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for i in range(5):
    inp = input('Enter the input: ')
    int_ = int(inp , 16)
    #print(bin(int_))
    index = bin(int_)[2::]
    #print(index)
    if len(index) == 8 :
        #print(index)
        index
    else:
        while True:
            if len(index) != 8:
                index = '0' + index
                if len(index) == 8:
                    break
        #print(index)
    w = [[int(index[0]), int(index[1]), int(index[2]), int(index[3])],
[int(index[4]), int(index[5]), int(index[6]), int(index[7])]]
    #print(w)
    output_lis = ''
    if w == [[1,1,1,1], [1,1,1,1]]:
        print(True)
    if w[0][0] + w[0][1] + w[0][2] + w[0][3] == 4:
        a = 'B + '
        for i in range(1):
            output_lis = output_lis + a
            if (w[0][0] + w[0][1] + w[0][2] + w[0][3] == 4) == True:
                w[0][0] = 0
                w[0][1] = 0
                w[0][2] = 0
                w[0][3] = 0
    if w[1][0] + w[1][1] + w[1][2] + w[1][3] == 4:
        b = '~B + '
        for i in range(1):
            output_lis = output_lis + b
            if (w[1][0] + w[1][1] + w[1][2] + w[1][3] == 4) == True:
                w[1][0] = 0
                w[1][1] = 0
                w[1][2] = 0
                w[1][3] = 0
    if w[0][0] + w[0][1] + w[1][0] + w[1][1] == 4:
        c = 'A + '
        for i in range(1):
            output_lis = output_lis + c
            if (w[0][0] + w[0][1] + w[1][0] + w[1][1] == 4) == True:
                w[0][0] = 0
                w[0][1] = 0
                w[1][0] = 0
                w[1][1] = 0
    if w[0][1] + w[0][2] + w[1][1] + w[1][2] == 4:

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d = 'C + '
for i in range(1):
    output_lis = output_lis + d
    if (w[0][1] + w[0][2] + w[1][1] + w[1][2] == 4) == True:
        w[0][1] = 0
        w[0][2] = 0
        w[1][1] = 0
        w[1][2] = 0
if w[0][2] + w[0][3] + w[1][2] + w[1][3] == 4:
    e = '~A + '
    for i in range(1):
        output_lis = output_lis + e
        if (w[0][2] + w[0][3] + w[1][2] + w[1][3] == 4) == True:
            w[0][2] = 0
            w[0][3] = 0
            w[1][2] = 0
            w[1][3] = 0
if w[0][0] + w[0][3] + w[1][0] + w[1][3] == 4:
    f = '~C + '
    for i in range(1):
        output_lis = output_lis + f
        if (w[0][0] + w[0][3] + w[1][0] + w[1][3] == 4) == True:
            w[0][0] = 0
            w[0][3] = 0
            w[1][0] = 0
            w[1][3] = 0
if w[0][0] + w[0][1] == 2:
    g = 'AB + '
    for i in range(1):
        output_lis = output_lis + g
        if (w[0][0] + w[0][1] == 2) == True:
            w[0][0] = 0
            w[0][1] = 0
if w[0][1] + w[0][2] == 2:
    h = 'BC + '
    for i in range(1):
        output_lis = output_lis + h
        if (w[0][1] + w[0][2] == 2) == True:
            w[0][1] = 0
            w[0][2] = 0
if w[0][2] + w[0][3] == 2:
    a2 = '~AB + '
    for i in range(1):
        output_lis = output_lis + a2
        if (w[0][2] + w[0][3] == 2) == True:
            w[0][2] = 0
            w[0][3] = 0
if w[1][0] + w[1][1] == 2:
    j = 'A~B + '
    for i in range(1):

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        output_lis = output_lis + j
    if (w[1][0] + w[1][1] == 2) == True:
        w[1][0] = 0
        w[1][1] = 0
if w[1][1] + w[1][2] == 2:
    k = '~BC + '
    for i in range(1):
        output_lis = output_lis + k
    if (w[1][1] + w[1][2] == 2) == True:
        w[1][1] = 0
        w[1][2] = 0
if w[1][2] + w[1][3] == 2:
    l = '~A~B + '
    for i in range(1):
        output_lis = output_lis + l
    if (w[1][2] + w[1][3] == 2) == True:
        w[1][2] = 0
        w[1][3] = 0
if w[0][0] + w[1][0] == 2:
    m = 'A~C + '
    for i in range(1):
        output_lis = output_lis + m
    if (w[0][0] + w[1][0] == 2) == True:
        w[0][0] = 0
        w[1][0] = 0
if w[0][1] + w[1][1] == 2:
    n = 'AC + '
    for i in range(1):
        output_lis = output_lis + n
    if (w[0][1] + w[1][1] == 2) == True:
        w[0][1] = 0
        w[1][1] = 0
if w[0][2] + w[1][2] == 2:
    o = '~AC + '
    for i in range(1):
        output_lis = output_lis + o
    if (w[0][2] + w[1][2] == 2) == True:
        w[0][2] = 0
        w[1][2] = 0
if w[0][3] + w[1][3] == 2:
    p = '~A~C + '
    for i in range(1):
        output_lis = output_lis + p
    if (w[0][3] + w[1][3] == 2) == True:
        w[0][3] = 0
        w[1][3] = 0
if w[0][0] + w[0][3] == 2:
    q = 'B~C + '
    for i in range(1):
        output_lis = output_lis + q

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    if (w[0][0] + w[0][3] == 2) == True:
        w[0][0] = 0
        w[0][3] = 0
if w[1][0] + w[1][3] == 2:
    r = '~B~C + '
    for i in range(1):
        output_lis = output_lis + r
    if (w[1][0] + w[1][3] == 2) == True:
        w[1][0] = 0
        w[1][3] = 0
if w[0][0] == 1:
    s = 'AB~C + '
    for i in range(1):
        output_lis = output_lis + s
    if (w[0][0] == 1) == True:
        w[0][0] = 0
if w[0][1] == 1:
    t = 'ABC + '
    for i in range(1):
        output_lis = output_lis + t
    if (w[0][1] == 1) == True:
        w[0][1] = 0
if w[0][2] == 1:
    u = '~ABC + '
    for i in range(1):
        output_lis = output_lis + u
    if (w[0][2] == 1) == True:
        w[0][2] = 0
if w[0][3] == 1:
    v = '~AB~C + '
    for i in range(1):
        output_lis = output_lis + v
    if (w[0][3] == 1) == True:
        w[0][3] = 0
if w[1][0] == 1:
    w = 'A~B~C + '
    for i in range(1):
        output_lis = output_lis + w
    if (w[1][0] == 1) == True:
        w[1][0] = 0
if w[1][1] == 1:
    x = 'A~BC + '
    for i in range(1):
        output_lis = output_lis + x
        if (w[1][0] == 1) == True:
            w[1][0] = 0
if w[1][2] == 1:
    y = '~A~BC + '
    for i in range(1):
        output_lis = output_lis + y

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    if (w[1][2] == 1) == True:
        w[1][2] = 0
if w[1][3] == 1:
    z = '~A~B~C + '
    for i in range(1):
        output_lis = output_lis + z
    if (w[1][3] == 1) == True:
        w[1][3] = 0
output_str = output_lis[:-2:]
print(output_str)
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