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2  -- Name: Capt Jeff Falkinburg
3  -- Date: Spring 2016
4  -- Course: ECE 281
5  -- File: Lsn20_muxFour.vhd
6  -- HW:   Lecture 20
7  -- Purp: Structural implementation of a 4 to 1 Multiplexer
8  -- Doc:   None
9  -- Academic Integrity Statement: I certify that, while others may have
10 -- assisted me in brain storming, debugging and validating this program,
11 -- the program itself is my own work. I understand that submitting code
12 -- which is the work of other individuals is a violation of the honor
13 -- code. I also understand that if I knowingly give my original work to
14 -- another individual is also a violation of the honor code.
15 -----
16 library IEEE;
17 use IEEE.STD_LOGIC_1164.ALL;
18
19 entity muxFour is
20     Port ( A : in  STD_LOGIC;
21           B : in  STD_LOGIC;
22           C : in  STD_LOGIC;
23           D : in  STD_LOGIC;
24           S : in  STD_LOGIC_VECTOR (1 downto 0);
25           Y : out  STD_LOGIC);
26 end muxFour;
27
28 architecture Structural of muxFour is
29     component muxTwo
30         Port ( A : in  STD_LOGIC;
31               B : in  STD_LOGIC;
32               S : in  STD_LOGIC;
33               Y : out  STD_LOGIC);
34     end component;
35
36     component andTwo
37         Port ( A : in  STD_LOGIC;
38               B : in  STD_LOGIC;
39               Y : out  STD_LOGIC);
40     end component;
41
42     signal top, bottom, anded : std_logic;
43
44
45 begin
46
47     andGate: andTwo
48     port map ( A => C,
49               B => D,
50               Y => anded);
51 -- Can be written in short form like this:
52 -- andGate: andTwo port map (C, D, anded);
53     mux1: muxTwo
54     port map ( A => A,
55               B => B,
56               S => S(0),
57               Y => top);
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58     mux2:      muxTwo
59     port map (  A => C,
60                 B => anded,
61                 S => S(0),
62                 Y => bottom);
63     mux3:      muxTwo
64     port map (  A => top,
65                 B => bottom,
66                 S => S(1),
67                 Y => Y);
68
69 end Structural;
70
```