

# DIGITAL CIRCUITS LAB

## *EXP-7 Mealyfsm*

In this lab, we used dataflow & behavioural modeling.

October 3,2024

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### Pen-Paper Design:

In this experiment, you will design a string detector using a Mealy type FSM which outputs '1' when input sequence of letters given thus far contains the following sub-sequences:

***must1***

***lion2***

***ring3***

in a string of letters.

For this experiment, letter 'a' is encoded as "00001", 'b' is encoded as "00010" and so on until 'z' is encoded as "11010" and the numbers 0 is encoded as "11011", 1 is encoded as "11100" until 4 is encoded as "11111".

For example suppose the input string is: ***Multiple0123 string0123 detection0123***

This string contains the subsequence "must1" "lion2" and "ring3".

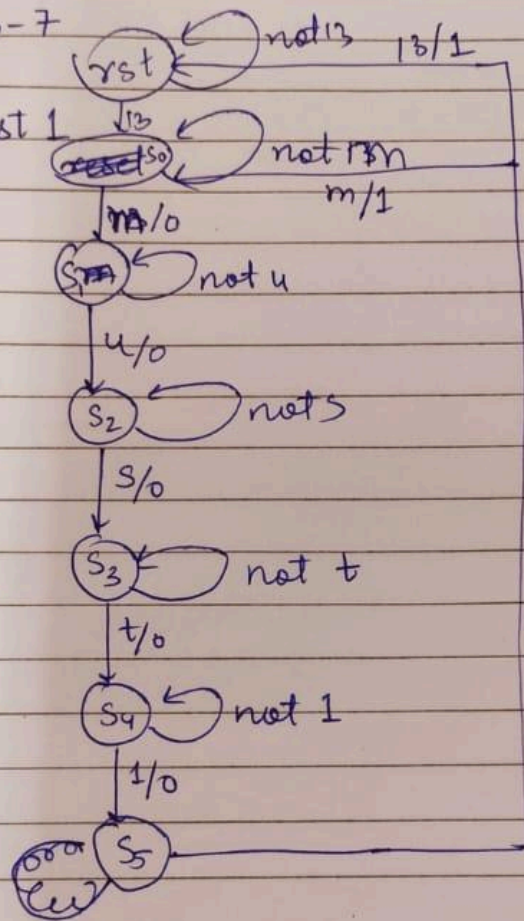
Thus, the input and output sequences when lined up will look like:

Multiple0123 string0123 detection0123  
000000000000000000000000101000000000000010

***Note:*** Consider characters in this problem as case insensitive.

→ lab-7

① must 1



$m = 13$   
 $u = 21$   
 $s = 19$   
 $t = 20$   
 $1 = 28$

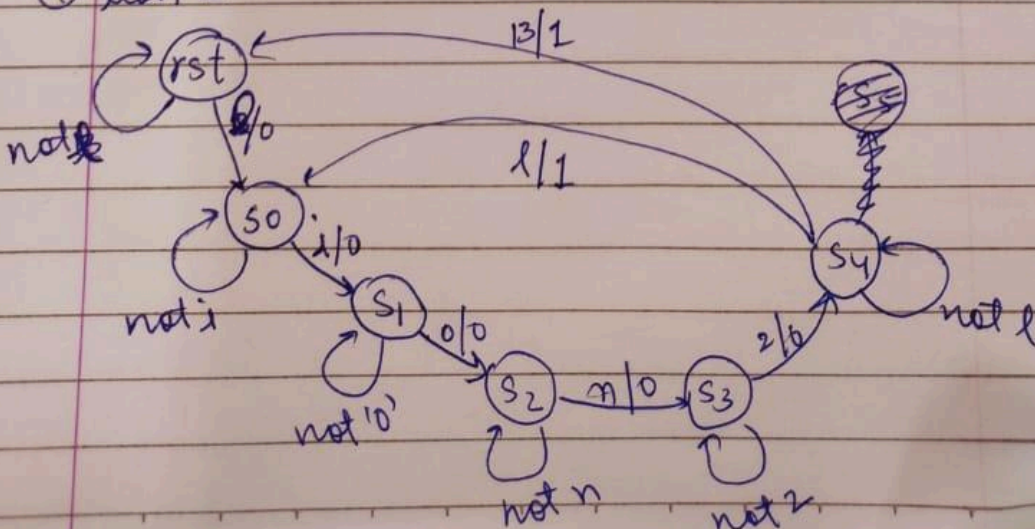
$l = 12$   
 $i = 9$   
 $0 = 15$   
 $n = 14$   
 $2 = 29$

$r = 18$   
 $i = 9$

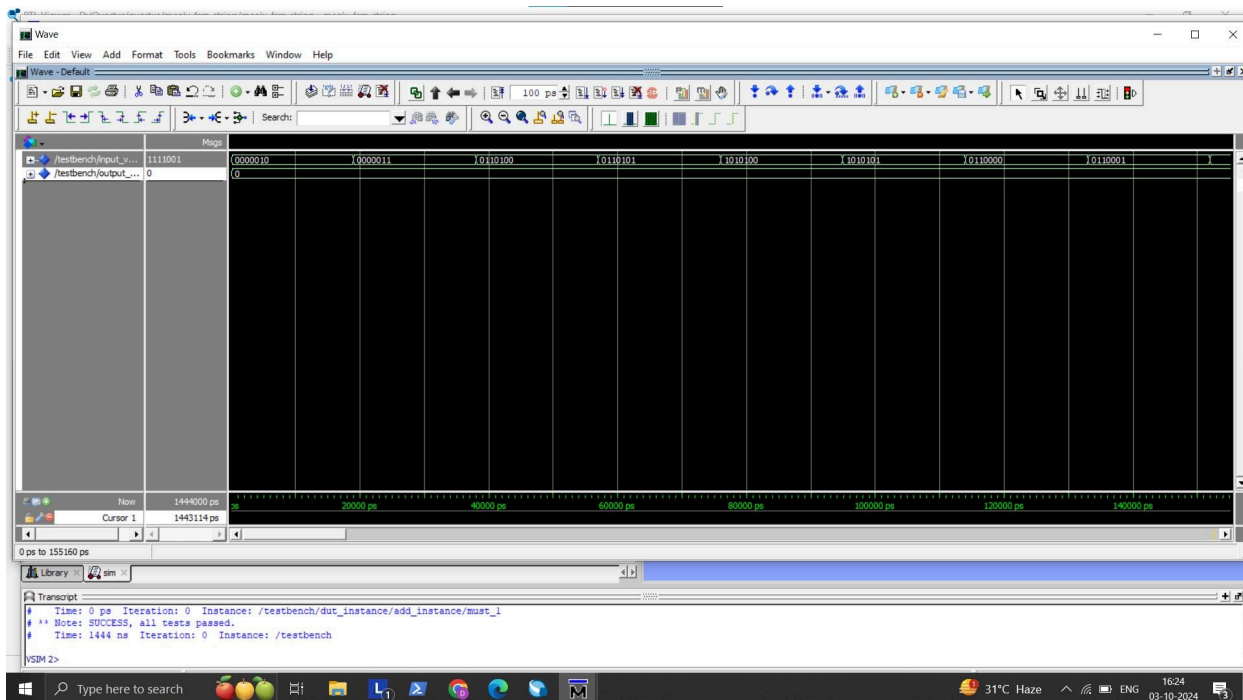
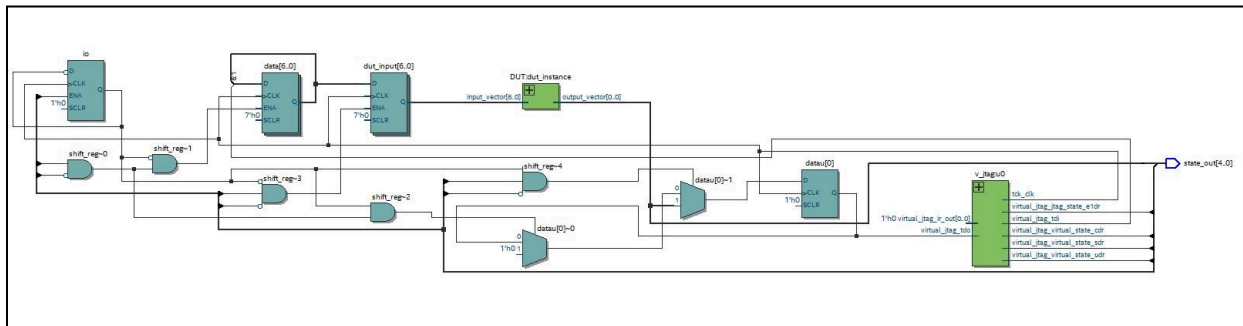
$n = 14$   
 $g = 7$   
 $3 = 30$

State diagram

② lien 2



## Netlists & Simulation Wave:



## Testing Terminal:

```
jtag> cable ft2232  
Connected to libftd2xx driver.  
jtag> _
```

```
jtag> detect  
IR length: 10  
Chain length: 1  
Device Id: 00000011000110000100000011011101 (0x0000000031840DD)  
Manufacturer: Altera  
Part(0): 10M25SAE144  
Stepping: 1  
Filename: d:\quartus\quartus\majority_circuit\xen10_files\urjtag_max10\urjtag\data\altera/10m25sae144/10M25SAE144  
jtag> _
```

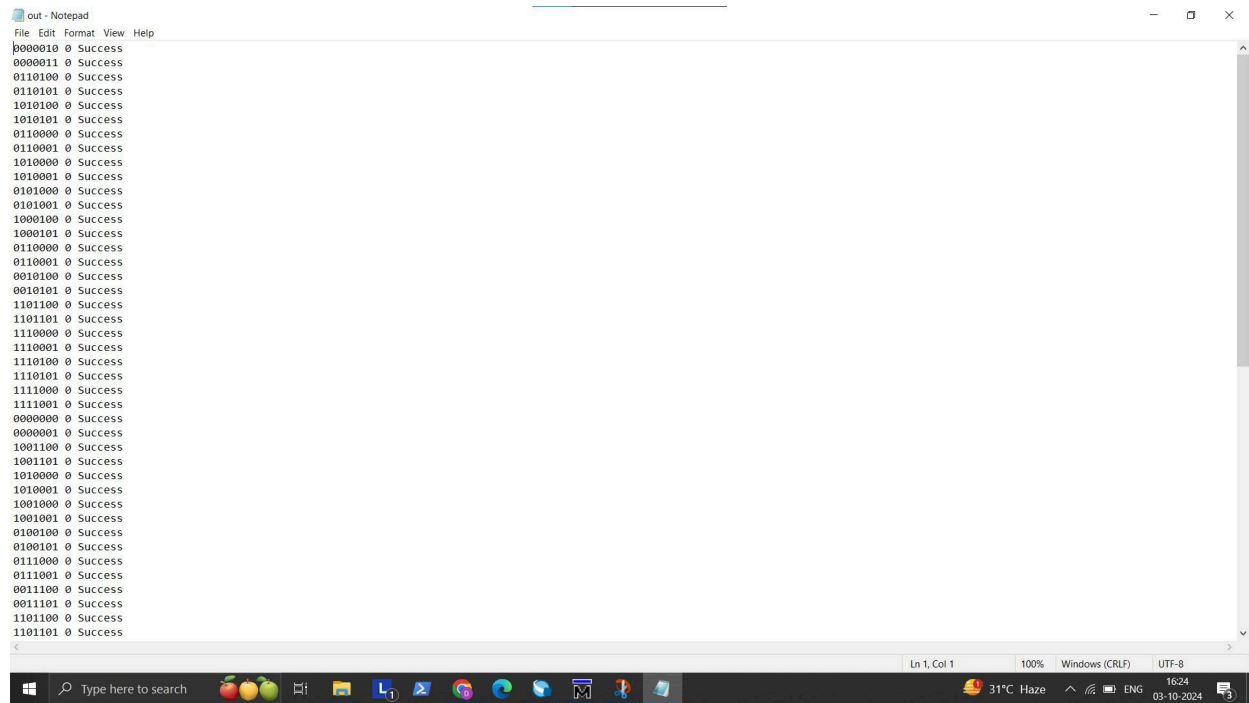
## Command Prompt:

Input command: *scan\_vjtag.exe TRACEFILE.txt out.txt*

Output:

```
{'type': 6, 'id': 67330064, 'description': b'Dual RS232-HS A', 'serial': b'A'}
```

## ScanChain Outputs:



```
out - Notepad
File Edit Format View Help
0000010 0 Success
0000011 0 Success
0110100 0 Success
0110101 0 Success
1010100 0 Success
1010101 0 Success
0110000 0 Success
0110001 0 Success
1010000 0 Success
1010001 0 Success
0101000 0 Success
0101001 0 Success
1000100 0 Success
1000101 0 Success
0110000 0 Success
0110001 0 Success
0010100 0 Success
0010101 0 Success
1101100 0 Success
1101101 0 Success
1110000 0 Success
1110001 0 Success
1110100 0 Success
1110101 0 Success
1111000 0 Success
1111001 0 Success
0000000 0 Success
0000001 0 Success
1001100 0 Success
1001101 0 Success
1010000 0 Success
1010001 0 Success
1001000 0 Success
1001001 0 Success
0100100 0 Success
0100101 0 Success
0111000 0 Success
0111001 0 Success
0011100 0 Success
0011101 0 Success
1101100 0 Success
1101101 0 Success
```

*Success in scanchain out file for the mealyfsm lab experiment.*