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70         integer_2_terms[cell_number] = ''
71         list2[cell_number] = '0'
72         list3[cell_number] = '0'
73     return t2
74
75 list1 = []
76 for z in range(5):
77     X = raw_input("Input a 2-character string in which each digit represents a decimal
78     digit. ")
79     list1.append(X)
80 for item in list1:
81     j = str(item)
82     list_of_j = list(j)
83     int1_binary = "{0:04b}".format(int(list_of_j[0], 16))
84     int2_binary = "{0:04b}".format(int(list_of_j[1], 16))
85     list2 = list(int1_binary)
86     list3 = list(int2_binary)
87     listA = ['A', 'A', '~A', '~A']
88     listC = ['~C', 'C', 'C', '~C']
89     integer_1_terms = []
90     integer_2_terms = []
91     for i in range(4):
92         if list2[i] == '0':
93             integer_1_terms.append('')
94         else:
95             integer_1_terms.append(listA[i] + 'B' + listC[i])
96     for k in range(4):
97         if list3[k] == '0':
98             integer_2_terms.append('')
99         else:
100            integer_2_terms.append(listA[k] + '~B' + listC[k])
101 result_string = ''
102 exit_loop = False
103 while exit_loop is False:
104     if item == "FF":
105         result_string = 1
106         integer_1_terms = []
107         integer_2_terms = []
108         exit_loop = True
109     elif list2 == ['1', '1', '1', '1'] :
110         result_string = "B"
111         integer_1_terms = []
112         group2_chk = False
113         i = 0
114         while group2_chk is False and i < 3:
115             if list3[i] == '1' and list3[i+1] == '1':
116                 list3[i] = '0'
117                 list3[i + 1] = '0'
118                 if i == 0:
119                     result_string = result_string + ' + ' + 'A~B'
120                     integer_2_terms[i] = ''
121                     integer_2_terms[i + 1] = ''
122                     group2_chk = True
123                 if i == 1:
124                     result_string = result_string + ' + ' + '~BC'
125                     integer_2_terms[i] = ''
126                     integer_2_terms[i + 1] = ''
127                     group2_chk = True
128                 if i == 2:
129                     result_string = result_string + ' + ' + '~A~B'
130                     integer_2_terms[i] = ''
131                     integer_2_terms[i + 1] = ''
132                     group2_chk = True
133                 i += 1
134             exit_loop = True
135     elif list3 == ['1', '1', '1', '1']:
136         result_string = "~B"
137         group2_chk = False
138         integer_2_terms = []

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138     i = 0
139     while group2_chk is False and i < 3:
140         if list2[i] == '1' and list2[i + 1] == '1':
141             list2[i] = '0'
142             list2[i + 1] = '0'
143             if i == 0:
144                 result_string = result_string + ' + ' + 'AB'
145                 integer_1_terms[i] = ''
146                 integer_1_terms[i + 1] = ''
147                 group2_chk = True
148             if i == 1:
149                 result_string = result_string + ' + ' + 'BC'
150                 integer_2_terms[i] = ''
151                 integer_2_terms[i + 1] = ''
152                 group2_chk = True
153             if i == 2:
154                 result_string = result_string + ' + ' + '~AB'
155                 integer_1_terms[i] = ''
156                 integer_1_terms[i + 1] = ''
157                 group2_chk = True
158         i += 1
159     exit_loop = True
160 elif list2[0] == '1' and list2[1] == '1' and list3[0] == '1' and list3[1] == '1':
161     result_string = "A"
162     integer_2_terms[0] = ''
163     integer_2_terms[1] = ''
164     integer_1_terms[0] = ''
165     integer_1_terms[1] = ''
166     n=2
167     checkbytype='col'
168     temp_result=''
169     while n <4:
170         temp_result = group2_process(checkbytype,n,temp_result)
171         if temp_result != '':
172             result_string = result_string + ' + ' + temp_result
173         n+= 1
174     exit_loop = True
175 elif list2[1] == '1' and list2[2] == '1' and list3[1] == '1' and list3[2] ==
176 '1':
177     result_string = "C"
178     integer_2_terms[1] = ''
179     integer_2_terms[2] = ''
180     integer_1_terms[1] = ''
181     integer_1_terms[2] = ''
182     if list2[3] == '1' and list3[3] == '1':
183         result_string = result_string + ' + ' + '~A~C'
184         integer_1_terms[3] = ''
185         integer_2_terms[3] = ''
186     exit_loop = True
187 elif list2[2] == '1' and list2[3] == '1' and list3[2] == '1' and list3[3] == '1':
188     result_string = "~A"
189     integer_2_terms[2] = ''
190     integer_2_terms[3] = ''
191     integer_1_terms[2] = ''
192     integer_1_terms[3] = ''
193     if list2[0] == '1' and list3[0] == '1':
194         result_string = result_string + ' + ' + 'A~C'
195         integer_1_terms[0] = ''
196         integer_2_terms[0] = ''
197     exit_loop = True
198 elif list2[0] == '1' and list2[3] == '1' and list3[0] == '1' and list3[3] == '1':
199     result_string = "~C"
200     integer_2_terms[0] = ''
201     integer_2_terms[3] = ''
202     integer_1_terms[0] = ''
203     integer_1_terms[3] = ''
204     exit_loop = True
205 else:
206     i = 0

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206     checkbytype=''
207     while i < 3:
208         temp_result = ''
209         checkbytype='row1'
210         temp_result = group2_process(checkbytype,i,temp_result)
211         if temp_result != '':
212             if result_string != '':
213                 result_string = result_string + ' + ' + temp_result
214             else:
215                 result_string = result_string + temp_result
216         i += 1
217     j=0
218     while j < 3:
219         temp_result = ''
220         checkbytype='row2'
221         temp_result = group2_process(checkbytype, j, temp_result)
222         if temp_result != '':
223             if result_string != '':
224                 result_string = result_string + ' + ' + temp_result
225             else:
226                 result_string = result_string + temp_result
227         j+=1
228     k=0
229     while k < 4:
230         temp_result = ''
231         checkbytype = 'col'
232         temp_result = group2_process(checkbytype, k, temp_result)
233         if temp_result != '':
234             if result_string != '':
235                 result_string = result_string + ' + ' + temp_result
236             else:
237                 result_string = result_string + temp_result
238         k +=1
239     if list2[0] == '1' and list2[3] == '1':
240         list2[0] = '0'
241         list2[3] = '0'
242         integer_1_terms [0] = ''
243         integer_1_terms [3] = ''
244         if result_string != '':
245             result_string = result_string + ' + ' + 'B~C'
246         else:
247             result_string = result_string + 'B~C'
248     if list3[0] == '1' and list3[3] == '1':
249         list3[0] = '0'
250         list3[3] = '0'
251         integer_2_terms[0] = ''
252         integer_2_terms[3] = ''
253         if result_string != '':
254             result_string = result_string + ' + ' + '~B~C'
255         else:
256             result_string = result_string + '~B~C'
257     exit_loop=True
258     for q in range(4):
259         if list2 != ['1','1','1','1']:
260             if integer_1_terms[q] != '':
261                 if result_string != '':
262                     result_string = result_string + ' + ' + integer_1_terms[q]
263                 else:
264                     result_string = result_string + integer_1_terms[q]
265     for r in range(4):
266         if list3 != ['1', '1', '1', '1']:
267             if integer_2_terms[r] != '':
268                 if result_string != '':
269                     result_string = result_string + ' + ' + integer_2_terms[r]
270             else:
271                 result_string = result_string + integer_2_terms[r]
272     print("OUTPUT: " + str(result_string))
273     result_string = ''

```