

DENSITY BASED TRAFFIC CONTROL SYSTEM

Verilog code:-

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1. module tlc(s,rst,t1,t2,t3,t4);
2. input [1:4]s;
3.   output reg [1:3] t1,t2,t3,t4;
4.   always @(*)
5.     begin
6.       if(rst==0)
7.         begin
8.           t1=3'b000;
9.           t2=3'b000;
10.          t3=3'b000;
11.          t4=3'b000;
12.        end
13.      else
14.        begin
15.          if(s==4'b0000|s==4'b1111) // when all
            roads having heavy traffic
16.            begin // FIXED TIME
              CONCEPT (30 sec) for each junction
17.                t1=3'b001;
18.                t2=3'b100;
19.                t3=3'b100;
20.                t4=3'b100;
21.                #20 t2=3'b010;
22.                #10 t1=3'b100;
23.                t2=3'b001;
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24.          #20 t3=3'b010;
25.          #10 t2=3'b100;
26.          t3=3'b001;
27.          #20 t4=3'b010;
28.          #10 t3=3'b100;
29.          t4=3'b001;
30.          end
31.          else if(s==4'b0001) // when sensor 1
           detects high traffic on road 1
32.          begin          // then more delay to
           green light on road 1
33.          t1=3'b001;
34.          t2=3'b100;
35.          t3=4'b100;
36.          t4=4'b100;
37.          #40 $moniter("traffic cleared");
38.          end
39.          else if(s==4'b0010) // when sensor 2
           detects high traffic on road 2
40.          // then more delay to
           green light on road 2
41.
42.          begin
43.          t1=3'b100;
44.          t2=3'b001;
45.          t3=4'b100;
46.          t4=4'b100;
47.          #40 $moniter("traffic cleared");
48.          end
49.          else if(s==4'b0100) // when sensor 3
           detects high traffic on road 3

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50.                                     // then more delay to
    green light on road 3
51.
52.             begin
53.                 t1=3'b100;
54.                 t2=3'b100;
55.                 t3=4'b001;
56.                 t4=4'b100;
57.                 #40 $moniter("traffic cleared");
58.             end
59.             else if(s==4'b1000) // when sensor 4
    detects high traffic on road 4
60.                                     // then more delay to
    green light on road 4
61.
62.             begin
63.                 t1=3'b100;
64.                 t2=3'b100;
65.                 t3=4'b100;
66.                 t4=4'b001;
67.                 #40 $moniter("traffic cleared");
68.             end
69.             else if(s==4'b0011) // when sensor 1
    and sensor 2 detects high traffic on road 1 and 2
70.                                     // then more delay to
    green light on road 1 followed by green light on road 2
71.
72.             begin
73.                 t1=3'b001;
74.                 t2=3'b100;
75.                 t3=4'b100;

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76.          t4=4'b100;
77.          #30 t2=3'b010;
78.          #10 t1=3'b100;
79.          t2=3'b001;
80.          #40 $moniter("traffic cleared");
81.      end
82.      else if(s==4'b0101) // when sensor 1
      and sensor 3 detects high traffic on road 1 and 3
83.          // then more delay to
      green light on road 1 followed by green light on road 3
84.
85.          begin
86.              t1=3'b001;
87.              t2=3'b100;
88.              t3=4'b100;
89.              t4=4'b100;
90.              #30 t3=3'b010;
91.              #10 t1=3'b100;
92.              t3=3'b001;
93.              #40 $moniter("traffic cleared");
94.          end
95.      else if(s==4'b0110) // when sensor 2
      and sensor 3 detects high traffic on road 2 and 3
96.          // then more delay to
      green light on road 2 followed by green light on road 3
97.
98.          begin
99.              t1=3'b100;
100.             t2=3'b001;
101.             t3=4'b100;
102.             t4=4'b100;
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103.          #30 t3=3'b010;
104.          #10 t2=3'b100;
105.          t3=3'b001;
106.          #40 $moniter("traffic cleared");
107.      end
108.      else if(s==4'b1001) // when sensor 1
        and sensor 4 detects high traffic on road 1 and 4
109.          // then more delay to
        green light on road 1 followed by green light on road 4
110.
111.      begin
112.          t1=3'b001;
113.          t2=3'b100;
114.          t3=4'b100;
115.          t4=4'b100;
116.          #30 t4=3'b010;
117.          #10 t1=3'b100;
118.          t4=3'b001;
119.          #40 $moniter("traffic cleared");
120.      end
121.      else if(s==4'b1010) // when sensor 2
        and sensor 4 detects high traffic on road 2 and 4
        respectively
122.          // then more delay to
        green light on road 2 followed by green light on road 4
123.
124.      begin
125.          t1=3'b100;
126.          t2=3'b001;
127.          t3=4'b100;
128.          t4=4'b100;

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129.          #30 t4=3'b010;
130.          #10 t2=3'b100;
131.          t4=3'b001;
132.          #40 $moniter("traffic cleared");
133.          end
134.          else if(s==4'b1100) // when sensor 3
            and sensor 4 detects high traffic on road 3 and 4
            respectively
135.          // then more delay to
            green light on road 3 followed by green light on road 4
136.
137.          begin
138.          t1=3'b100;
139.          t2=3'b100;
140.          t3=4'b001;
141.          t4=4'b100;
142.          #30 t4=3'b010;
143.          #10 t3=3'b100;
144.          t4=3'b001;
145.          #40 $moniter("traffic cleared");
146.          end
147.          else if(s==4'b0111) // when sensor
            2,3,4 detects high traffic on road 2,3,4 respectively
148.          // then more delay to
            green light on road 2 followed by green light on road
            3,4
149.
150.          begin
151.          t1=3'b001;
152.          t2=3'b100;
153.          t3=4'b100;

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154.          t4=4'b100;
155.          #30 t2=3'b010;
156.          #10 t1=3'b100;
157.          t2=3'b001;
158.          #30 t3=3'b010;
159.          #10 t2=3'b100;
160.          t3=3'b001;
161.          #40 $moniter("traffic cleared");
162.          end
163.          else if(s==4'b1011) // when sensor
    1,2,4 detects high traffic on road 1,2,4 respectively
164.          // then more delay to
    green light on road 1 followed by green light on road
    2,4
165.
166.          begin
167.          t1=3'b001;
168.          t2=3'b100;
169.          t3=4'b100;
170.          t4=4'b100;
171.          #30 t2=3'b010;
172.          #10 t1=3'b100;
173.          t2=3'b001;
174.          #30 t4=3'b010;
175.          #10 t2=3'b100;
176.          t4=3'b001;
177.          #40 $moniter("traffic cleared");
178.          end
179.          else if(s==4'b1101) // when sensor
    1,3,4 detects high traffic on road 1,3,4 respectively
180.          // then more delay to

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green light on road 1 followed by green light on road
3,4

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181.  
182.          begin  
183.          t1=3'b001;  
184.          t2=3'b100;  
185.          t3=4'b100;  
186.          t4=4'b100;  
187.          #30 t3=3'b010;  
188.          #10 t1=3'b100;  
189.          t3=3'b001;  
190.          #30 t4=3'b010;  
191.          #10 t3=3'b100;  
192.          t4=3'b001;  
193.          #40 $monitor("traffic cleared");  
194.          end  
195.          else if(s==4'b1110) // when sensor  
    2,3,4 detects high traffic on road 2,3,4 respectively  
196.          // then more delay to  
    green light on road 2 followed by green light on road  
    3,4
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```
197.  
198.          begin  
199.          t1=3'b100;  
200.          t2=3'b001;  
201.          t3=4'b100;  
202.          t4=4'b100;  
203.          #30 t3=3'b010;  
204.          #10 t2=3'b100;  
205.          t3=3'b001;  
206.          #30 t4=3'b010;
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207.                #10 t3=3'b100;
208.                t4=3'b001;
209.                #40 $monitor("traffic cleared");
210.            end
211.        end
212.    end
213. endmodule

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Result:-

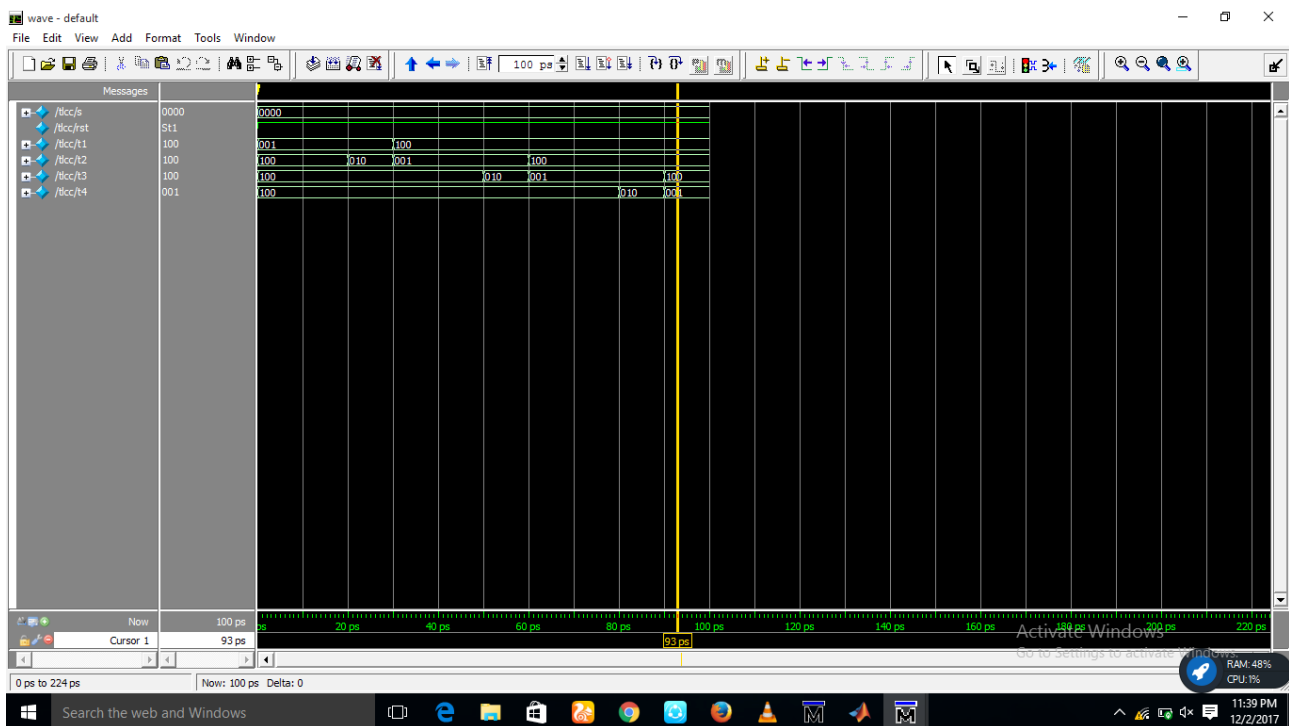


Fig.1 S=0000,rst=1

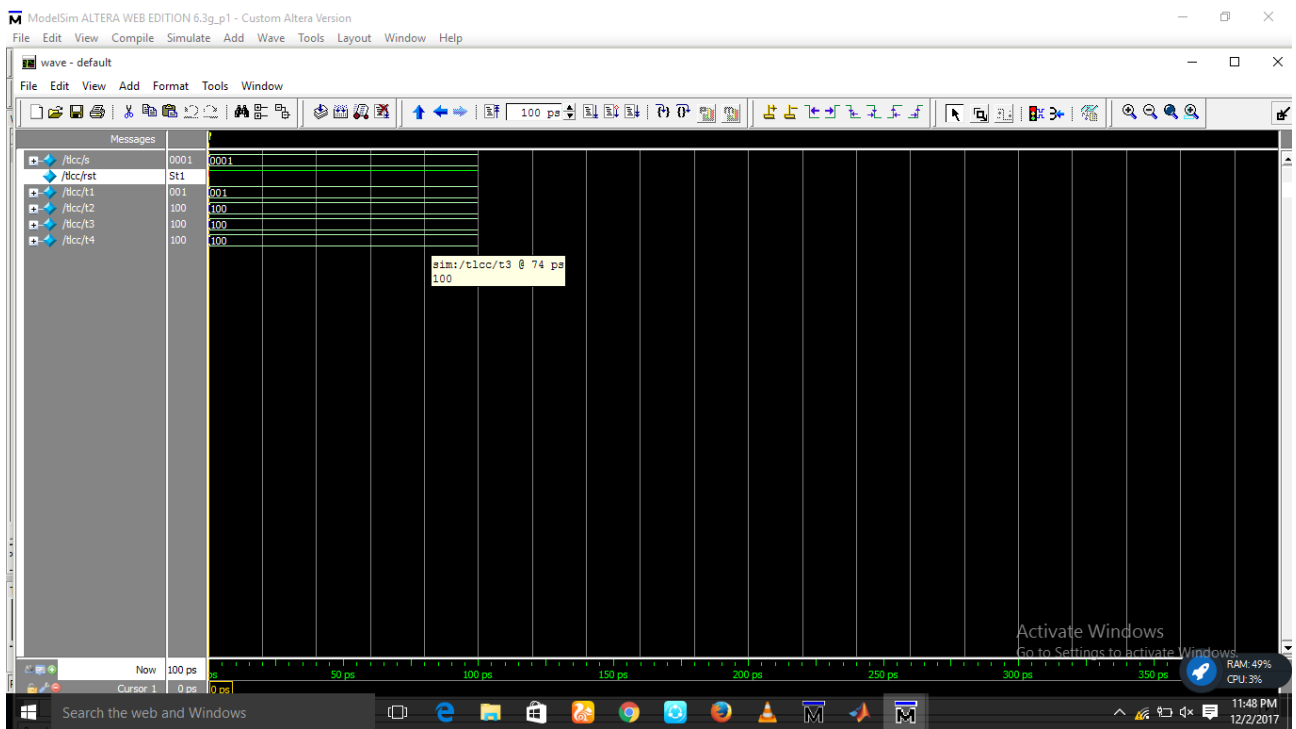


Fig 2.S=0001,rst=1

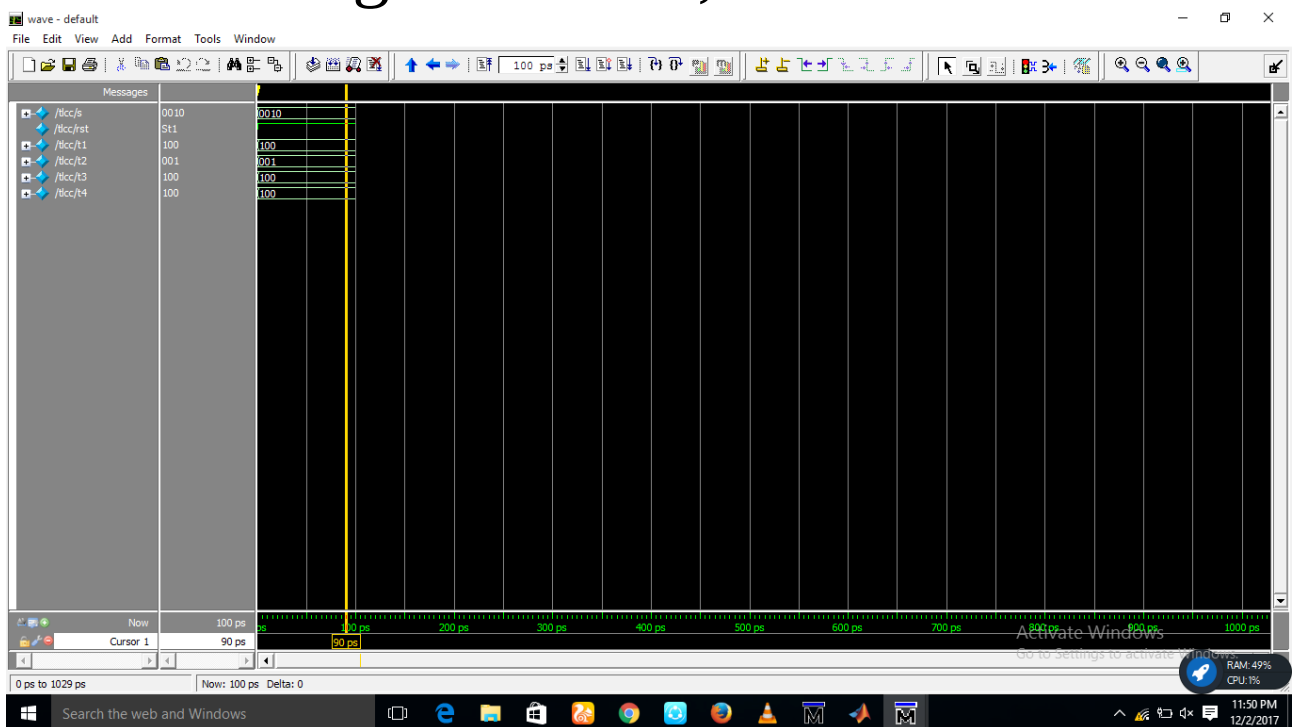


Fig 3.S=0010,rst=1

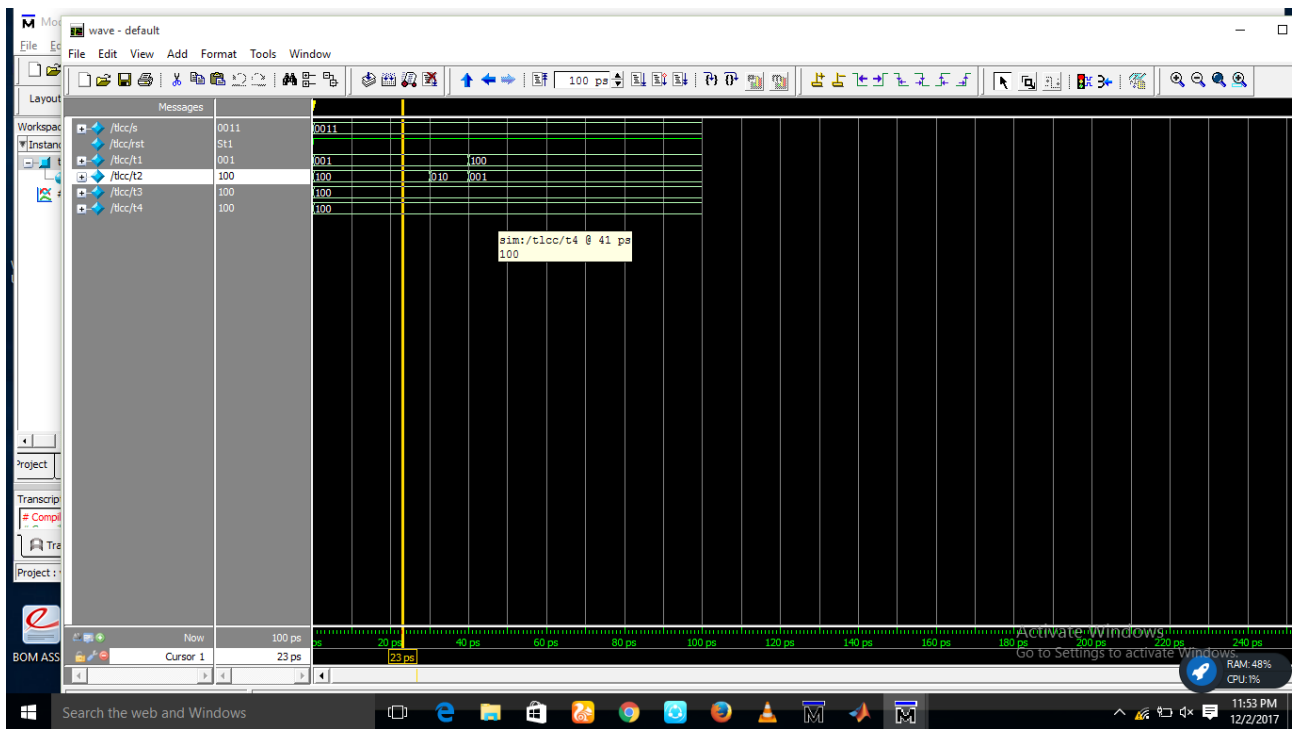


Fig 4. $S=0011, rst=1$

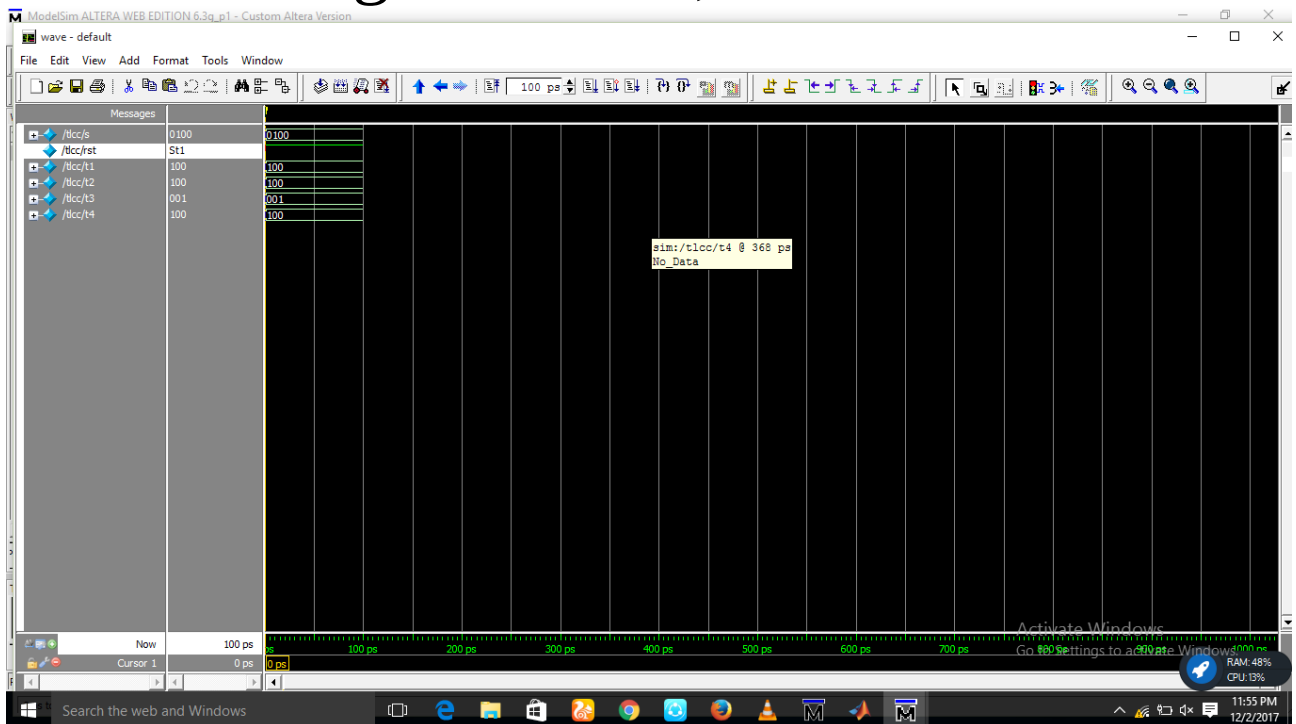


Fig 5. $S=0100, rst=1$

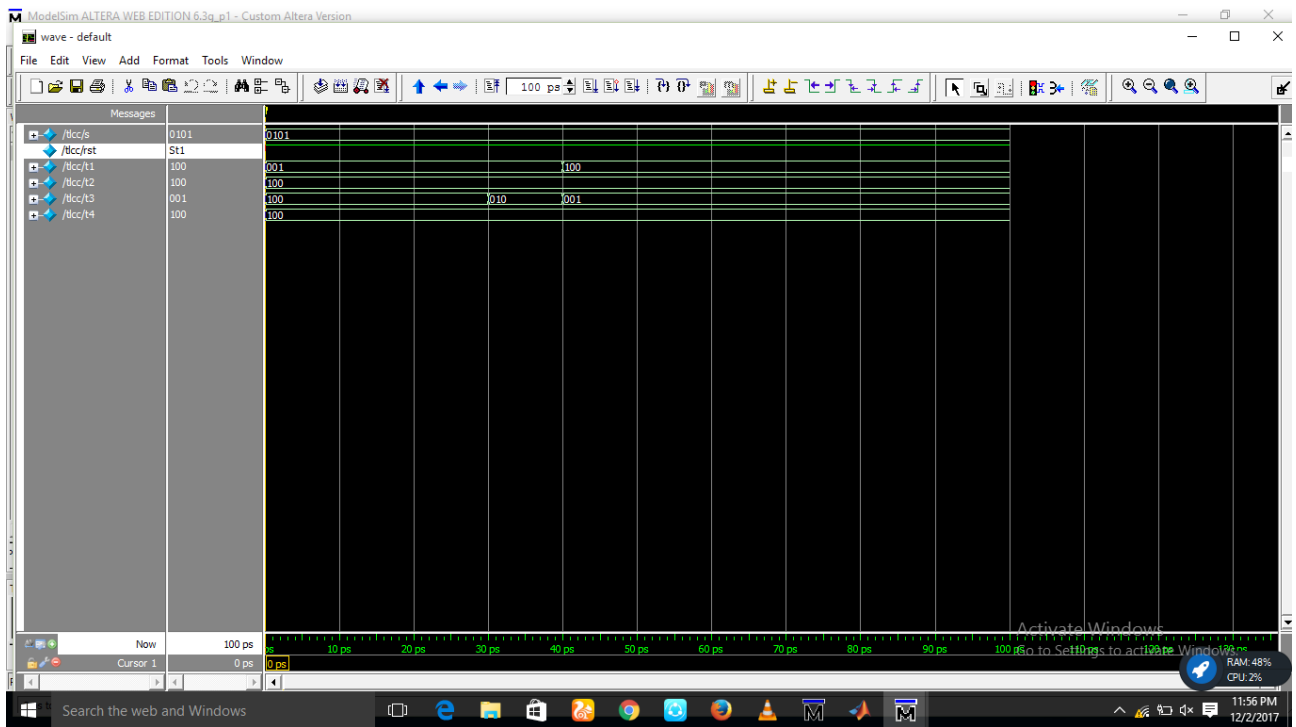


Fig 6. $S=0101, rst=1$

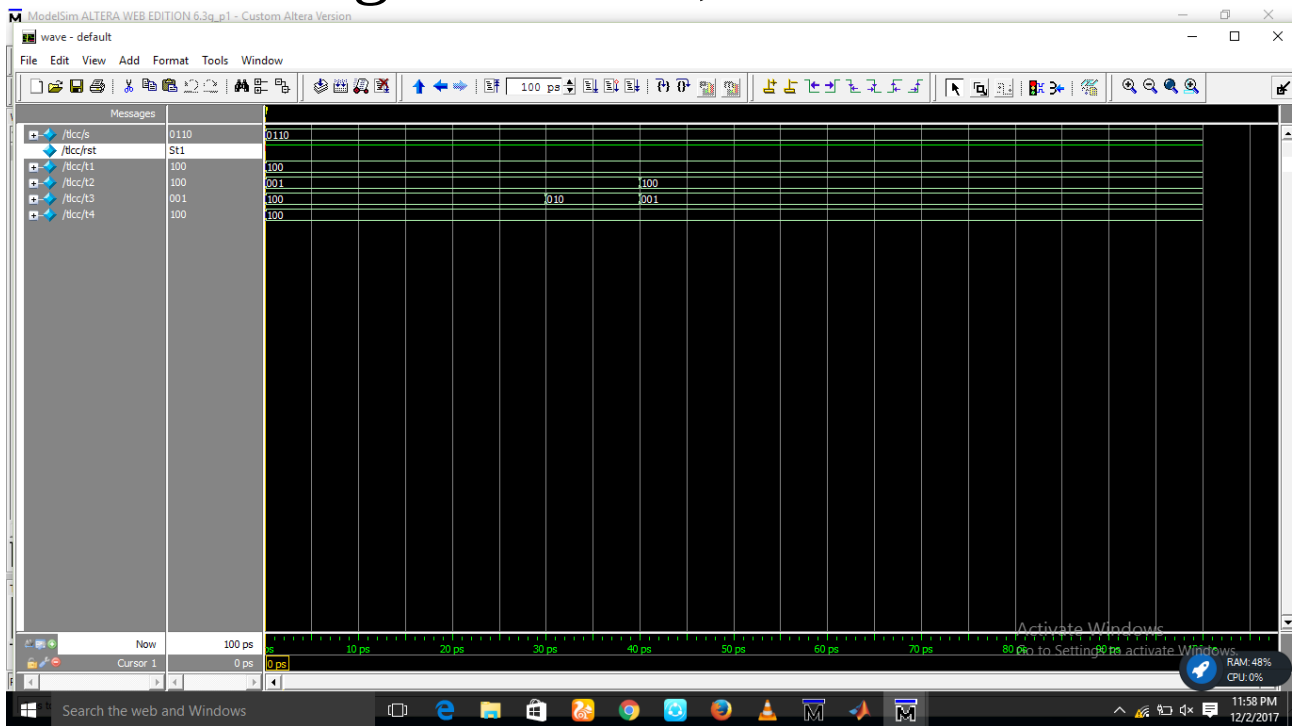


Fig 7. $S=0110, rst=1$

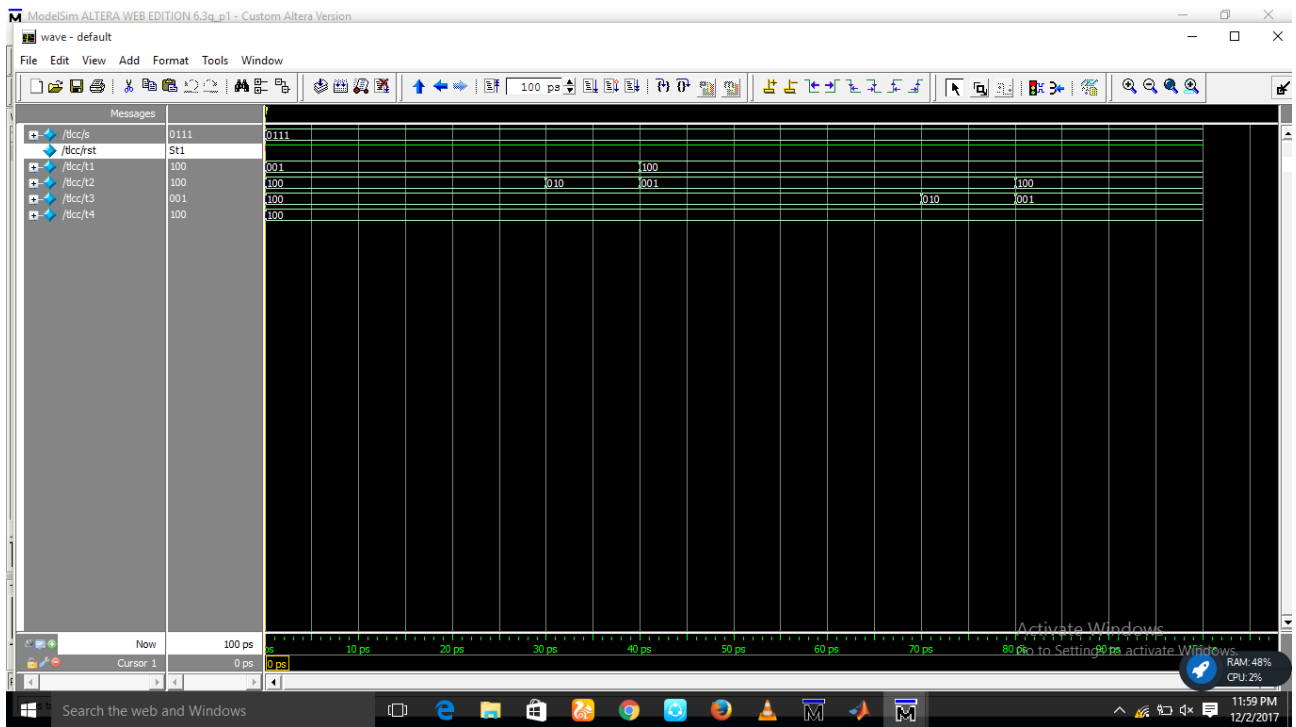


Fig 8. $S=0111, rst=1$

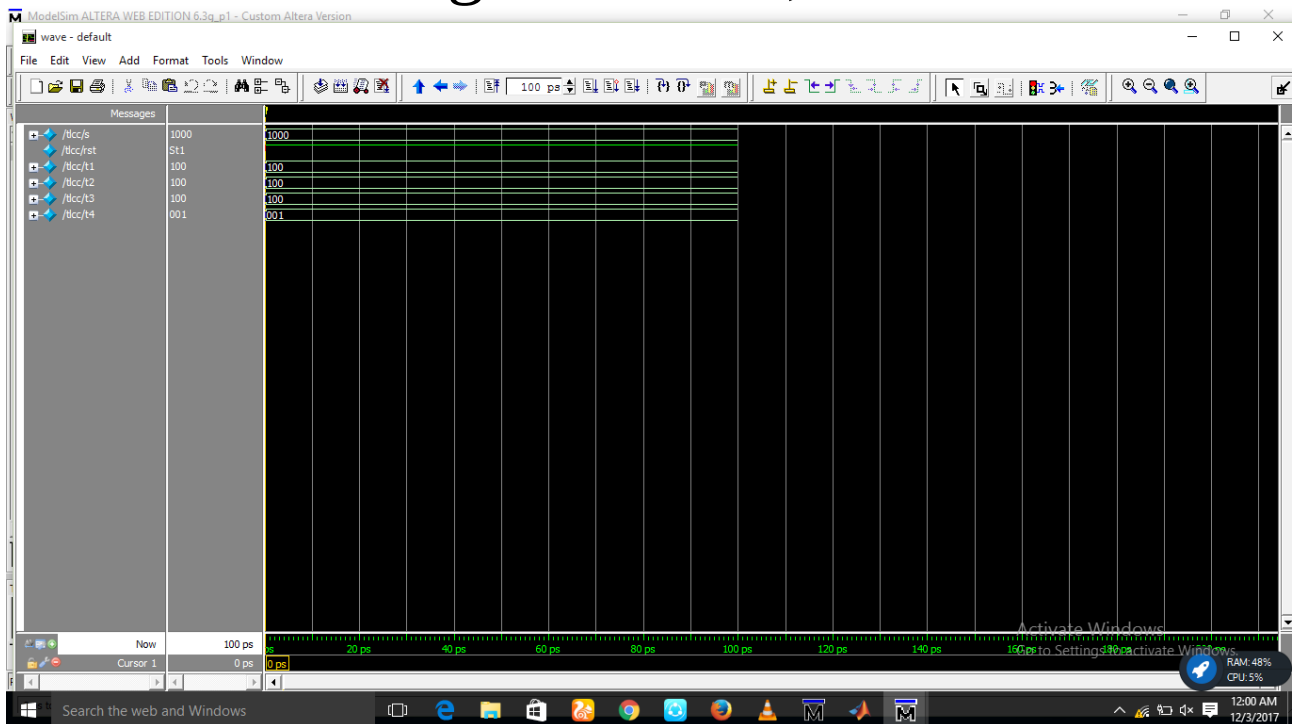


Fig 9. $S=1000, rst=1$

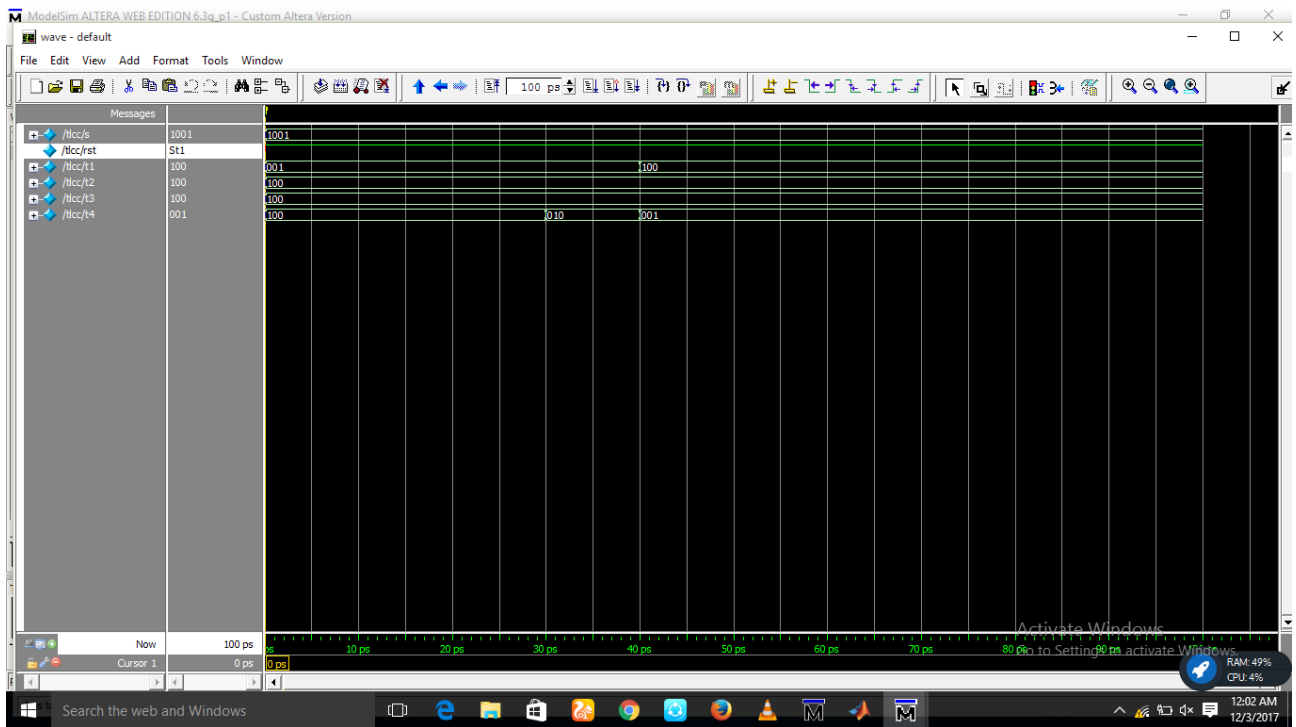


Fig 10. $S=1001, rst=1$

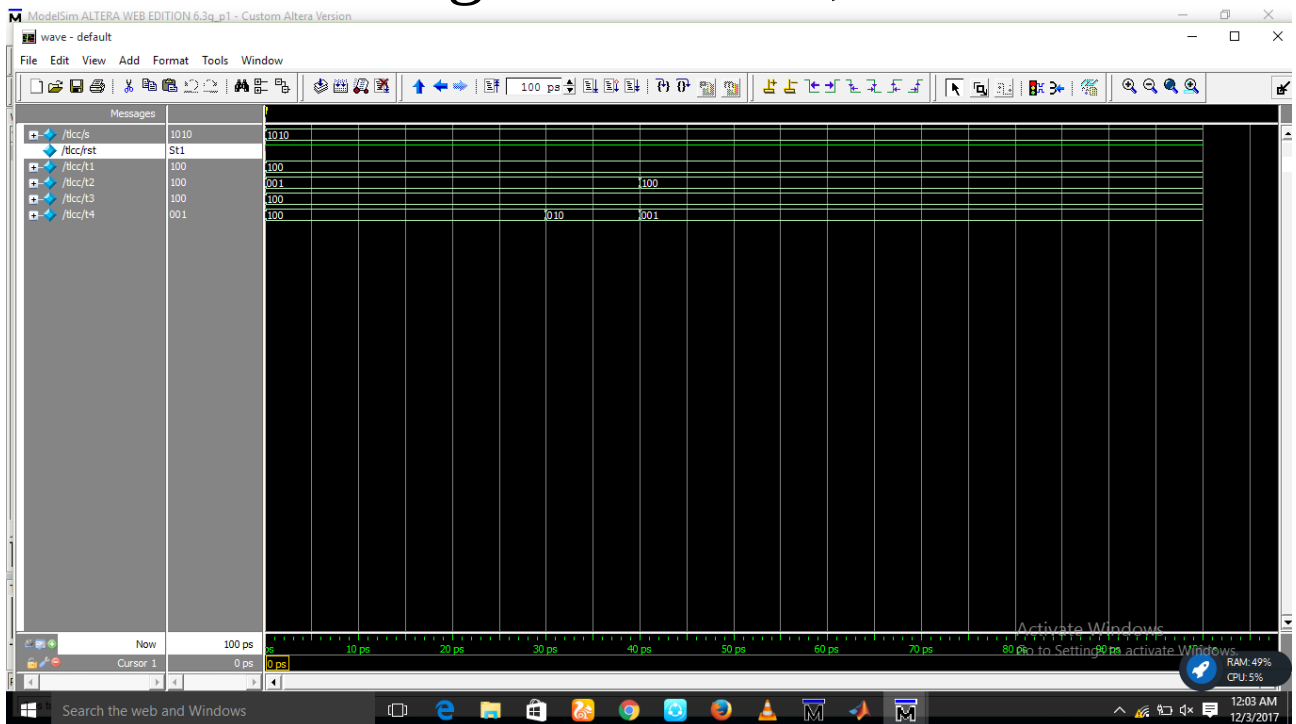


Fig 11. $S=1010, rst=1$

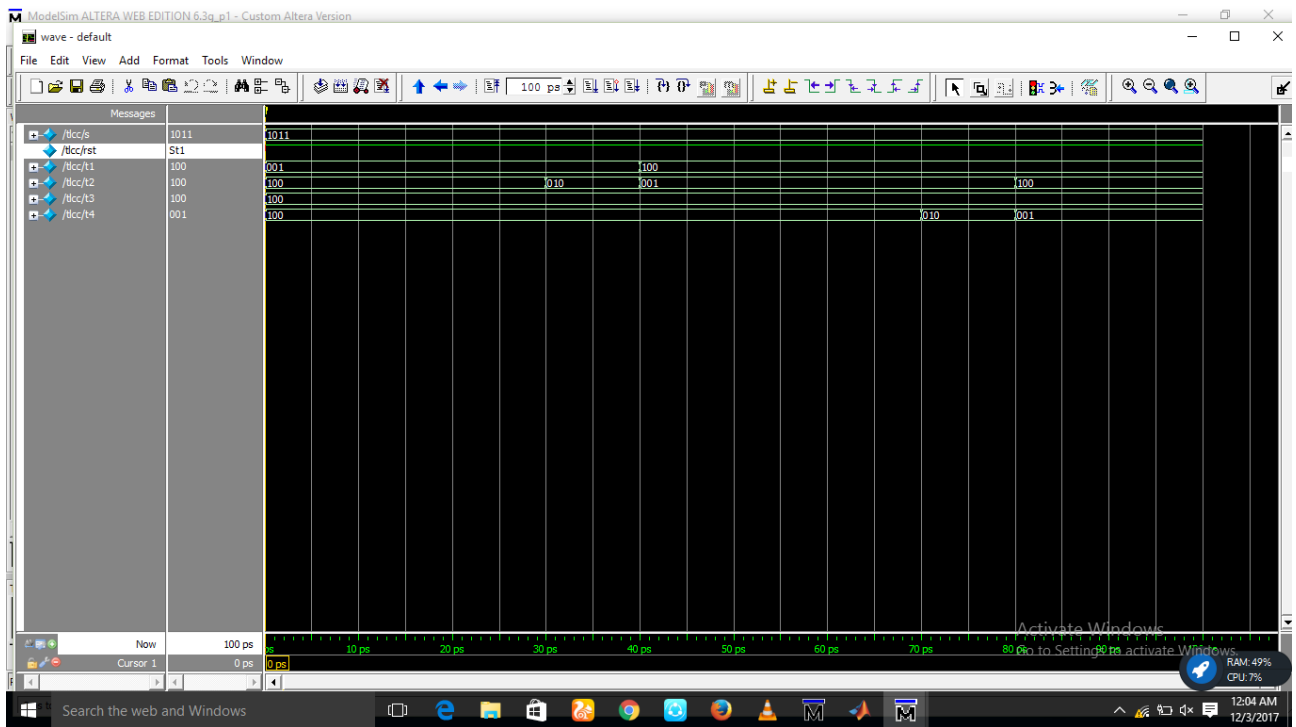


Fig 12. $S=1011, rst=1$

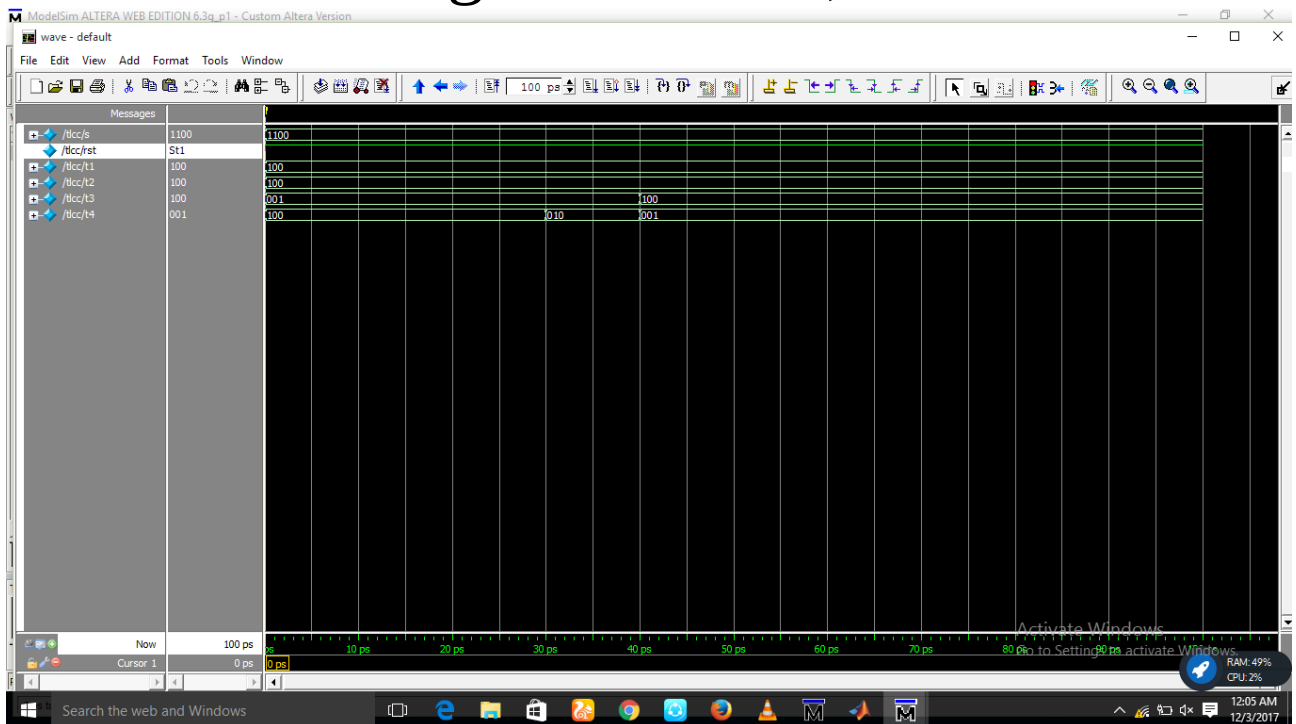


Fig 13. $S=1100, rst=1$

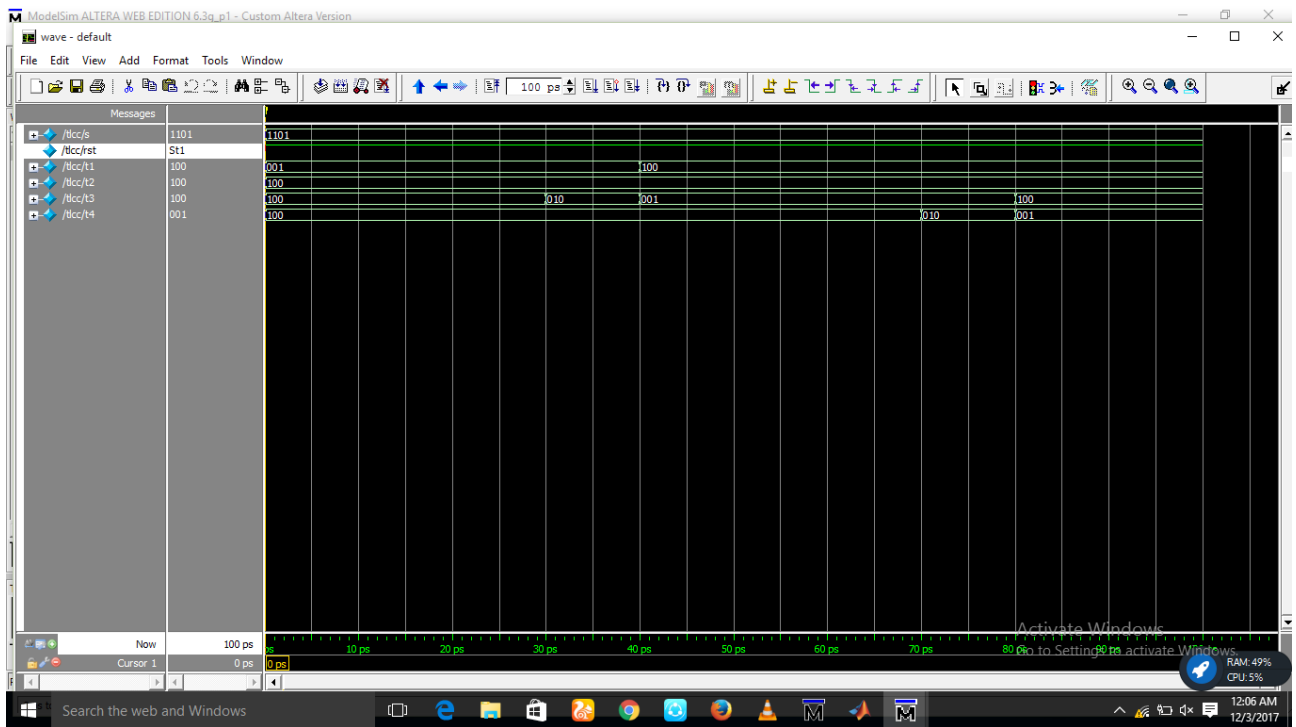


Fig 14. $S=1101, rst=1$

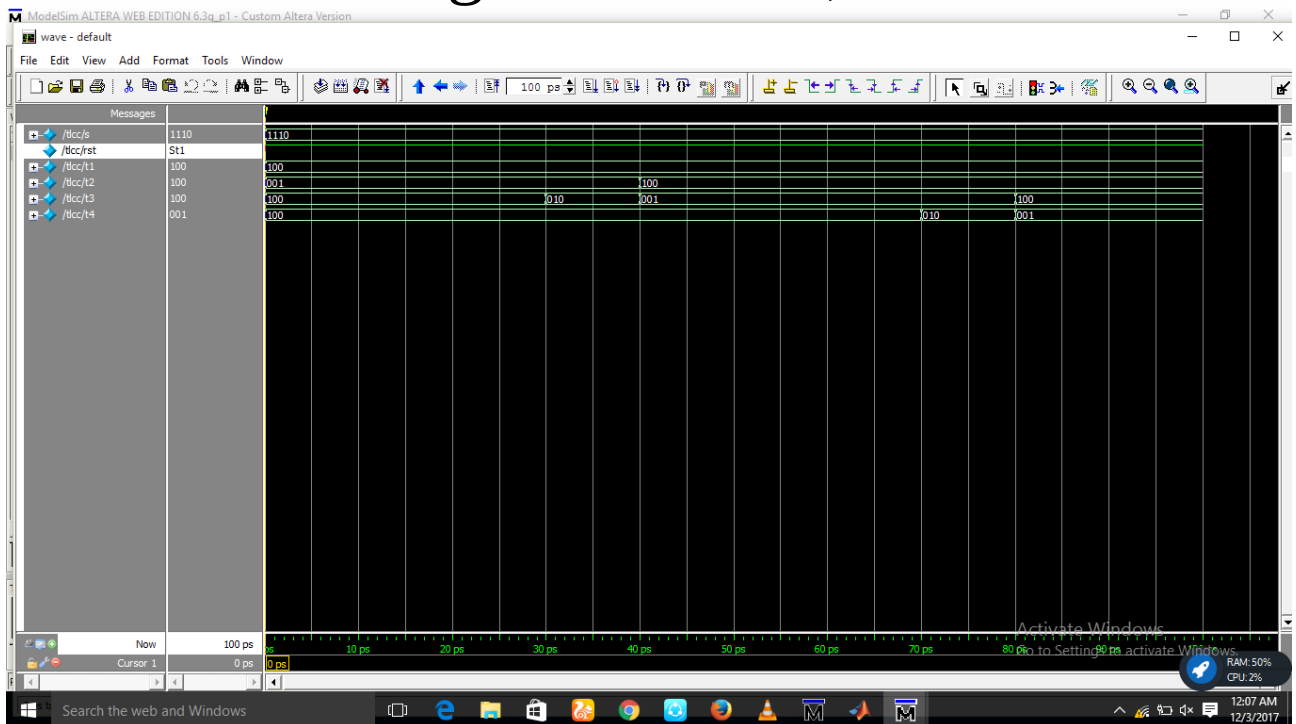


Fig 15. $S=1110, rst=1$

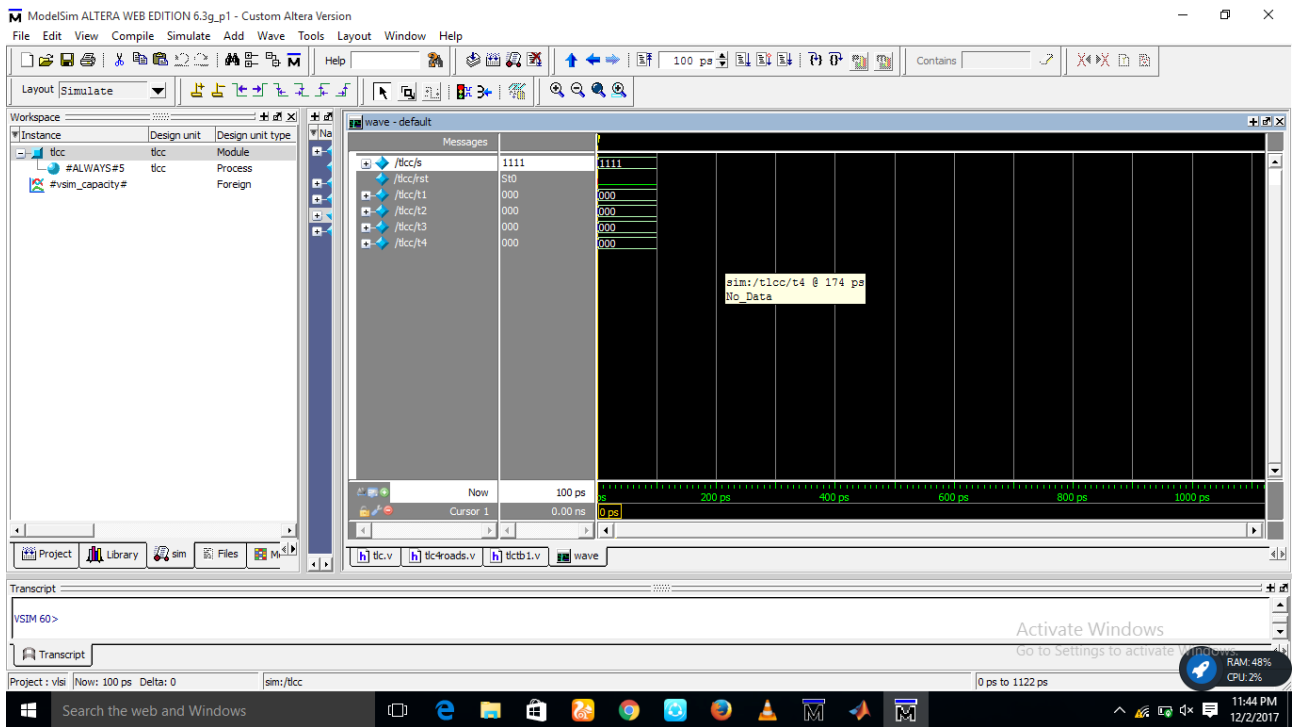


Fig 15. $S=1111, rst=0$

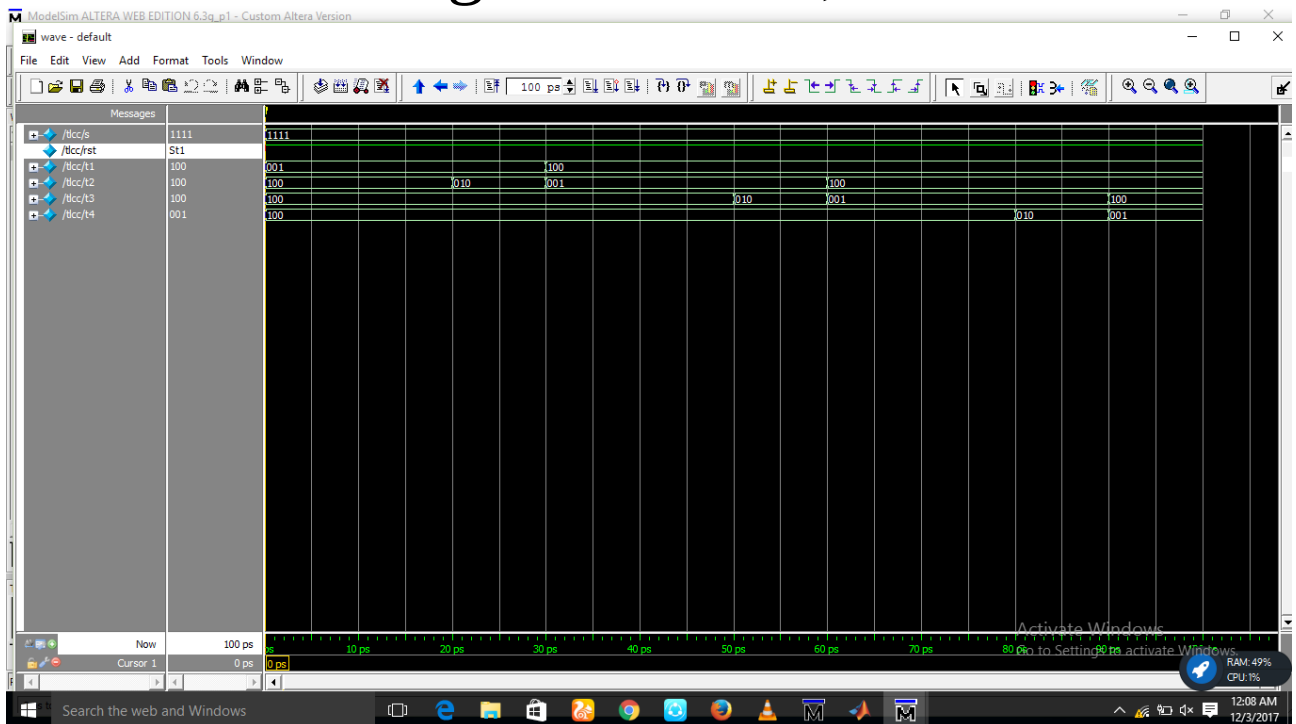


Fig 16. $S=1111, rst=1$