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#include <fstream>
#include <cstring>
using namespace std;
int vei[3][5];
int main()
{
    ifstream f("date.in");
    ofstream g("date.out");
    int i,j,z=-1,t,k;
    char sfin[30],r[4]="ACA";
    for(k=1;k<=5;k++){
        f.getline(sfin,3);z--1;
        i=0;
        while(i<2)
        {
            j=4;
            if(sfin[i]>='0'&&sfim[i]<='9')
                while(sfin[i]>0&&j>0)
                    {vei[i+1][j]=sfin[i]%2;
                    sfin[i]=sfin[i]/2;
                    j--;}
            else
                switch (sfin[i]){
                    case 'A':{vei[i+1][1]=1;vei[i+1][3]=1;}break;
                    case 'B':{vei[i+1][1]=1;vei[i+1][3]=1;vei[i+1][4]=1;}break;
                    case 'C':{vei[i+1][1]=1;vei[i+1][2]=1;}break;
                    case 'D':{vei[i+1][1]=1;vei[i+1][2]=1;vei[i+1][4]=1;}break;
                    case 'E':{vei[i+1][1]=1;vei[i+1][2]=1;vei[i+1][3]=1;}break;
                    case 'F':{vei[i+1][1]=1;vei[i+1][2]=1;vei[i+1][3]=1;vei[i+1][4]=1;}break;}
            i++;
        }
        i=1;
        while(i<=2)
        {
            j=1;
            while(vei[i][j]==1&&j<=4)
                j++;
            if(j>4)
                {z++;
                if(i==1)
                    {sfin[z]='B';
                    for(t=1;t<=4;t++)
                        vei[1][t]=0;}
                else
                    {sfin[z]='~';z++;sfin[z]='B';
                    for(t=1;t<=4;t++)
                        vei[2][t]=0;
                    }
                z++;sfin[z]='+';}
            i++;}
        i=1;
        while(i<=3)
        {

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if(vei[1][i]==1&&vei[1][i+1]==1&&vei[2][i]==1&&vei[2][i+1]==1)
{z++;vei[1][i]=0;vei[1][i+1]=0;vei[2][i]=0;vei[2][i+1]=0;
  if(i==1)
    {sfin[z]='A';}
  else
    if(i==2)
      sfin[z]='C';
    else
      {sfin[z]='~';z++;sfin[z]='A';}
  z++;sfin[z]='+';}
i++;}
if(vei[1][1]==1&&vei[1][4]==1&&vei[2][1]==1&&vei[2][4]==1)
{z++;sfin[z]='~';z++;sfin[z]='C';z++;sfin[z]='+';
vei[1][1]=0;vei[1][4]=0;vei[2][1]=0;vei[2][4]=0;}
for(i=1;i<=2;i++)
  for(j=1;j<=3;j++)
    if(vei[i][j]==1&&vei[i][j+1]==1)
      {
        vei[i][j]=0;vei[i][j+1]=0;
        if(j==1 || j==3)
          {if(j==3)
            {z++;sfin[z]='~';}
          z++;sfin[z]=r[j-1];}
        if(i==1)
          {z++;sfin[z]='B';}
        else{z++;sfin[z]='~';z++;sfin[z]='B';}
        if(j==2)
          {z++;sfin[z]=r[j-1];}
        z++;sfin[z]='+';}
i=1;
while(i<=4)
  {if(vei[1][i]==1&&vei[2][i]==1)
    {vei[1][i]=0;vei[2][i]=0;
    switch(i){
      case 1:{z++;sfin[z]='A';z++;sfin[z]='~';sfin[z]='C';}break;
      case 2:{z++;sfin[z]='A';z++;sfin[z]='C';}break;
      case 3:{z++;sfin[z]='~';z++;sfin[z]='A';z++;sfin[z]='C';}break;
      case 4:{z++;sfin[z]='~';z++;sfin[z]='A';z++;sfin[z]='~';z++;sfin[z]='C';}break;}
    z++;sfin[z]='+';
  }
  i++;}
i=1;
while(i<=2)
  { if(vei[i][1]==1&&vei[i][4]==1)
    { vei[i][1]=0;vei[i][4]=0;
      if(i==1)
        {z++;sfin[z]='B';z++;sfin[z]='~';z++;sfin[z]='C';}
      else
        {z++;sfin[z]='~';z++;sfin[z]='B';z++;sfin[z]='~';z++;sfin[z]='C';}
      z++;sfin[z]='+';}
    i++;}
for(i=1;i<=2;i++)

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for(j=1;j<=4;j++)
  if(vei[i][j]==1)
    {if(j>=3)
      {z++;sfin[z]='~';}
      z++;sfin[z]='A';
      if(i==1)
        {z++;sfin[z]='B';}
        else{z++;sfin[z]='~';z++;sfin[z]='B';}
      if(j==1 || j==4)
        {z++;sfin[z]='~';}
        z++;sfin[z]='C';
        z++;sfin[z]='+';
      }
sfin[z]='\0';
g<<sfin;
g<<endl;
for(i=1;i<=2;i++)
  for(j=1;j<=4;j++)
    vei[i][j]=0;
}}
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