EXPERIMENT-9

AIM: To design a 4-bit combinational shifter / logic shifter.

**PLATFORM USED:** Circuit verse

THEORY:

Shift micro-operations are used for the serial transfer of data and also support in conjunction with arithmetic, logic, and several data-processing operations. The contents of a register can be shifted to the left or the right. Information transferred through the serial input determines the type of shift.

There are three types of shift operation:

- Logical shift
- Circular shift
- Arithmetic shift

Symbolic Designation	Description
R ←R1 shl R	Shift-left register R
R ←R1 shr R	Shift-right register R
R ←R1 cil R	Circular shift-left register R
R ←R1 cir R	Circular shift-right register R
R ←R1 ashl R	Arithmetic shift-left R
R ←R1 ashr R	Arithmetic shift-right R

Symbolic representation
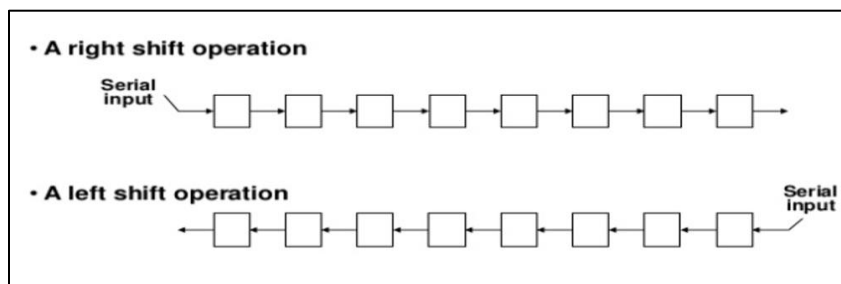
4-bit combinational circuit shifter
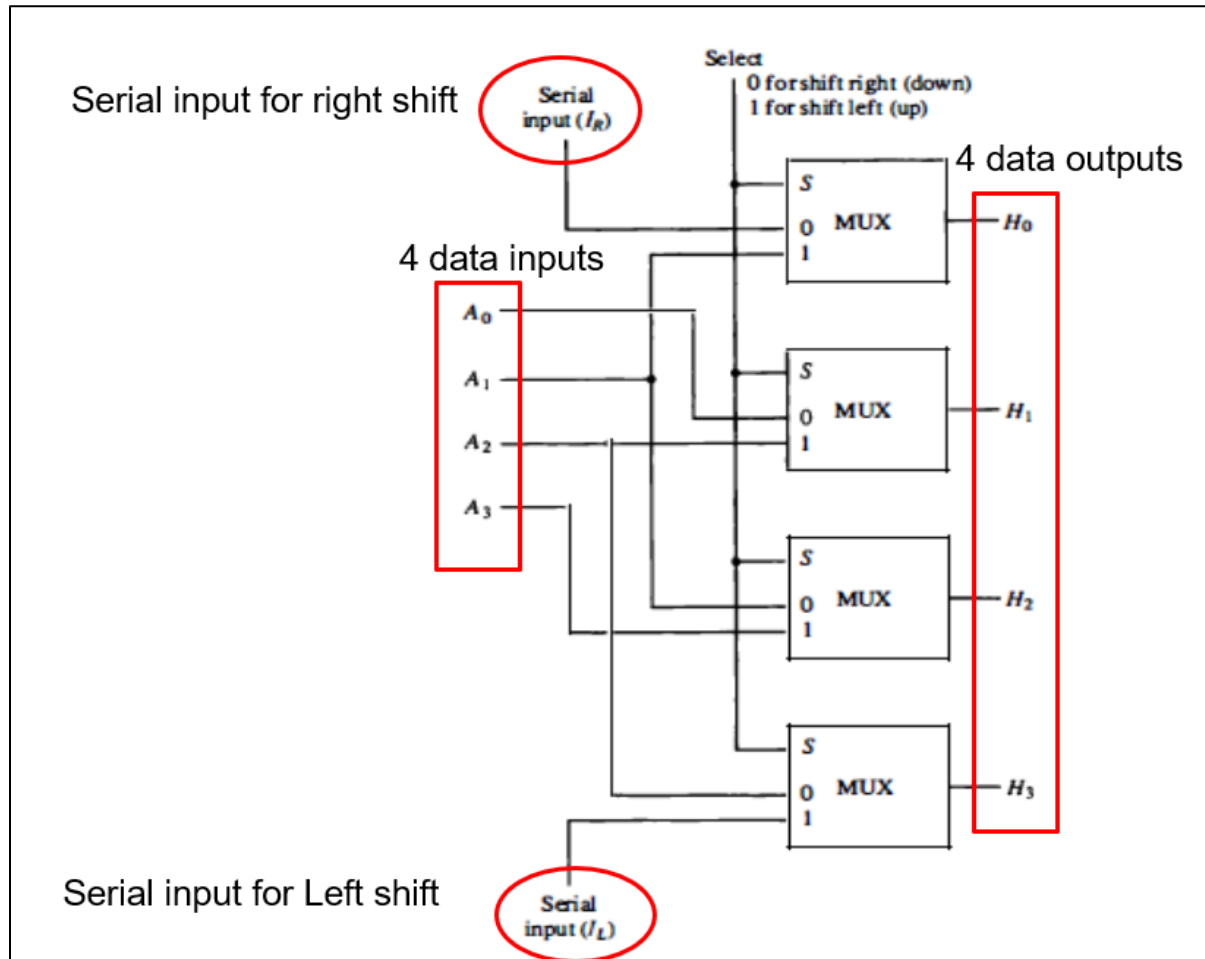
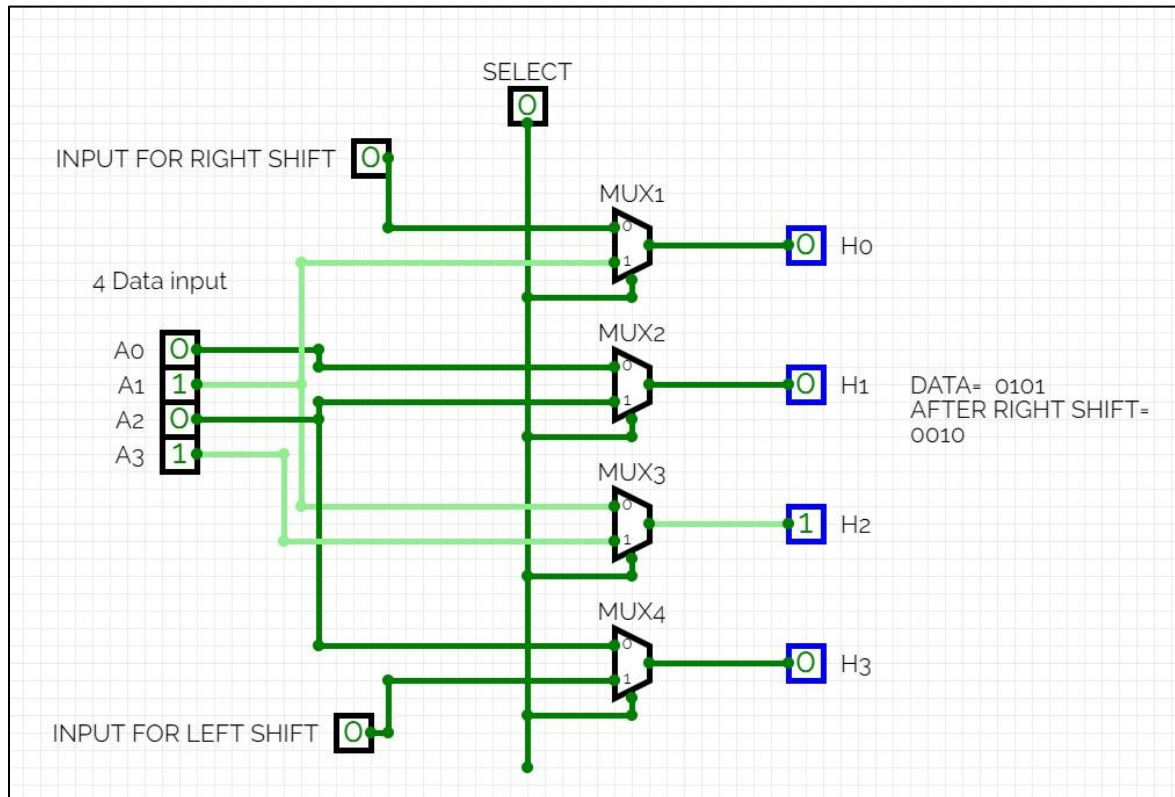## Truth table

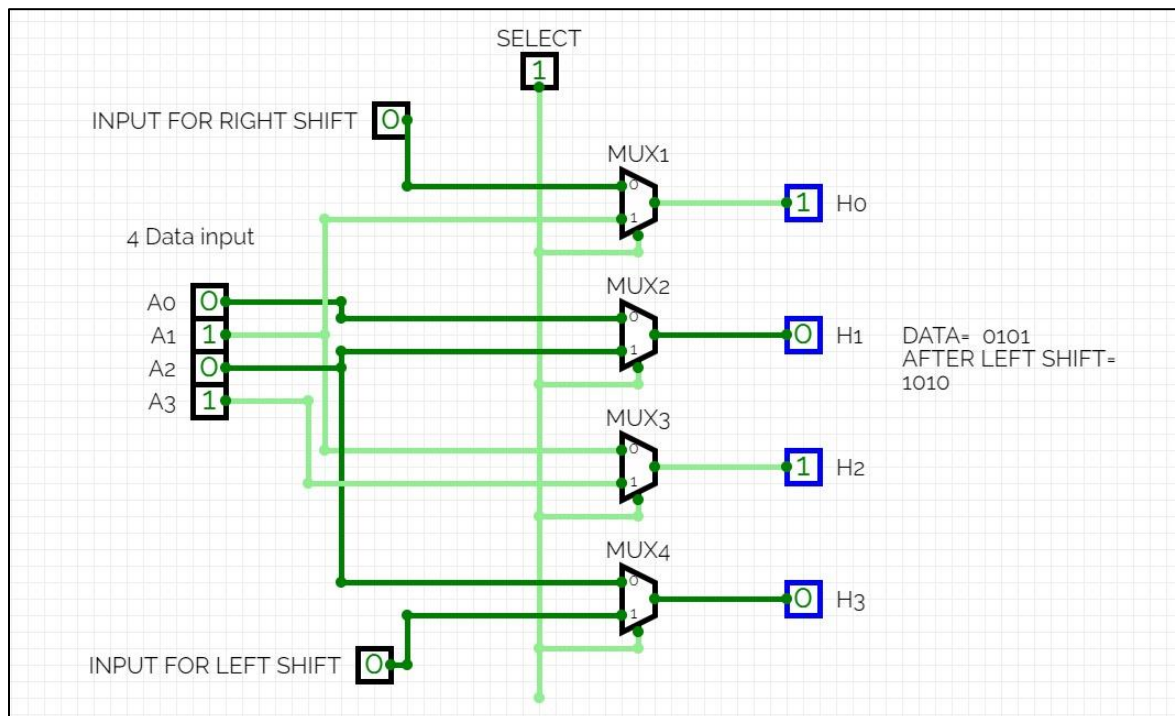|	Function table			
Select	Output			
S	H_0	H_1	H_2	H_3
0	I_R	A_0	A_1	A_2
1	A_1	A_2	A_3	I_L

When the selection input S = 0, the input data are shifted right (down in the diagram). When S = 1, the input data are shifted left (up in the diagram).
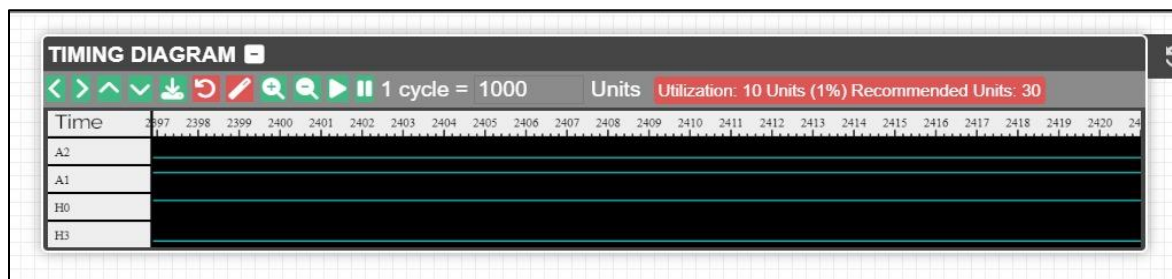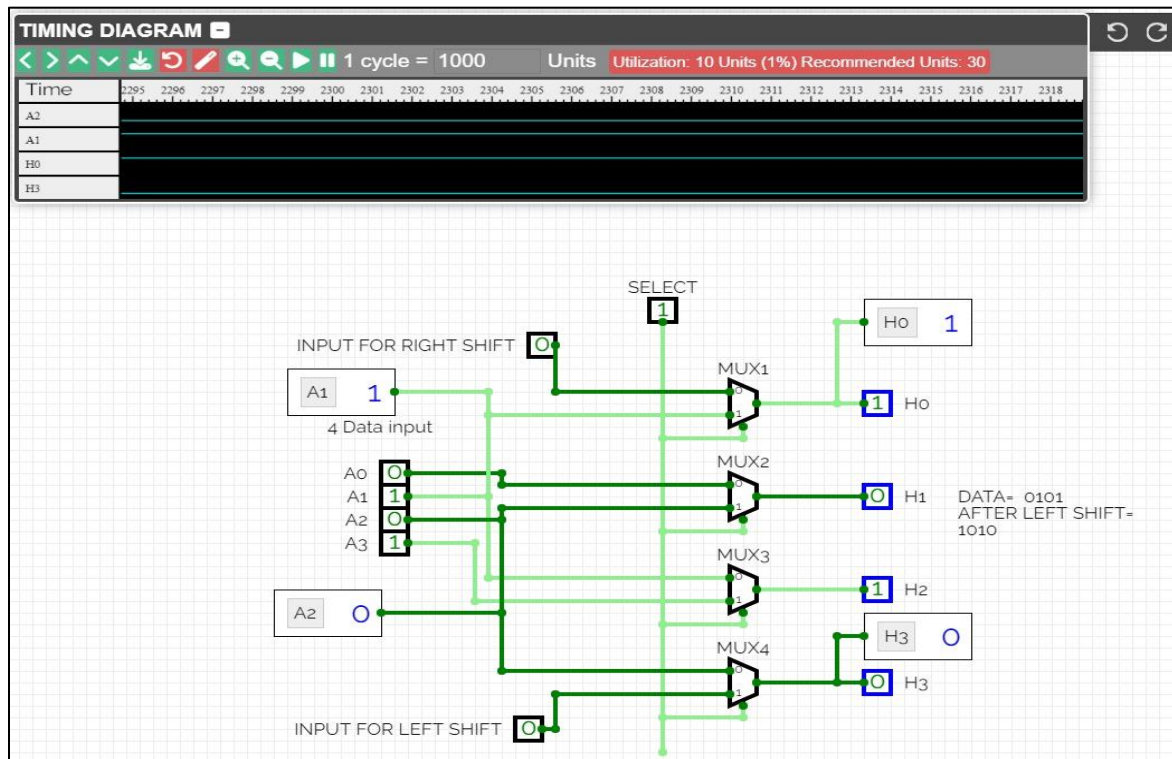
OUTPUT

LOGICAL RIGHT SHIFT

LOGICAL LEFT SHIFT

TIMING DIAGRAM

RESULT

4-bit combinational shifter has been designed successfully.

Criteria	Total Marks	Marks Obtained	Comments
Concept (A)	2		
Implementation (B)	2		
Performance (C)	2		
Total	6		