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1  /*-------------------------------------------------------------------------------
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3  CLass: EE417 Summer 2024
4  Lesson 06 HW Question 1
5  Group: Ron Kalin/ Lamin Jammeh
6  Project Description: This is the main module, it counts the number of 0s in the input
7  data and displays the results
8  Note that the word_size is Parameterize so it can change without causing an error in the
   code
9  -------------------------------------------------------------------------------*/
10
11 /*----------16 bits Word_size Trial--------------*/
12 module count_0s #(
13                         parameter   word_size  = 16,           //change as you wish
14                         parameter   count_size = 5             //count size should be at
   least 16 to accomodate for both 8bit and 16bit word_size
15                         )
16                        (
17                         input    [word_size -1: 0] data_in,                  //data_in =
   [15:0]
18                         output   reg   [count_size -1:0] total_zeros
19                         );
20 integer  index;     //define index as integer to shift through the data_in
21
22
23 //define an always block and write the conditions for the output or behavior of the system
24 always   @ (data_in)                    //look for change in data_in
25    begin:   count_zeros                 //name the begine block as count_ones
26       total_zeros = 0;                        //start total_zeros at 0
27       for (index = 0;      index < word_size;   index = index + 1)      //start index from
   0 to word_size and increment by 1
28          begin
29             if (data_in[index] == 0)                                    //check each
   index of data for 0s
30                begin
31                total_zeros = total_zeros + 1;
   //increment count by 1 once a 0 is encounter at an index in data_in
32                end
33          end
34    end
35 endmodule
```