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1 Please refer to the precedence table in MSTC Question Set 3.
2 1. Evaluate the value in the 'rs' variable.
3 int a=10;
4 int b=20;
5 int c=30;
6 int d=25;
7 int e = 25;
8 int f=0;
9 int g=1;
10 int rs;
11 #####
12 1.1.
13 rs = a > b;
14 rs = a < b;
15 rs = a >= b;
16 rs = a <= b;
17 rs = a == b;
18 rs = a != b;
19 #####
20 1.2.
21 rs = d > e;
22 rs = d < e;
23 rs = d >= e;
24 rs = d <= e;
25 rs = d == e;
26 rs = d != e;
27 #####
28 1.3.
29 rs= f && f;
30 rs = f && g;
31 rs = g && f;
32 rs = g && g;
33 #####
34 1.4.
35 rs = f || f;
36 rs = f || g;
37 rs = g || f;
38 rs = g || g;
39 #####
40 1.5.
41 rs = !f;
42 rs = !g;
43 #####
44 1.6.
45 rs = f && !g;
46 rs = f || !g;
47 rs = !f && g;
48 rs = !f || g;
49 #####
50 1.7.
51 rs = !f && !g;
52 rs = !f || !g;
53 #####
54 1.8.
55 rs = f && g || e;
56 rs = f && (!g || e);
57 rs = f || g && e;
58 rs = (f || g) && e;
59 #####
60 1.9.
61 rs = (f && g) || (!f && !g);
62 rs = (f || g) && (f || g);
63 rs = (f && !g) || (!f && g);
64 rs = (f || !g) && (!f || g);
65 #####
66 1.10.
67 rs = !(a > b);
68 rs = !(a >= b);
69 rs = !(a < b);

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70  rs = !(a <= b);
71  rs = !(a == b);
72  rs = !(a != b);
73  rs = !(d == e);
74  rs = !(d != e);
75  #####
76  1.11
77  How to negative compound operations?
78  not(p and q) = (not p) or (not q)
79  not(p or q) = (not p) or (not q)
80
81  rs = (a > b) && (c > d);
82  rs = !((a > b) && (c > d));
83  rs = !(a > b) || !(c > d);
84  rs = (a <= b) || (c <= d);
85
86  rs = (a > b) || (c > d);
87  rs = !((a > b) || (c > d));
88  rs = !(a > b) && !(c > d);
89  rs = (a <= b) && (c <= d);
90  #####
91  1.12
92  Complex conditions
93  rs = (a > b) || (c <= d) || (d == e);
94  rs = (a < b) && (c > d) && (d == e);
95  rs = !(a < b) && !(c > d) && !(d == e);
96  rs = !(a < b) || !(c > d) || !(d == e);
97  rs = (a == b) || (b == c) || (c == d) || (d == e);
98  rs = (a == b) && (b == c) && (c == d) && (d == e);
99  #####
100  1.13 Write conditions in words.
101  -----
102  e.g
103  [1]
104
105  rs = (a > b) || (c <= d) || (d == e);
106  ANS:
107  rs
108
109  is assigned to the evaluation of
110
111  a is greater than b
112  OR
113  c is less than or equal to d
114  OR
115  d is equal to e.
116
117  [2] rs = !(a > b)
118  rs
119  is assigned to evaluation of
120  not of a is greater than b
121  -----
122  rs = a > b;
123  rs = a < b;
124  rs = a >= b;
125  rs = a <= b;
126  rs = a == b;
127  rs = a != b;
128
129  rs = d > e;
130  rs = d < e;
131  rs = d >= e;
132  rs = d <= e;
133  rs = d == e;
134  rs = d != e;
135
136  rs = f && f;
137  rs = f && g;
138  rs = g && f;

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139 rs = g && g;
140
141 rs = f || f;
142 rs = f || g;
143 rs = g || f;
144 rs = g || g;
145
146 rs = !f;
147 rs = !g;
148
149 rs = f && !g;
150 rs = f || !g;
151 rs = !f && g;
152 rs = !f || g;
153
154 rs = !f && !g;
155 rs = !f || !g;
156
157 rs = f && g || e;
158 rs = f && (!g || e);
159 rs = f || g && e;
160 rs = (f || g) && e;
161
162 rs = (f && g) || (!f && !g);
163 rs = (f || g) && (f || g);
164 rs = (f && !g) || (!f && g);
165 rs = (f || !g) && (!f || g);
166
167 rs = !(a > b);
168 rs = !(a >= b);
169 rs = !(a < b);
170 rs = !(a <= b);
171 rs = !(a == b);
172 rs = !(a != b);
173 rs = !(d == e);
174 rs = !(d != e);
175
176 rs = (a > b) && (c > d);
177 rs = !((a > b) && (c > d));
178 rs = !(a > b) || !(c > d);
179 rs = (a <= b) || (c <= d);
180
181 rs = (a > b) || (c > d);
182 rs = !((a > b) || (c > d));
183 rs = !(a > b) && !(c > d);
184 rs = (a <= b) && (c <= d);
185
186 rs = (a > b) || (c <= d) || (d == e);
187 rs = (a < b) && (c > d) && (d == e);
188 rs = !(a < b) && !(c > d) && !(d == e);
189 rs = !(a < b) || !(c > d) || !(d == e);
190 rs = (a == b) || (b == c) || (c == d) || (d == e);
191 rs = (a == b) && (b == c) && (c == d) && (d == e);
192 #####
193 1.14:
194 Let int x be a boolean variable, Meaning that it can store only 0 or 1.
195 The possible values of x are
196 x
197 0
198 1
199 -----
200 Let x and y be two boolean variables, meaning that both x and y can store only
201 0 or 1. Possible combinations of truth values of x and y are as follows
202
203 x   y
204 0   0
205 0   1
206 1   0
207 1   1

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208 -----
209 Let x, y and z be three boolean variables, meaning that all three variables
210 x, y and z can store only 0 or 1.
211 x   y   z
212 0   0   0
213 0   0   1
214 0   1   0
215 0   1   1
216
217 1   0   0
218 1   0   1
219 1   1   0
220 1   1   1
221
222 How to evaluate a boolean expression for all possible values of boolean variables
223 in it?
224
225 Consider boolean expression, x && y
226 value of x && y in all cases
227
228 x   y   x&&y
229 0   0   0
230 0   1   0
231 1   0   0
232 1   1   1
233
234 Now write down this in words
235 when x is 0 and y is 0 then x&&y is 0
236 when x is 0 and y is 1 then x&&y is 0
237 when x is 1 and y is 0 then x&&y is 0
238 when x is 1 and y is 1 then x&&y is 1
239
240 Consider following boolean expression,
241 x && y || !z
242 Let us evaluate above expression for all possible truth values of x, y, z
243
244 C1  C2  C3  C4 = !C3      C5=C1 && C2      C6=C5 || C4
245 x   y   z   !z      x&&y
246 0   0   0   1      0          1
247 0   0   1   0      0          0
248 0   1   0   1      0          1
249 0   1   1   0      0          0
250
251 1   0   0   1      0          1
252 1   0   1   0      0          0
253 1   1   0   1      0          1
254 1   1   1   0      1          1
255
256 Now write this in words
257
258 when x is 0 y is 0 and z is 0 then x&&y || !z is 1
259 when x is 0 y is 0 and z is 1 then x&&y || !z is 1
260 when x is 0 y is 1 and z is 0 then x&&y || !z is 1
261 when x is 0 y is 1 and z is 1 then x&&y || !z is 0
262 when x is 1 y is 0 and z is 0 then x&&y || !z is 1
263 when x is 1 y is 0 and z is 1 then x&&y || !z is 0
264 when x is 1 y is 1 and z is 0 then x&&y || !z is 1
265 when x is 1 y is 1 and z is 1 then x&&y || !z is 1
266 -----
267 Based on above examples calculate the following:
268 x && y
269 x && !y
270 !x && y
271 !x && !y
272
273 !(x && y)
274 !(x && !y)
275 !(!x && y)
276 !(x && !y)

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277
278 x || y
279 x || !y
280 !x || y
281 !x || !y
282
283 x && y && z
284 !x && y && !z
285 (x || y) && z
286 x && (y || z)
287
288 !x || y && !z
289 !x || !y || z
290 !x && (y && z) || (x && y)
291 (x && y) || (y && z) || (z && x)
292 (x || y) && (y || z) && (z || x)
293 #####
294 P 1.15
295
296 Solve the problem below with following values of a, b, c, d, e, f
297 Also, write each of the equations in words.
298
299 Set 1:
300     int a = 10, b = 20;
301     int c = 300, e = 200;
302     int e = 200, f = 200;
303
304 Set 2:
305     int a = 10, b = 25;
306     int c = 300, e = 20;
307     int e = 200, f = 205;
308
309 Set 3:
310     int a = 100, b = 25;
311     int c = 30, e = 200;
312     int e = 200, f = 205;
313
314 Set 4:
315     int a = 100, b = 25;
316     int c = 300, e = 20;
317     int e = 200, f = 205;
318
319 (a > b) && (c < d)
320 (a > b) && !(c < d)
321 !(a > b) && (c < d)
322 !(a > b) && !(c < d)
323
324 !((a > b) && (c < d))
325 !((a > b) && !(c < d))
326 !(a > b) && (c < d)
327 !((a > b) && !(c < d))
328
329 (a > b) || (c < d)
330 (a > b) || !(c < d)
331 !(a > b) || (c < d)
332 !(a > b) || !(c < d)
333
334 (a > b) && (c < d) && (c < d) && (e == f)
335 !(a > b) && (c < d) && !(e == f)
336 ((a > b) || (c < d)) && (e == f)
337 (a > b) && ((c < d) || (e == f))
338
339 !(a > b) || (c < d) && !(e == f)
340 !(a > b) || !(c < d) || (e == f)
341 !(a > b) && ((c < d) && (e == f)) || ((a > b) && (c < d))
342 ((a > b) && (c < d)) || ((c < d) && (e == f)) || ((e == f) && (a > b))
343 ((a > b) || (c < d)) && ((c < d) || (e == f)) && ((e == f) || (a > b))

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