```
1   --------------------------------------------------------------------------------
2   -- Company:
3   -- Engineer:
4   --
5   -- Create Date:   12:41:02 05/20/2021
6   -- Design Name:
7   -- Module Name:   C:/Xilinx/14.7/VHDL_Design_Project/TB_TrafficLights.vhd
8   -- Project Name:  VHDL_Design_Project
9   -- Target Device:
10  -- Tool versions:
11  -- Description:
12  --
13  -- VHDL Test Bench Created by ISE for module: TrafficLights
14  --
15  -- Dependencies:
16  --
17  -- Revision:
18  -- Revision 0.01 - File Created
19  -- Additional Comments:
20  --
21  -- Notes:
22  -- This testbench has been automatically generated using types std_logic and
23  -- std_logic_vector for the ports of the unit under test.  Xilinx recommends
24  -- that these types always be used for the top-level I/O of a design in order
25  -- to guarantee that the testbench will bind correctly to the post-implementation
26  -- simulation model.
27  --------------------------------------------------------------------------------
28  LIBRARY ieee;
29  USE ieee.std_logic_1164.ALL;
30
31  -- Uncomment the following library declaration if using
32  -- arithmetic functions with Signed or Unsigned values
33  --USE ieee.numeric_std.ALL;
34
35  ENTITY TB_TrafficLights IS
36  END TB_TrafficLights;
37
38  ARCHITECTURE behavior OF TB_TrafficLights IS
39
40      -- Component Declaration for the Unit Under Test (UUT)
41
42      COMPONENT TrafficLights
43      PORT(
44           reset : IN  std_logic;
45           clock : IN  std_logic;
46           FourHzPulse : IN  std_logic; -- 4Hz Pulse --
47           Flash : IN  std_logic; -- Train Button --
48           TrafficGreen : IN  std_logic; -- Car Button --
49           PedGreen : IN  std_logic; -- Pedestrian Button --
50           MotorEnable : OUT  std_logic; -- Enable The Stepper Motor To Rotate --
51           MotorClockwise : OUT  std_logic; -- Direction Of Rotation For Stepper Motor--
52           HTrafficLightOutput : OUT  std_logic_vector(1 downto 0); -- Output for
    Horizontal Traffic Light --
53           VTrafficLightOutput : OUT  std_logic_vector(1 downto 0) -- Output for
    Vertical Traffic Light --
54          );
55      END COMPONENT;
```

```
56
57
58      --Inputs
59      signal reset : std_logic := '0';
60      signal clock : std_logic := '0';
61      signal FourHzPulse : std_logic := '0';
62      signal Flash : std_logic := '0';
63      signal TrafficGreen : std_logic := '0';
64      signal PedGreen : std_logic := '0';
65
66      --Outputs
67      signal MotorEnable : std_logic;
68      signal MotorClockwise : std_logic;
69      signal HTrafficLightOutput : std_logic_vector(1 downto 0);
70      signal VTrafficLightOutput : std_logic_vector(1 downto 0);
71
72      -- Clock period definitions
73      constant clock_period : time := 10 ns;
74
75   BEGIN
76
77      -- Instantiate the Unit Under Test (UUT)
78      uut: TrafficLights PORT MAP (
79             reset => reset,
80             clock => clock,
81             FourHzPulse => FourHzPulse,
82             Flash => Flash,
83             TrafficGreen => TrafficGreen,
84             PedGreen => PedGreen,
85             MotorEnable => MotorEnable,
86             MotorClockwise => MotorClockwise,
87             HTrafficLightOutput => HTrafficLightOutput,
88             VTrafficLightOutput => VTrafficLightOutput
89           );
90
91      -- Clock process definitions
92      clock_process :process
93      begin
94         clock <= '0';
95         wait for clock_period/2;
96         clock <= '1';
97         wait for clock_period/2;
98      end process;
99
100     -- 4 Hz Pulse --
101     FourHzPulse_process :process
102     begin
103        FourHzPulse <= '0';
104        wait for 2.5 ns ;
105        FourHzPulse <= '1';
106        wait for clock_period/2;
107     end process;
108
109     -- Stimulus process
110     stim_proc: process
111     begin
112        -- hold reset state for 100 ns.
```

```
113         reset <= '1';
114         wait for 100 ns;
115         reset <= '0';
116 
117         -- insert stimulus here --
118 
119         -- When Train Button Is Pressed --
120         wait for clock_period*10;
121         Flash <= '1';
122         TrafficGreen <= '0';
123         PedGreen <= '0';
124 
125         -- When Car Button Is Pressed --
126         wait for clock_period*10;
127         Flash <= '0';
128         TrafficGreen <= '1';
129         PedGreen <= '0';
130 
131         -- When Pedestrian Button Is Pressed --
132         wait for clock_period*10;
133         Flash <= '0';
134         TrafficGreen <= '0';
135         PedGreen <= '1';
136 
137         -- When Train Button Is Pressed --
138         wait for clock_period*10;
139         Flash <= '1';
140         TrafficGreen <= '0';
141         PedGreen <= '0';
142 
143         wait;
144      end process;
145 
146   END;
```