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1 ///////////////////////////////////////////////////////////////////
2 //                                                                    //
3 // File name : scoreboard.sv                                          //
4 // Author    : G. Andres Mancera                                     //
5 // License   : GNU Lesser General Public License                    //
6 // Course    : Advanced Verification with SystemVerilog OOP         //
7 //           : Testbench - UCSC Silicon Valley Extension            //
8 //                                                                    //
9 //////////////////////////////////////////////////////////////////////
10
11 class scoreboard;
12
13     mailbox      rcv_from_drv;
14     mailbox      rcv_from_mon;
15     int unsigned num_of_mismatches;
16
17     coverage      cov = new();
18
19     // Constructor
20     function new( input mailbox drv2sb, input mailbox mon2sb );
21         $display("SCBD :: inside new() function");
22         this.rcv_from_drv  = drv2sb;
23         this.rcv_from_mon  = mon2sb;
24         num_of_mismatches  = 0;
25     endfunction : new
26
27     // Class methods
28     task compare( input mailbox rcv_from_drv,
29                 input mailbox rcv_from_mon );
30
31         packet      drv_pkt;
32         packet      mon_pkt;
33         int unsigned error;
34
35         forever begin
36             error = 0;
37
38             // Get the packet from the driver through the mailbox.
39             rcv_from_drv.get(drv_pkt);
40             //drv_pkt.print("SCBD EXPECTED");
41
42             // Get the packet from the monitor through the mailbox.
43             rcv_from_mon.get(mon_pkt);
44             //mon_pkt.print("SCBD ACTUAL");
45
46             error = compare_driver_and__monitor_packets(drv_pkt, mon_pkt);
47             if ( error ) begin
48                 num_of_mismatches++;
49             end
50             else begin
51                 $display("SCBD :: t=%2t, EXPECTED AND ACTUAL PACKETS MATCH", $time);
52             end
53
54             // Collect coverage info based on the packet received from the driver
55             cov.collect_coverage(drv_pkt);
56         end
57
58     endtask : compare
59
60

```

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61  function int unsigned compare_driver_and__monitor_packets( input packet drv_pkt,
62                                                            input packet mon_pkt
63  );
64      int unsigned    error;
65      if ( drv_pkt.mac_dst_addr != mon_pkt.mac_dst_addr ) begin
66          $display("SCBD ERROR :: t=%2t, PACKET MAC_DST_ADDR MISMATCH!, EXPECTED=%h,
67          ACTUAL=%h",
68                  $time, drv_pkt.mac_dst_addr, mon_pkt.mac_dst_addr );
69          error++;
70      end
71      if ( drv_pkt.mac_src_addr != mon_pkt.mac_src_addr ) begin
72          $display("SCBD ERROR :: t=%2t, PACKET MAC_SRC_ADDR MISMATCH!, EXPECTED=%h,
73          ACTUAL=%h",
74                  $time, drv_pkt.mac_src_addr, mon_pkt.mac_src_addr );
75          error++;
76      end
77      if ( drv_pkt.ether_type != mon_pkt.ether_type ) begin
78          $display("SCBD ERROR :: t=%2t, PACKET ETHER_TYPE MISMATCH!, EXPECTED=%h,
79          ACTUAL=%h",
80                  $time, drv_pkt.ether_type, mon_pkt.ether_type );
81          error++;
82      end
83      if ( drv_pkt.payload.size() > mon_pkt.payload.size() ) begin
84          $display("SCBD ERROR :: t=%2t, PAYLOAD TX SIZE=%0d; RX SIZE=%0d, BYTES
85          DROPPED!",
86                  $time, drv_pkt.payload.size(), mon_pkt.payload.size() );
87          error++;
88      end
89      else begin
90          for ( int i=0; i<mon_pkt.payload.size(); i++ ) begin
91              //$display("SCBD DEBUG :: COMPARE PAYLOAD[%0d] : DRIVER=%h, MONITOR=%h",
92              //          i, drv_pkt.payload[i], mon_pkt.payload[i] );
93              if ( i<drv_pkt.payload.size() ) begin
94                  if ( drv_pkt.payload[i] != mon_pkt.payload[i] ) begin
95                      $display("SCBD ERROR :: t=%2t, PACKET PAYLOAD[%0d] MISMATCH!,
96                      EXPECTED=%h, ACTUAL=%h",
97                              $time, i, drv_pkt.payload[i], mon_pkt.payload[i] );
98                      error++;
99                  end
100              end
101          end
102          else begin
103              if ( mon_pkt.payload[i] != 8'h0 ) begin
104                  $display("SCBD ERROR :: t=%2t, PACKET PAYLOAD[%0d] MISMATCH!,
105                  EXPECTED=%h, ACTUAL=%h",
106                          $time, i, 8'h0, mon_pkt.payload[i] );
107                  error++;
108              end
109          end
110      end
111      return (error);
112  endfunction : compare_driver_and__monitor_packets
113
114 endclass
115
116

```