin[3]=='1')
    {
        output[j]="B";
        j++;
        bin[1]='0';
        bin[2]='0';
        bin[3]='0';
        bin[0]='0';
    }
    if (bin[4]=='1'&&bin[5]=='1'&&bin[6]=='1'&&bin[7]=='1')
    {
        output[j]="~B";
        j++;
        bin[6]='0';
    }
}

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bin[5]='0';
bin[7]='0';
bin[4]='0';
}
if (bin[0]=='1'&&bin[3]=='1'&&bin[4]=='1'&&bin[7]=='1')
{
    output[j]="~C";
    j++;
    bin[0]='0';
    bin[3]='0';
    bin[7]='0';
    bin[4]='0';
}

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for (int i=0;i<8;i++)
{
    if (bin[i]=='1' && bin[i+1]=='1' && i!=3)
    {
        bin[i]='0';
        bin[i+1]='0';
        if(i==0)
        {
            output[j]="AB";
            j++;
        }
        if(i==1)
        {
            output[j]="BC";
            j++;
        }
        if(i==2)
        {
            output[j]="~AB";
            j++;
        }
        if(i==4)
        {
            output[j]="A~B";
            j++;
        }
        if(i==5)
        {
            output[j]="~BC";
            j++;
        }
        if(i==6)
        {
            output[j]="~A~B";
            j++;
        }
    }
}

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    }
}
}
for (int i=0;i<4;i++)
{
    if (bin[i]=='1'&&bin[i+4]=='1')
    {
        if (i==0)
        {
            output[j]="A~C";
            j++;
        }
        if (i==1)
        {
            output[j]="AC";
            j++;
        }
        if (i==2)
        {
            output[j]="~AC";
            j++;
        }
        if (i==3)
        {
            output[j]="~A~C";
            j++;
        }
        bin[i]='0';
        bin[i+4]='0';
    }
}
if (bin[0]=='1'&& bin[3]=='1')
{
    output[j]="B~C";
    j++;
    bin[0]='0';
    bin[3]='0';
}
if (bin[4]=='1'&&bin[7]=='1')
{
    output[j]="~B~C";
    j++;
    bin[4]='0';
    bin[7]='0';
}
for (int i=0;i<8;i++)
{
    if (bin[i]=='1')
    {

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        output[j++]=answer[i];
    }
}
for (int i=0;i<j;i++)
{
    if(i!=0)
    {
        cout<<" ";
    }
    cout<<output[i];
}
}
return 0;
}
```