1 project_test.vhd

```
--TESTBENCH

LIBRARY IEEE;
USE IEEE.std_logic_1164.all;

     --ENTITY OF MY BLOCK
entity project_tb is

END project_tb;


architecture ProjectTest of project_tb is

--AN ISTANCE OF MY COMPONENT
Component project

        port (
    p_in    : in std_logic_vector;
    q_in    : in std_logic_vector;
    output  : out std_logic_vector);
end Component;

CONSTANT N       :  INTEGER  := 2;       -- Bus Width
CONSTANT N_BIT   :  INTEGER  := 9;
    CONSTANT MckPer: Time:= 1000 ns;
    CONSTANT TestLen: Integer:=24;

    ---- INPUT SIGNAL
    SIGNAL clk  : std_logic := '0';
    SIGNAL p_in_tb: std_logic_vector (0 to N_BIT):="0000000000";
    SIGNAL q_in_tb: std_logic_vector (0 to N_BIT):="0000000000";

    ---- OUTPUT SIGNAL
    SIGNAL output_tb : std_logic_vector (0 to N_BIT);
    SIGNAL clk_cycle: Integer;
    SIGNAL Testing: Boolean:=true;

    begin
        I : project
        port map(p_in_tb,q_in_tb,output_tb); --

    clk <=Not clk after MckPer/2 when Testing else '0';
        Test_Proc: process(clk)
         VARIABLE count: INTEGER:=0;
        BEGIN
            clk_cycle <=  (count+1)/2;
            CASE count IS

                --corner cases
                --p and q both 0
         WHEN  2   => p_in_tb  <= "1111111111";    q_in_tb <= "0000000000";
         WHEN  4   => p_in_tb  <= "1111111111";    q_in_tb <= "1111111111";
         WHEN  6   => p_in_tb  <= "0111111111";    q_in_tb <= "0000000001";
         WHEN  8   => p_in_tb  <= "0111111111";    q_in_tb <= "0111111111";

         WHEN  10   => p_in_tb  <= "0000000000";       q_in_tb <= "1000000000"
; --PARTICOULAR CASE


            --|P|=4 |Q|=290
```

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         WHEN  12   => p_in_tb  <= "1111111100";       q_in_tb <= "1011011110"
; --P AND Q NEG. |P|<|Q|
         --|P|=16  --|Q|=16
         WHEN  14   => p_in_tb  <= "1111110000";       q_in_tb <= "1111110000"
; --P AND Q NEG. |P|=|Q|
          --|P|=16 |Q|=8
         WHEN  16   => p_in_tb  <= "1111110000";       q_in_tb <= "1111111100"
; --P AND Q NEG. |P|>|Q|
           --p=50 q=4
         WHEN  18   => p_in_tb  <= "0000110010";       q_in_tb <= "0000000100"
; --P AND Q POS. P>Q
         --p=15 q=15
         WHEN  20   => p_in_tb  <= "0000001111";       q_in_tb <= "0000001111"
; --P AND Q POS. P=Q
          --p=70 q=221
         WHEN  22   => p_in_tb  <= "0001000110";       q_in_tb <= "0011011101"
; --P AND Q POS. P<Q

          WHEN (TestLen - 1) =>   Testing <= False;
          WHEN OTHERS => NULL;
     END CASE;

     count:= count + 1;
   END PROCESS Test_Proc;
   End ProjectTest;
```