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for i in range(5):
    first_hexa = input("Enter your Hexa-Decimal number: ")
    Split_1 = first_hexa[0]
    Split_2 = first_hexa[1]
    dec_1 = int(Split_1, 16)
    dec_2 = int(Split_2, 16)
    b_1 = (bin(dec_1))[2:]
    b_2 = (bin(dec_2))[2:]

    if b_1 != 4:
        remain_len = 4 - len(b_1)
        needed_zeros = ''
        for i in range(remain_len):
            needed_zeros += '0'
        b_1 = needed_zeros + b_1
    # print(b_1)
    if b_2 != 4:
        remain_len = 4 - len(b_2)
        needed_zeros_2 = ''
        for i in range(remain_len):
            needed_zeros_2 += '0'
        b_2 = needed_zeros_2 + b_2
    # print(b_2)
    end_result = []
    bin_1 = []
    bin_2 = []

    for x in range(0, len(b_1)):
        bin_1.append(b_1[x])
        bin_2.append(b_2[x])

    # print("1 ", bin_1)
    # print("2 ", bin_2)
    if int(bin_1[0]) + int(bin_1[1]) + int(bin_1[2]) + int(bin_1[3]) == 4:
        end_result.append('+B')
        bin_1[0] = "0"
        bin_1[1] = "0"
        bin_1[2] = "0"
        bin_1[3] = "0"
    if int(bin_2[0]) + int(bin_2[1]) + int(bin_2[2]) + int(bin_2[3]) == 4:
        end_result.append('~B')
        bin_2[0] = "0"
        bin_2[1] = "0"
        bin_2[2] = "0"
        bin_2[3] = "0"
    if int(bin_2[0]) + int(bin_2[1]) + int(bin_1[0]) + int(bin_1[1]) == 4:
        end_result.append('+A')
        bin_2[0] = "0"
        bin_2[1] = "0"
        bin_1[0] = "0"

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    bin_1[1] = "0"
if int(bin_2[2]) + int(bin_2[1]) + int(bin_1[2]) + int(bin_1[1]) == 4:
    end_result.append('+C')
    bin_2[2] = "0"
    bin_2[1] = "0"
    bin_1[1] = "0"
    bin_1[2] = "0"
if int(bin_2[2]) + int(bin_2[3]) + int(bin_1[2]) + int(bin_1[3]) == 4:
    end_result.append('+~A')
    bin_2[2] = "0"
    bin_2[3] = "0"
    bin_1[2] = "0"
    bin_1[3] = "0"
if int(bin_2[0]) + int(bin_2[3]) + int(bin_1[0]) + int(bin_1[3]) == 4:
    end_result.append('+~C')
    bin_2[0] = "0"
    bin_2[3] = "0"
    bin_1[0] = "0"
    bin_1[3] = "0"
if int(bin_1[0]) + int(bin_1[1]) == 2:
    end_result.append('+AB')
    bin_1[0] = "0"
    bin_1[1] = "0"
if int(bin_1[2]) + int(bin_1[1]) == 2:
    end_result.append('+BC')
    bin_1[2] = "0"
    bin_1[1] = "0"
if int(bin_1[2]) + int(bin_1[3]) == 2:
    end_result.append('+~AB')
    bin_1[2] = "0"
    bin_1[3] = "0"
if int(bin_2[0]) + int(bin_2[1]) == 2:
    end_result.append('+A~B')
    bin_2[0] = "0"
    bin_2[1] = "0"
if int(bin_2[2]) + int(bin_2[1]) == 2:
    end_result.append('+~BC')
    bin_2[2] = "0"
    bin_2[1] = "0"
if int(bin_2[2]) + int(bin_2[3]) == 2:
    end_result.append('+~A~B')
    bin_2[2] = "0"
    bin_2[3] = "0"
if int(bin_1[0]) + int(bin_2[0]) == 2:
    end_result.append('+A~C')
    bin_1[0] = "0"
    bin_2[0] = "0"
if int(bin_1[1]) + int(bin_2[1]) == 2:
    end_result.append('+AC')
    bin_1[1] = "0"

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    bin_2[1] = "0"
if int(bin_1[2]) + int(bin_2[2]) == 2:
    end_result.append('~AC')
    bin_1[2] = "0"
    bin_2[2] = "0"
if int(bin_1[3]) + int(bin_2[3]) == 2:
    end_result.append('~A~C')
    bin_1[3] = "0"
    bin_2[3] = "0"
if int(bin_1[0]) + int(bin_1[3]) == 2:
    end_result.append('~B~C')
    bin_1[0] = "0"
    bin_1[3] = "0"
if int(bin_2[0]) + int(bin_2[3]) == 2:
    end_result.append('~B~C')
    bin_2[0] = "0"
    bin_2[3] = "0"
if int(bin_1[0]) == 1:
    end_result.append('~AB~C')
    bin_1[0] = "0"
if int(bin_1[1]) == 1:
    end_result.append('~ABC')
    bin_1[1] = "0"
if int(bin_1[2]) == 1:
    end_result.append('~ABC')
    bin_1[2] = "0"
if int(bin_1[3]) == 1:
    end_result.append('~AB~C')
    bin_1[3] = "0"
if int(bin_2[0]) == 1:
    end_result.append('~A~B~C')
    bin_2[0] = "0"
if int(bin_2[1]) == 1:
    end_result.append('~A~BC')
    bin_2[1] = "0"
if int(bin_2[2]) == 1:
    end_result.append('~A~BC')
    bin_2[2] = "0"
if int(bin_2[3]) == 1:
    end_result.append('~A~B~C')
    bin_2[3] = "0"

final_str = ''
for i in end_result:
    final_str += i
print(final_str[1:])
print('Thank You!')

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