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#include <iostream>
#include <cstring>

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using namespace std;

char l[3];
int e[5][5],P,c,a,v[50],i,j,n,ok,k,r;

int main()
{for(r=5;r>=1;r--){cin>>l;

P=1;

n=0;

ok=0;

a=0;

for(int s=1;s<=8;s++) v[s]=0;

for(i=strlen(l)-1;i>=0;i--) {

    if(l[i]>='A'&&l[i]<='F') c=l[i]-55;

    else c=l[i]-48;

    a=a+c*P;

    P=P*16;}

    while(a)

{v[++n]=a%2;

a=a/2;

}

k=1;

for(i=2;i>=1;i--)

    for(j=4;j>=1;j--)

        {e[i][j]=v[k];

        k++;}

if(e[1][1] and e[1][2] and e[1][3] and e[1][4]) {

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    for(i=1;i<=4;i++) e[1][i]=0;
    ok=1;
cout<<"B";}
    if(e[2][1] and e[2][2] and e[2][3] and e[2][4]) {
    if(ok) cout<<" ";
    ok=1;
    for(i=1;i<=4;i++) e[2][i]=0;
cout<<"~B";}
    if(e[1][1] and e[1][2] and e[2][1] and e[2][2]) {
    if(ok) cout<<" ";
    ok=1;
    for(i=1;i<=2;i++) e[i][1]=e[i][2]=0;
cout<<"A";}
    if(e[1][2] and e[1][3] and e[2][2] and e[2][3]) {
    if(ok) cout<<" ";
    ok=1;
    for(i=1;i<=2;i++) e[i][2]=e[i][3]=0;
cout<<"C";}
    if(e[1][1] and e[1][4] and e[2][1] and e[2][4]) {
    if(ok) cout<<" ";
    ok=1;
    for(i=1;i<=2;i++) e[i][1]=e[i][4]=0;
cout<<"~C";}
    if(e[1][3] and e[1][4] and e[2][3] and e[2][4]) {
    if(ok) cout<<" ";
    ok=1;
    for(i=1;i<=2;i++) e[i][3]=e[i][4]=0;
cout<<"~A";}
    if(e[1][1] and e[1][2]) {

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```
    if(ok) cout<<"+";
    ok=1;
    e[1][1]=e[1][2]=0;
    cout<<"AB";}
if(e[1][2] and e[1][3]) {
    if(ok) cout<<"+";
    ok=1;
    e[1][2]=e[1][3]=0;
    cout<<"BC";}
if(e[1][3] and e[1][4]) {
    if(ok) cout<<"+";
    ok=1;
    e[1][3]=e[1][4]=0;
    cout<<"~AB";}
if(e[2][1] and e[2][2]) {
    if(ok) cout<<"+";
    ok=1;
    e[2][1]=e[2][2]=0;
    cout<<"A~B";}
if(e[2][2] and e[2][3]) {
    if(ok) cout<<"+";
    ok=1;
    e[2][2]=e[2][3]=0;
    cout<<"~BC";}
if(e[2][3] and e[2][4]) {
    if(ok) cout<<"+";
    ok=1;
    e[2][3]=e[2][4]=0;
    cout<<"~A~B"};
```

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if(e[1][1] and e[2][1])
{ if(ok) cout<<"+";
  ok=1;
  e[1][1]=e[2][1]=0;
  cout<<"A~C";
}
if(e[1][2] and e[2][2])
{ if(ok) cout<<"+";
  ok=1;
  e[1][2]=e[2][2]=0;
  cout<<"AC";
}
if(e[1][3] and e[2][3])
{ if(ok) cout<<"+";
  ok=1;
  e[1][3]=e[2][3]=0;
  cout<<"~AC";
}
if(e[1][4] and e[2][4])
{ if(ok) cout<<"+";
  ok=1;
  e[1][4]=e[2][4]=0;
  cout<<"~A~C";
}
if(e[1][1] and e[1][4]) {
  if(ok) cout<<"+";
  ok=1;
  e[1][1]=e[1][4]=0;
  cout<<"B~C";}

```

```
if(e[2][1] and e[2][4]) {  
    if(ok) cout<<"+"  
    ok=1;  
    e[2][1]=e[2][4]=0;  
    cout<<"~B~C";}
```

```
if(e[1][1])  
{if(ok) cout<<"+"  
    ok=1;  
    cout<<"AB~C";}
```

```
if(e[1][2])  
{if(ok) cout<<"+"  
    ok=1;  
    cout<<"ABC";}
```

```
    if(e[1][3])  
{if(ok) cout<<"+"  
    ok=1;  
    cout<<"~ABC";}
```

```
    if(e[1][4])  
{if(ok) cout<<"+"  
    ok=1;  
    cout<<"~AB~C";}
```

```
    if(e[2][1])  
{if(ok) cout<<"+"  
    ok=1;  
    cout<<"A~B~C";}
```

```
        if(e[2][2])  
{if(ok) cout<<"+"  
    ok=1;
```

```
    cout<<"A~BC";}
        if(e[2][3])
{if(ok) cout<<"+";
    ok=1;
    cout<<"~A~BC";}
        if(e[2][4])
{if(ok) cout<<"+";
    ok=1;
    cout<<"~A~B~C";}
cout<<endl;
}}
```