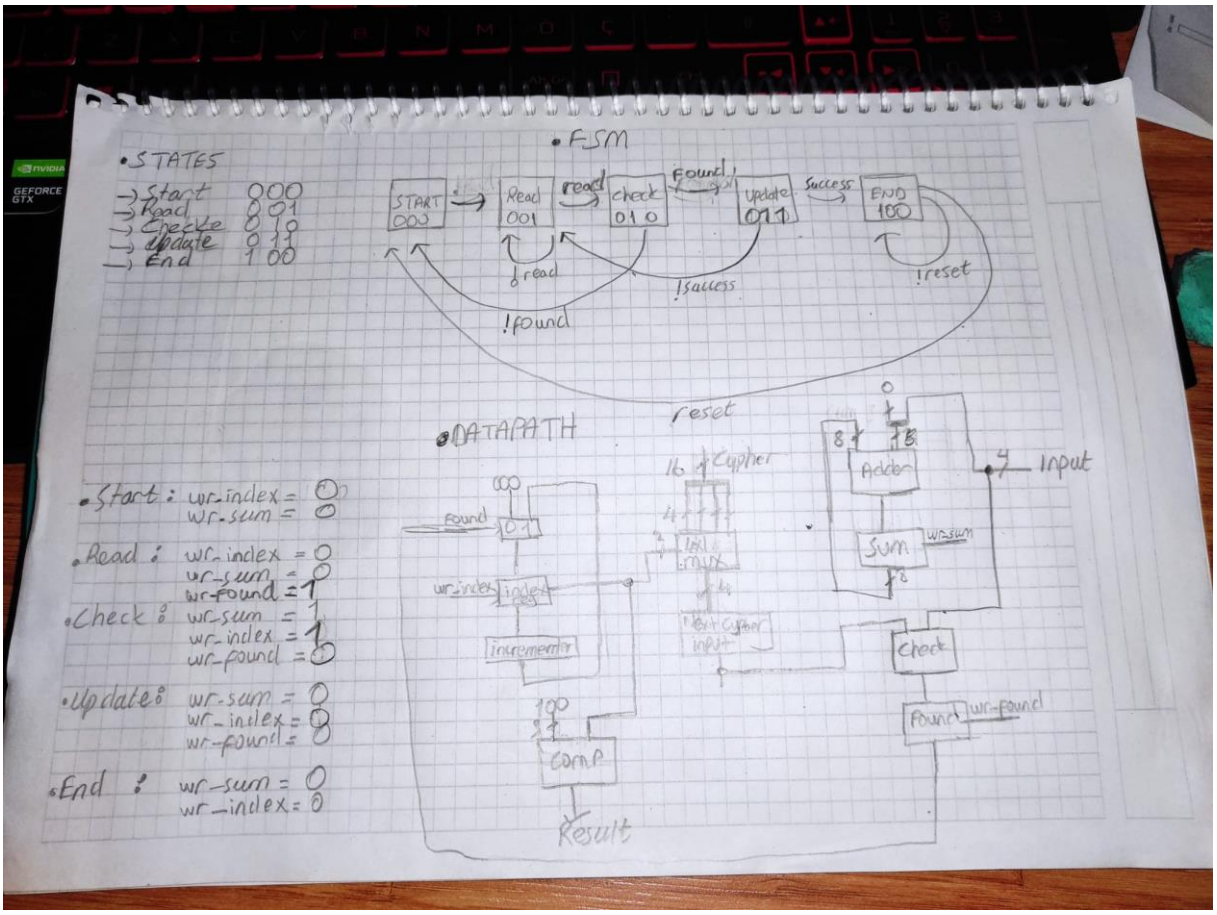
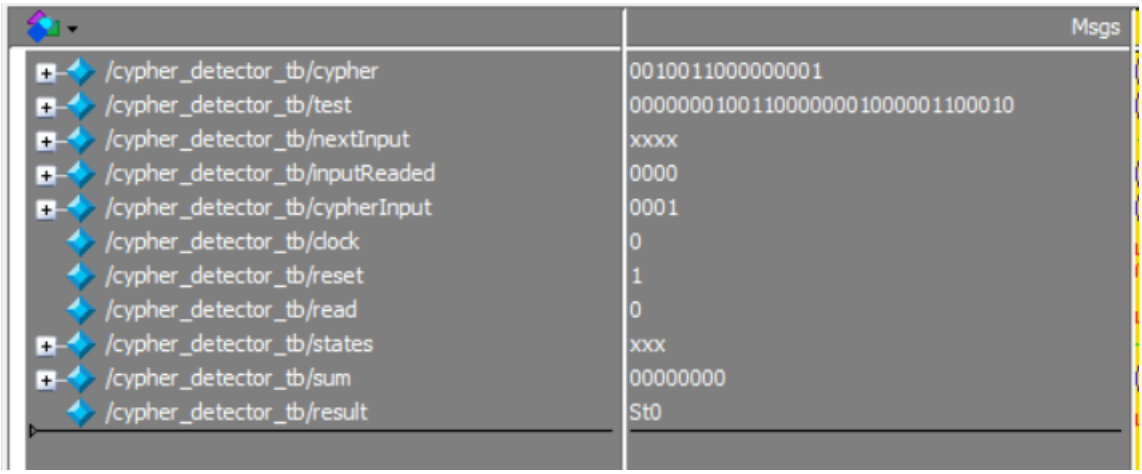
CSE 331 BONUS HOMEWORK REPORT

FSM AND DATAPATH



- **TEST INPUTS AND OUTPUTS**



Cypher : 16 bit input that we want to find it in readied inputs.

Test : 32 bit test input that we want to search.

CypherInput : 4 bit of input that comes from cypher input .

NextInput : 4 bit of input that comes from test input for ready.

InputReaded : 4 bit input that comes from test input if the read signal is rising edge.

Clock : Provides the state changes.

Reset : Reset signal.

Read : Read signal.

States : Indicates what states it is in.

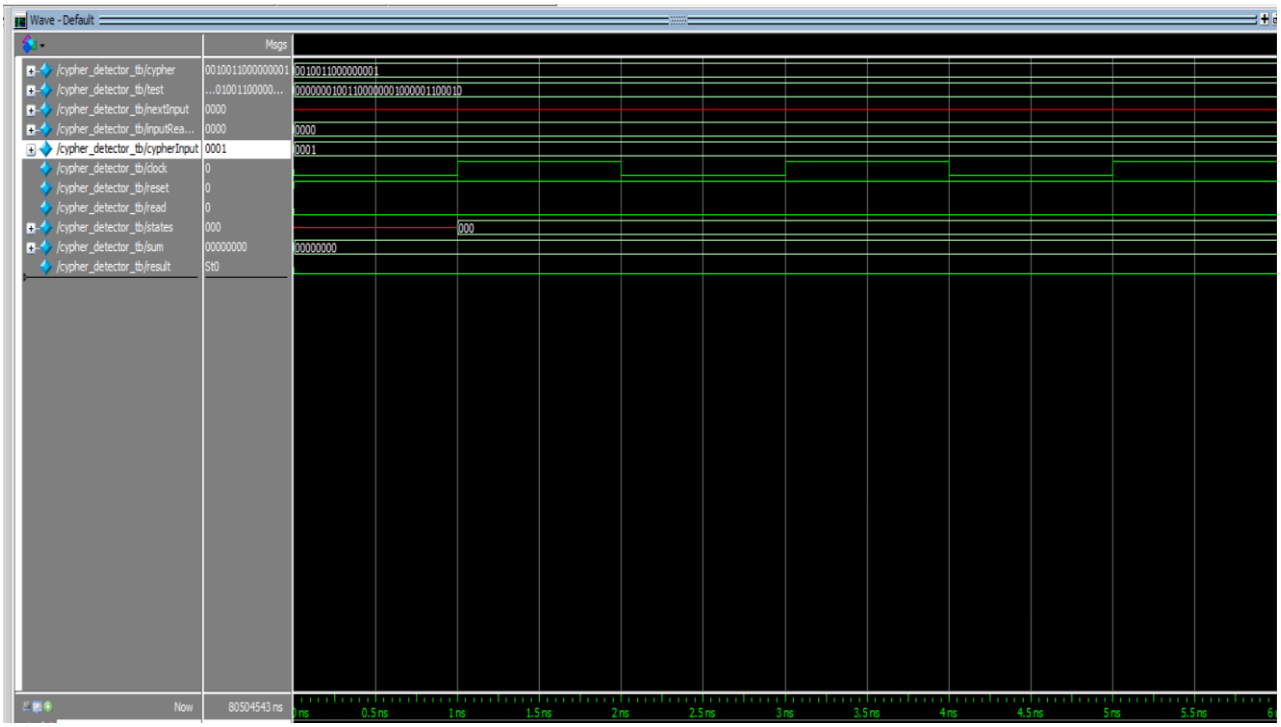
Sum : sum of all numbers until the right cypher is detected.

Result : becomes 1 only after the right cypher numbers are collected.

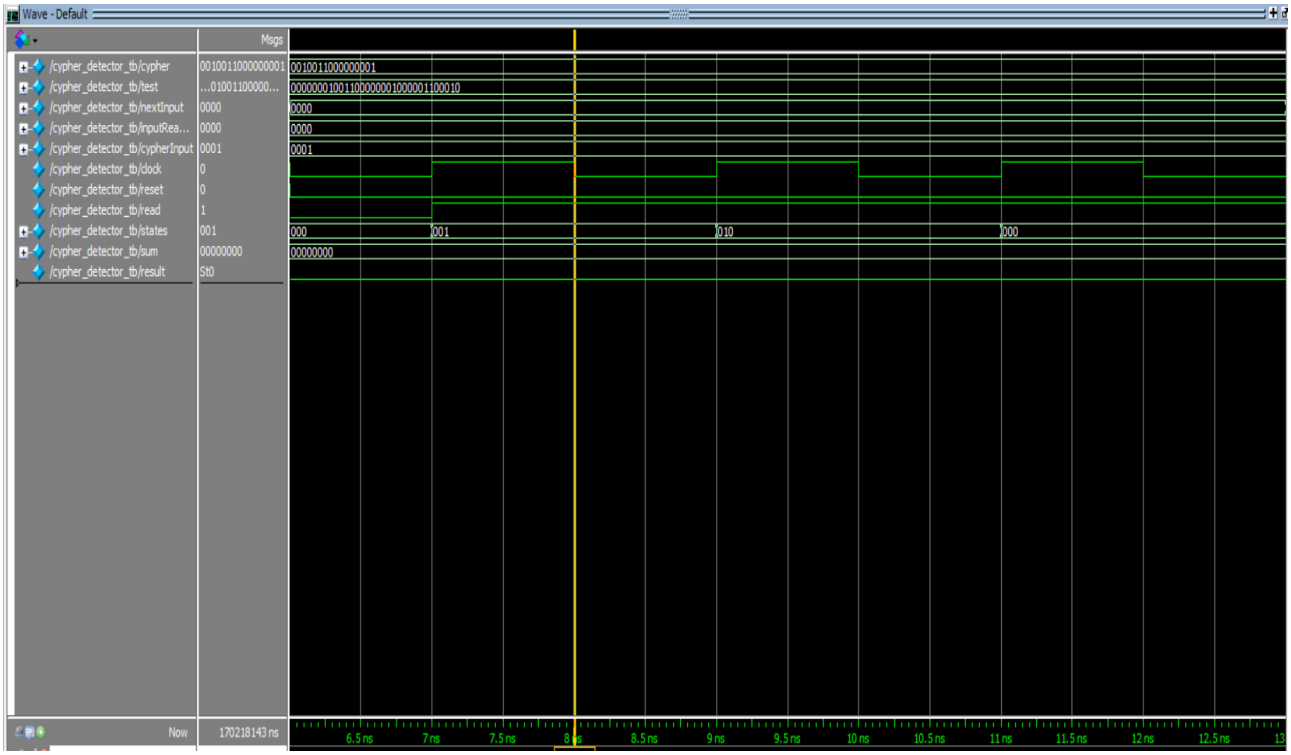
- **TEST RESULTS**

NOT: Index value is incremented by 1 if the cypherinput is matched readedInput.
Else index is reset to 0.

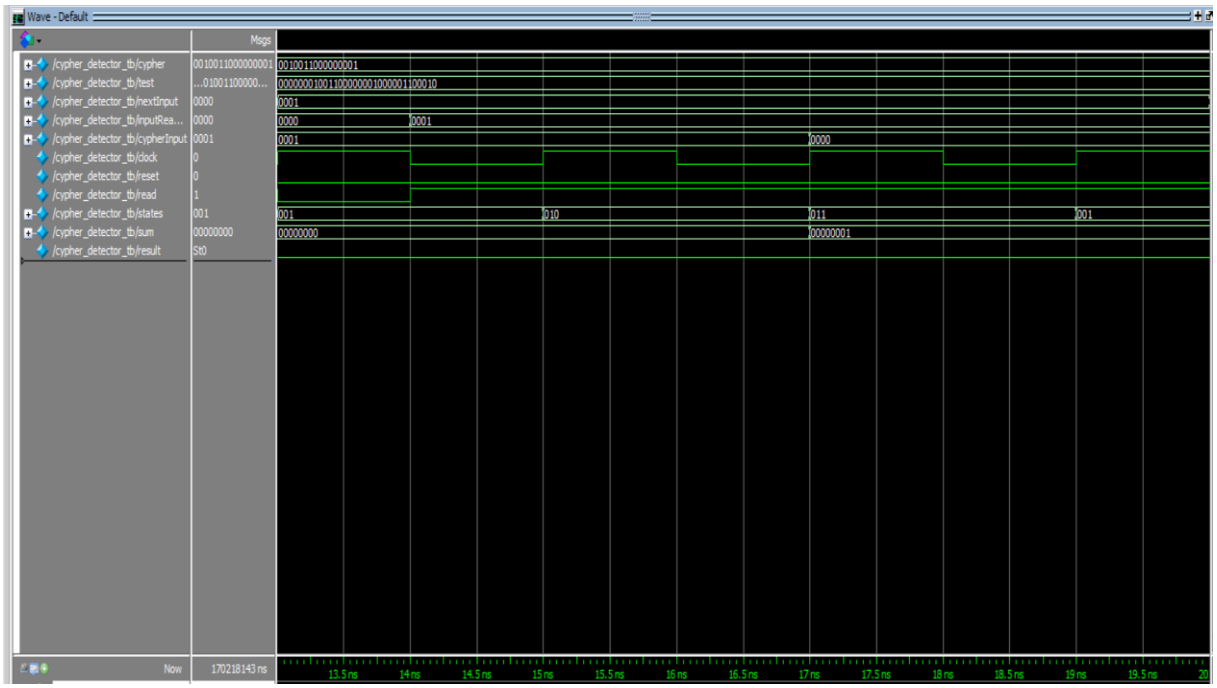
CYPHER ->>> 0010 0110 0000 0001
TEST INPUT ->>> 0000 0001 0011 0000 0001 0000 0110 0010



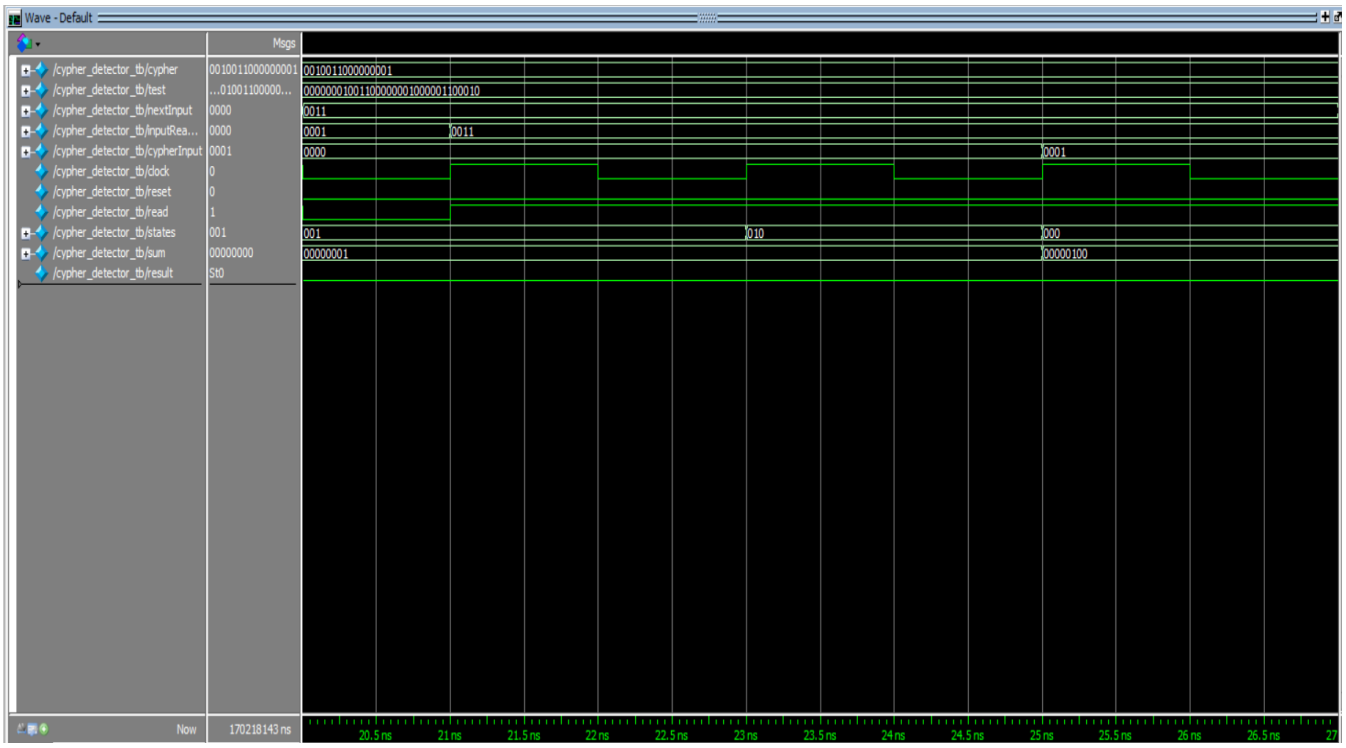
Until the 6 ns , the reset input 1. So state is in START.(000)
Read signal is 0.



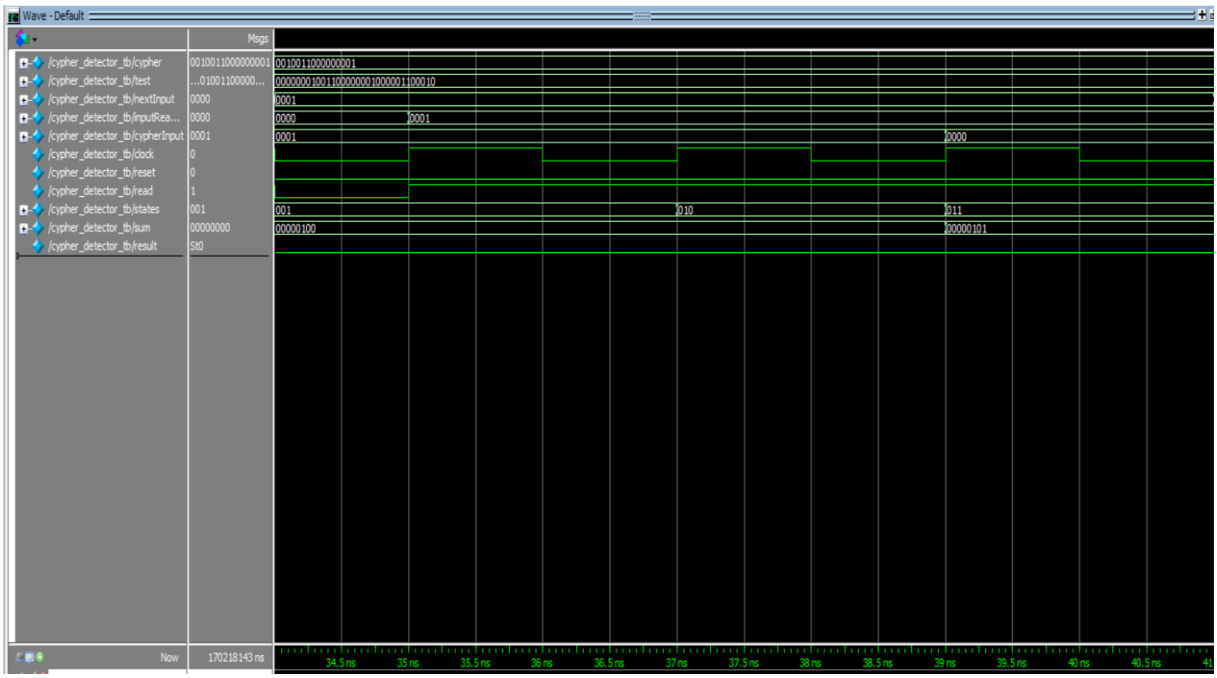
At 6 ns, the reset set to 0.
At 7 ns , the read input became 0 to 1.
So the next state became READ. 001.
0001 = CypherInput , index = 0
0000 = inputReaded
0001 and 0000 are compared. Since they are different next state becomes START(000) after the CHECK STATE.(010)



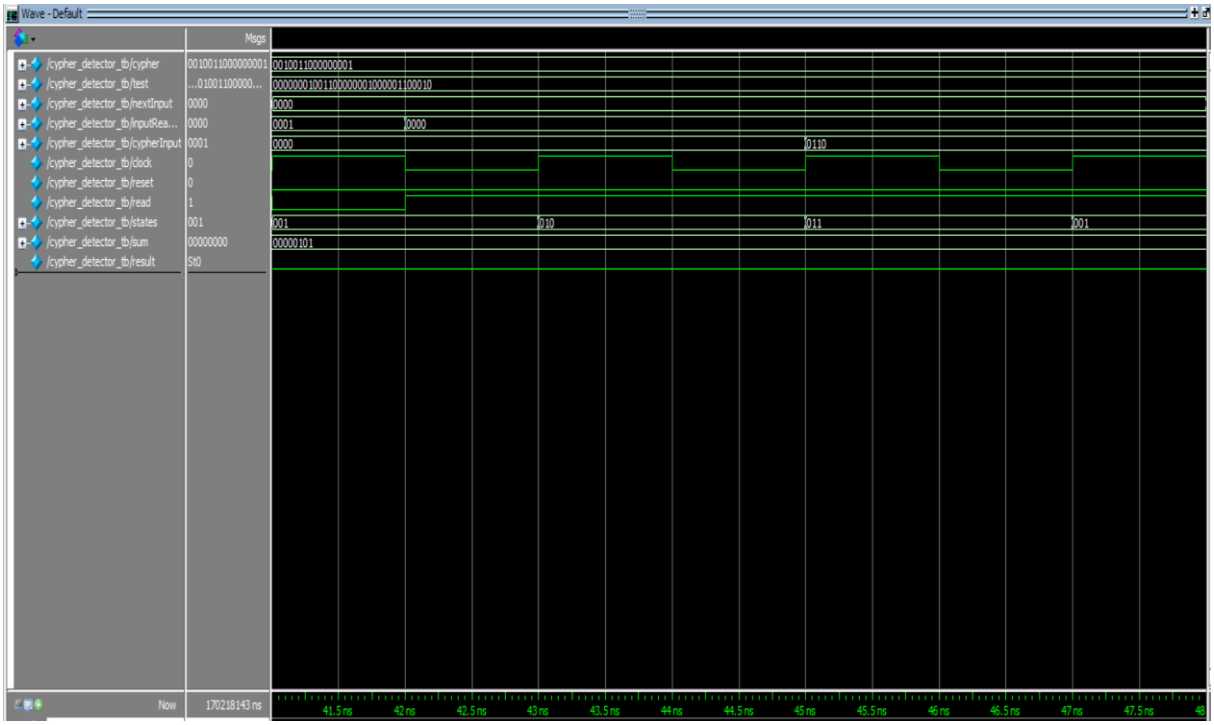
At 13 ns, read signal is set to 0.
At 14 ns ,read signal is set to 1.
0001 = readedInput
0001 = cypherInput . Index = 1
0001 and 0001 are compared . Since they are equal. Next State became UPDATE(011) after the CHECK STATE(010).
Then next state became READ(001) to wait next input.



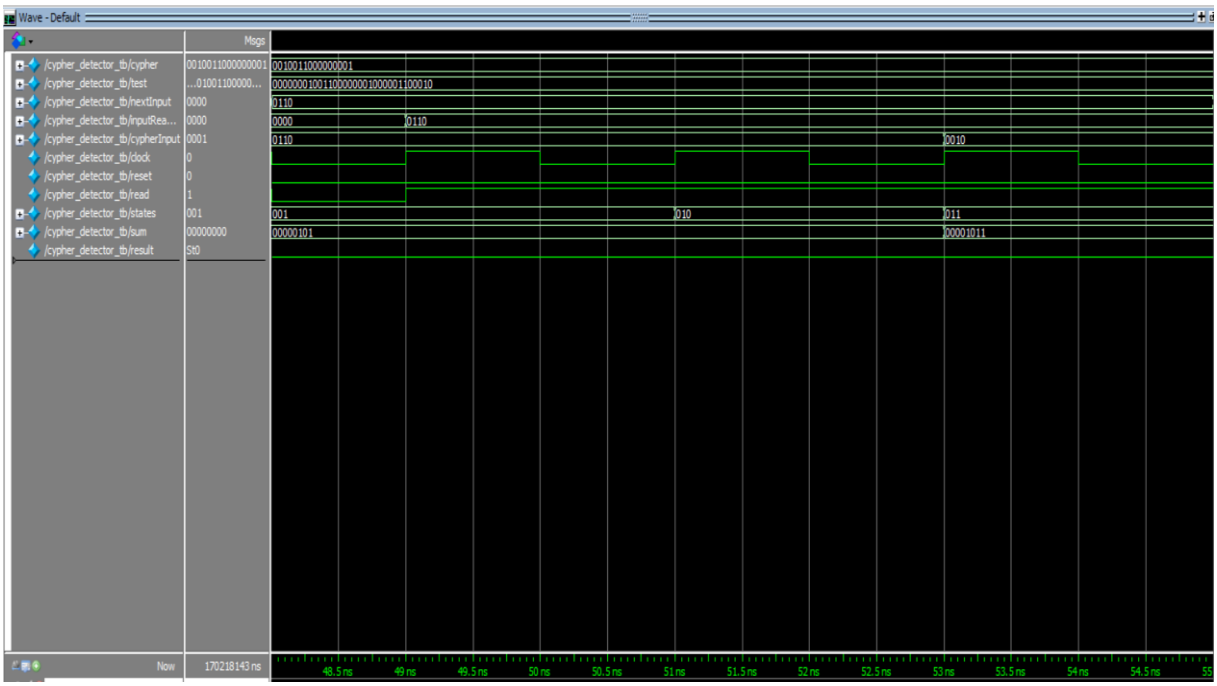
At 20 ns, read signal is set to 0.
At 21 ns ,read signal is set to 1.
Next input is readied at 21 ns.
0011 = InputReaded
0000 = cypherInput , Index = 1.
0011 and 0000 are compared . Since they are different , next State became START(000) after the CHECK STATE(010).



At 34 ns, read signal is set to 0.
At 35 ns ,read signal is set to 1.
Next input is readied at 35 ns.
0001 = InputReaded
0001 = cypherInput , Index = 0.
0001 and 0001 are compared . Since they are equal. Next State became UPDATE(011) after the CHECK STATE(010).
Then next state became READ(001) to wait next input.

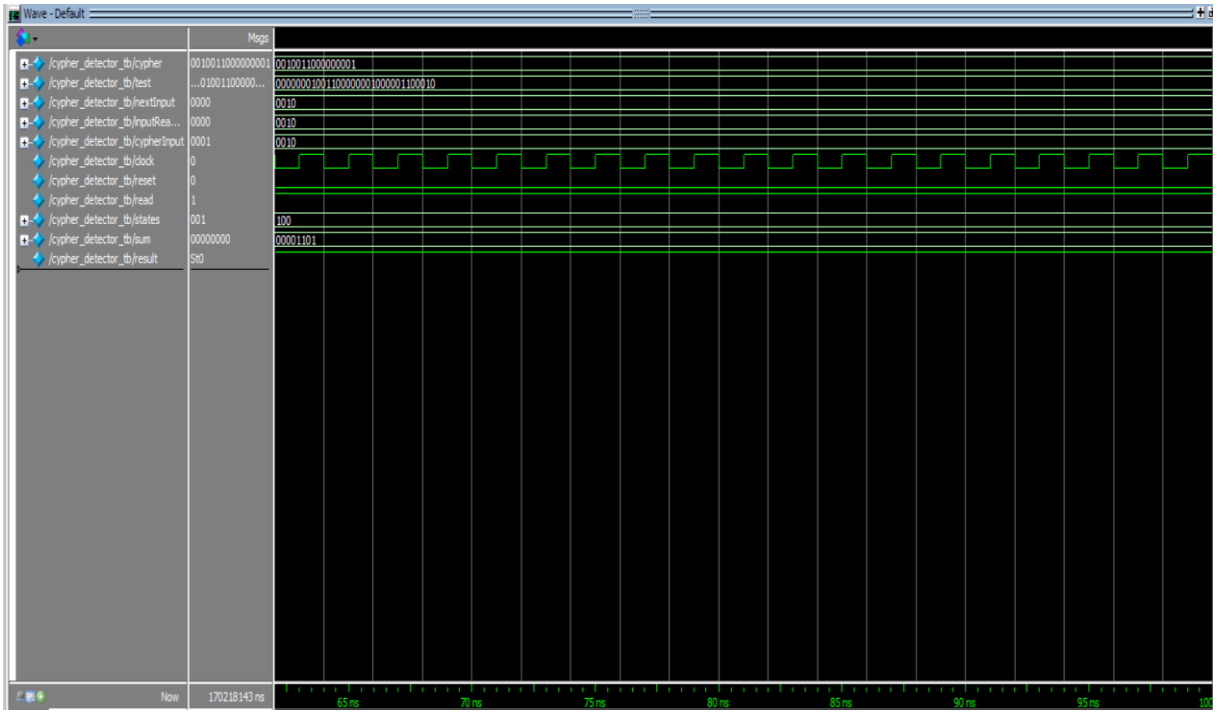


At 41 ns, read signal is set to 0.
At 42 ns ,read signal is set to 1.
Next input is readied at 40 ns.
0000 = InputReaded
0000 = cypherInput , Index = 1.
0001 and 0001 are compared . Since they are equal. Next State became UPDATE(011) after the CHECK STATE(010).
Then next state became READ(001) to wait next input.



At 48 ns, read signal is set to 0.
At 49 ns ,read signal is set to 1.
Next input is readied at 49 ns.
0110 = InputReaded
0110 = cypherInput , Index = 2.
0110 and 0110 are compared . Since they are equal. Next State became UPDATE(011) after the CHECK STATE(010).
Then next state became READ(001) to wait next input.

At 55 ns, read signal is set to 0.
At 56 ns ,read signal is set to 1.
Next input is readied at 56 ns.
0010 = InputReaded
0010 = cypherInput , Index = 3.
0010 and 0010 are compared . Since they are equal ,next State became UPDATE(011) after the CHECK STATE(010).
THE INDEX BECOMES 4 IN UPDATE STATE . This indicates that cypher is found in given input.
SO next state became END(100) until the reset signal becomes 1. Since the reset signal is 0 , the END state is remained.



End states is remained.

CYPHER ->>> 0010 0110 0000 0001
TEST INPUT ->>> 0000 0001 0011 0000 0001 0000 0110 0010 ,
sum of all test input bits = 13
RESULT IS = 1
SUM is = 00001101 = 13

MUHAMMED SİNAN
PEHLİVANOĞLU
1901042664