Assignment : Implementation of 2:1 MUX (Data flow), 4:1 MUX (Dataflow, if-else, using case), 1:4 DEMUX (using case and data flow) using Xilinx ISE

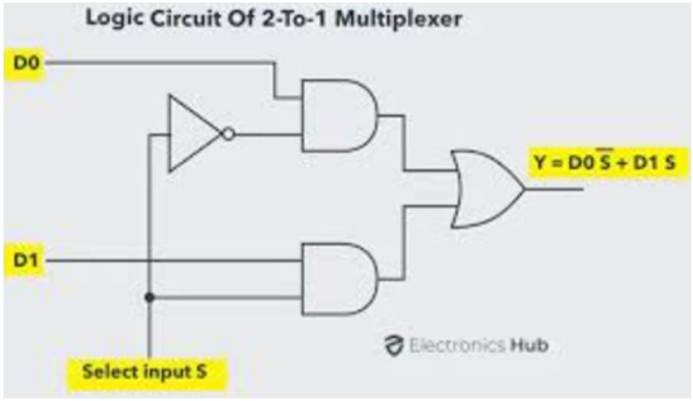
Software used: Xilinx ISE

Property Name	Value
Device family	Spartan3
Device	CX3S50
Package	PQ208
Speed	-5
Top-level source type	HDL
Synthesis Tool	XST (VHDL/Verilog)
Simulator	ISim (VHDL/Verilog)
Preferred Language	VHDL

Truth Table (2:1 MUX):

INPUT			**OUTPUT**
I1	**I0**	**S**	**O**
X	0	0	0
X	1	0	1
0	X	1	0
1	X	1	1

Data flow Model (2:1 MUX):



Code (2:1 MUX):

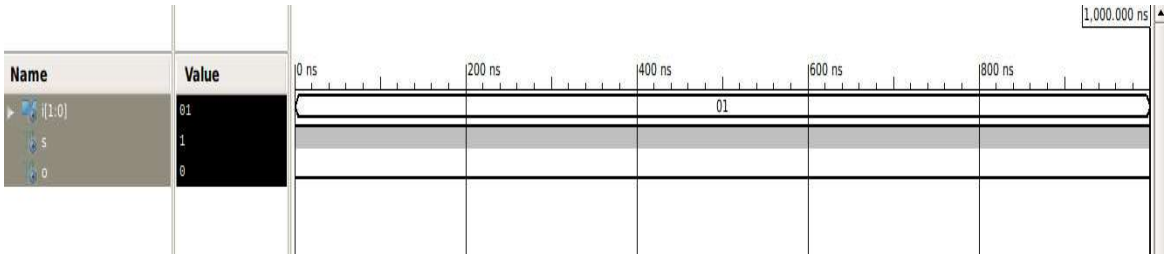
1. DataFlow Model Code:

O<=(I(0) and (not S)) or (I(1) and S);

2. Behavioral Model Code:

```
begin
--O<=(I(0) and (not S)) or (I(1) and S);
process(I,S)
begin
if S='0' then
O<=I(0);
else
O<=I(1);
end if;
end process;
end Behavioral;
```

Output:

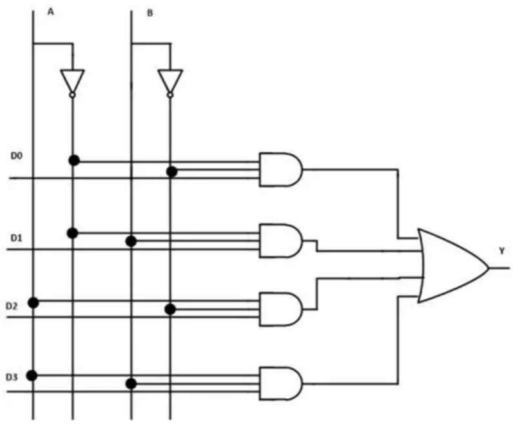


4:1 MUX

Truth Table of 4:1 MUX

I3	I2	I1	I0	S1	S0	O (Output)
X	X	X	0	0	0	0
X	X	X	1	0	0	1
X	X	0	X	0	1	0
X	X	1	X	0	1	1
X	0	X	X	1	0	0
X	1	X	X	1	0	1
0	X	X	X	1	1	0
1	X	X	X	1	1	1

Data flow Model:



Code:

1. DataFlow Model Code:

O< = ((not S(0)) and (not S(1)) and I(0))

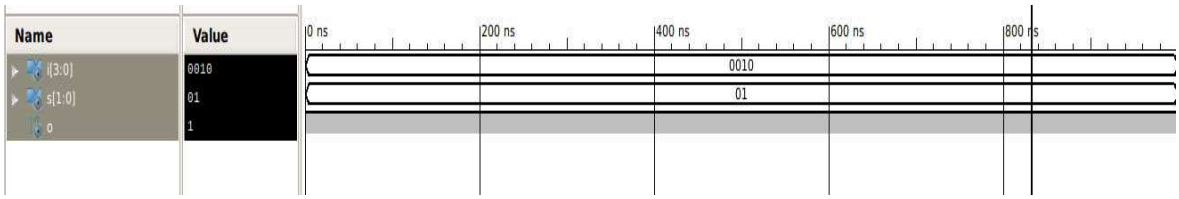
or (S(0) and (not S(1) and I(1))

or ((not S(0)) and S(1) and I(2)) or (S(0) and S(1) and I(3));

2. Behavioral Model Code:

```
begin
--O<=((not S(0)) and (not S(1)) and I(0)) or
-- (S(0) and (not S(1)) and I(1)) or
-- ((not S(0)) and S(1) and I(2)) or (S(0) and S(1) and I(3));
process(I,S)
begin
case S is
when "00"=>O<=I(0);
when "01"=>O<=I(1);
when "10"=>O<=I(2);
when "11"=>O<=I(3);
when others=> O<='X';
end case;
end process;
end Behavioral;
```

Output:

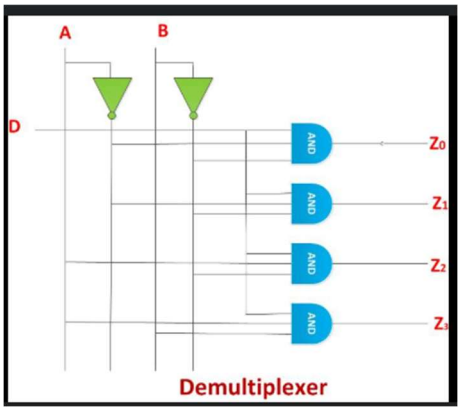


1:4 DEMUX:

Truth Table:

D	S1	S0	Y3	Y2	Y1	Y0
0	0	0	0	0	0	0
1	0	0	0	0	0	1
1	0	1	0	0	1	0
1	1	0	0	1	0	0
1	1	1	1	0	0	0

Data flow Model:



Code:

1. Behavioral Model Code:

```
begin
process(I,S)
begin
O<= (others=>'0');
case S is
when "00"=>O(0)<=I;
when "01"=>O(1)<=I;
when "10"=>O(2)<=I;
when "11"=>O(3)<=I;
when others=>O<= (others=>'0');

end case;
end process;
end Behavioral;
```

2. Data flow Model Code:

O <= ("0001" when S = "00" else "0010" when S = "01" else "0100" when S = "10" else "1000" when S = "11" else "0000");

Output: