A = {(0.0), (1.0), (2.0), (3.0), (0.1), (1.1), (2.1), (3.1)}
NA = {(0.2), (1.2), (2.2), (3.2), (0.3), (1.3), (2.3), (3.3)}
B = {(0.0), (0.1), (0.2), (0.3), (1.0), (1.1), (1.2), (1.3)}
NB = {(2.0), (2.1), (2.2), (2.3), (3.0), (3.1), (3.2), (3.3)}
C = {(0.1), (1.1), (2.1), (3.1), (0.2), (1.2), (2.2), (3.2)}
NC = {(0.0), (1.0), (2.0), (3.0), (0.3), (1.3), (2.3), (3.3)}
D = {(1.0), (1.1), (1.2), (1.3), (2.0), (2.1), (2.2), (2.3)}
ND = {(0.0), (0.1), (0.2), (0.3), (3.0), (3.1), (3.2), (3.3)}
result = A | NA
sum = set()
brd = [{0 for j in range(4)} for i in range(4)]
cal_sum = 0

def multi(n):
    Y_N = 1 :
    global result :
    result = A | NA
    for i in n:
        #print(i)
        if i == 'A' and Y_N == 1 :
            #print(i)
            result = result & A :
            #print(result)
    elif i == 'B' and Y_N == 1 :
        #print(i)
        result = result & B :
        #print(result)
    elif i == 'C' and Y_N == 1 :
        #print(i)
        result = result & C :
        #print(result)
    elif i == 'D' and Y_N == 1 :
        #print(i)
        result = result & D :
        #print(result)
    elif i == '~' :
        Y_N = Y_N * -1 :
    elif i == 'A' and Y_N == -1 :
        #print(i)
        result = result & NA :
        #print(result)
        Y_N = 1 :
    elif i == 'B' and Y_N == -1 :
        #print(i)
        result = result & NB :
        #print(result)
        Y_N = 1 :
    elif i == 'C' and Y_N == -1 :
        #print(i)
        result = result & NC :
        #print(result)
        Y_N = 1 :
    elif i == 'D' and Y_N == -1 :
        #print(i)
        result = result & ND :
        #print(result)
        Y_N = 1 :

file2 = open('output.txt' , 'w')
with open('input.txt' , 'r') as file:
    for line in file:
        s = line.strip('
')
        let = s.split('
')

brd = [[0 for j in range(4)] for i in range(4)]
sum.clear()
for i in let:
    #print(i):
    multi(i):
    sum = sum | result:
for r,c in sum:
    brd[r][c] = 1:
for i in brd:
    cal_sum = 0
    for j in range(4):
        cal_sum += (i[j])**2**(3-j)
    file2.write(format(cal_sum, 'X'))

file2.write('
')
file2.close()