D0011E

Lab 2

# Part 1

library ieee; -- Load the ieee 1164 library

use ieee.std\_logic\_1164.all; -- Make the package 'visible'

-- The top level entity of the test bench has no ports...

entity bcdcheck2\_tb is

end bcdcheck2\_tb;

architecture stimulus of bcdcheck2\_tb is

-- First, declare the lower-level entity...

component bcdcheck2

port(x : in std\_logic\_vector(3 downto 0);

max, min, even, lo3, noBCD : out STD\_LOGIC);

end component;

-- Next, declare some local signals to assign values to and observe...

signal x : std\_logic\_vector(3 downto 0);

signal max, min, even, lo3, noBCD : STD\_LOGIC;

begin

-- Create an instance of the component under test

bcdcheck2\_instance: bcdcheck2 port map( x => x, max => max, min=>min, even=>even, lo3=>lo3, noBCD => noBCD);

-- Now define a process to apply some stimulus over time...

process

constant PERIOD: time := 40 ns;

begin

x <= "0000";

wait for PERIOD;

x <= "0001";

wait for PERIOD;

x <= "0010";

wait for PERIOD;

x <= "0011";

wait for PERIOD;

x <= "0100";

wait for PERIOD;

x <= "0101";

wait for PERIOD;

x <= "0110";

wait for PERIOD;

x <= "0111";

wait for PERIOD;

x <= "1000";

wait for PERIOD;

x <= "1001";

wait for PERIOD;

x <= "1010";

wait for PERIOD;

x <= "1011";

wait for PERIOD;

x <= "1100";

wait for PERIOD;

x <= "1101";

wait for PERIOD;

x <= "1110";

wait for PERIOD;

x <= "1111";

wait for PERIOD;

-- put breakpoint to line below

wait for PERIOD;

end process;

end stimulus;

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Input (x) | max | min | even | lo3 | noBCD | hieq3 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 | 0 | 0 | 1 | 1 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4 | 0 | 0 | 1 | 0 | 0 | 1 |
| 5 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8 | 0 | 0 | 1 | 0 | 0 | 1 |
| 9 | 1 | 0 | 0 | 0 | 0 | 1 |
| 10 (A) | 0 | 0 | 1 | 0 | 1 | 0 |
| 11 (B) | 0 | 0 | 0 | 0 | 1 | 0 |
| 12 (C) | 0 | 0 | 1 | 0 | 1 | 0 |
| 13 (D) | 0 | 0 | 0 | 0 | 1 | 0 |
| 14 (E) | 0 | 0 | 1 | 0 | 1 | 0 |
| 15 (F) | 0 | 0 | 0 | 0 | 1 | 0 |

# Part 3

Y

CD \ AB

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 |

00 01 11 10

00

01

11

10