Faculty of Engineering and Technology

Electrical and Computer Engineering Department

DIGITAL ELECTRONICS AND COMPUTER

ORGANIZATION LABORATORY

ENCS2110

Pre lab

Exp.No.3.Encoders,Decoders,Multiplexer,and Demultiplexer

Student Name:Saja Asfour

ID Number:1210737

Instructor name: Bilal Karaki

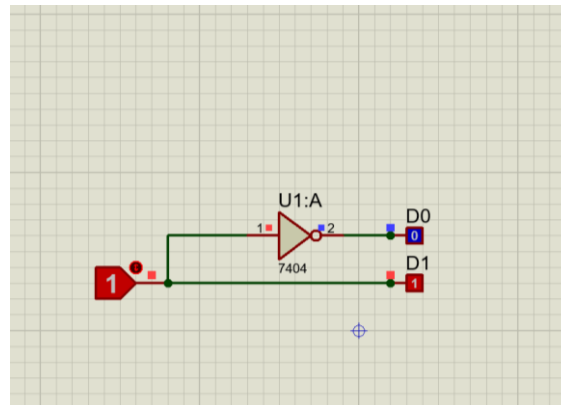Section Number:10

Place: Masri107

1-Using proteus build the following circuit and show why you use this component:

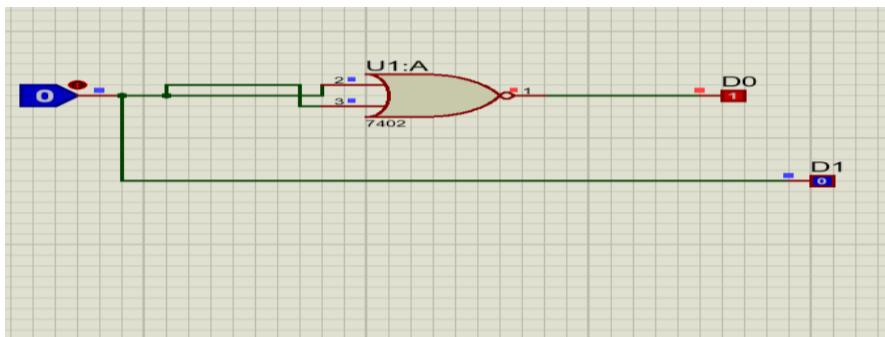a-Build 1x2 Decoder using basic gates:

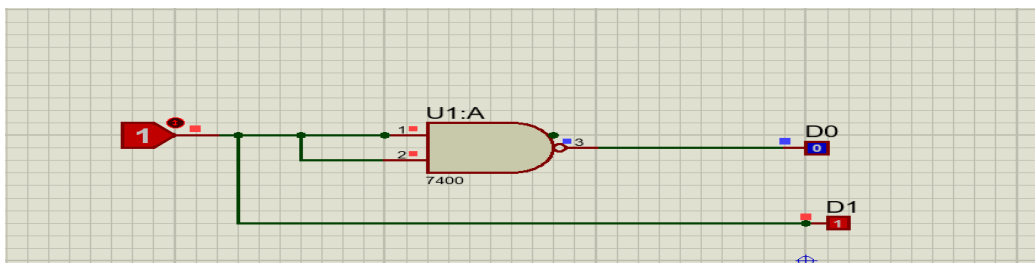| Input	Output	
A	D0	D1
0	1	0
1	0	1

D0=A'

D1=A

b- Build the above circuit using universal gates:

With NOR gate


With NAND gate

c- Build a 2x1 Encoder using basic gates

Input		OUTPUT
D0	D1	A
0	1	1
1	0	0
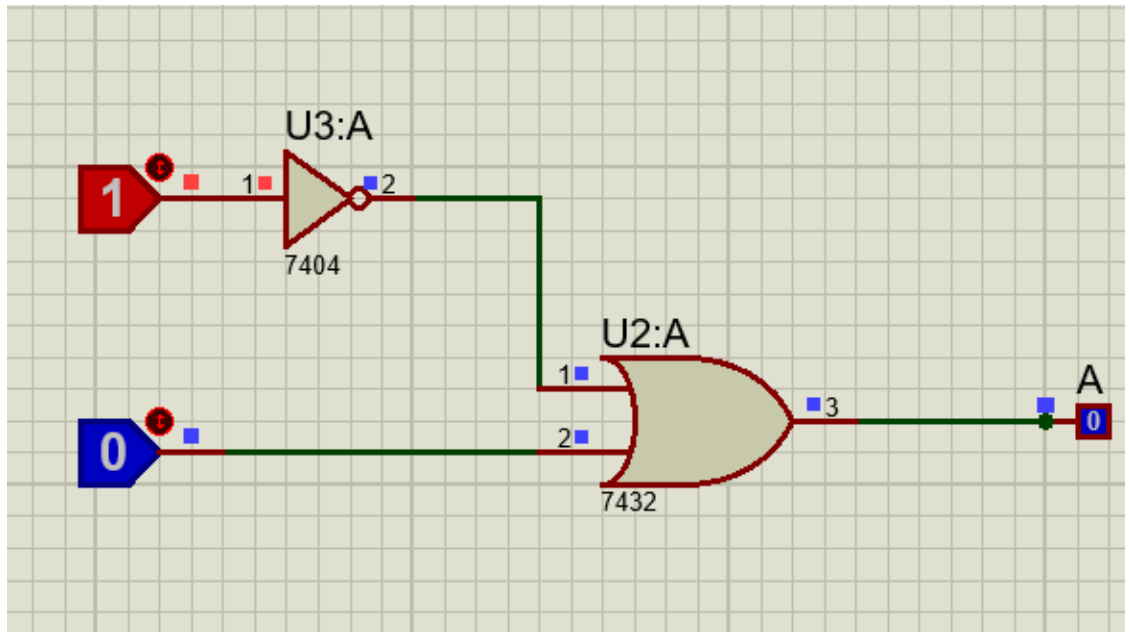
d- Build an 8x1 multiplexer using basic gate

INPUT											OUTPUT
S2	S1	S0	D0	D1	D2	D3	D4	D5	D6	D7	Y
0	0	0	0	X	X	X	X	X	X	X	0=D0
0	0	0	1	X	X	X	X	X	X	X	1=D0
0	0	1	X	0	X	X	X	X	X	X	0=D1
0	0	1	X	1	X	X	X	X	X	X	1=D1
0	1	0	X	X	0	X	X	X	X	X	0=D2
0	1	0	X	X	1	X	X	X	X	X	1=D2
0	1	1	X	X	X	0	X	X	X	X	0=D3
0	1	1	X	X	X	1	X	X	X	X	1=D3
1	0	0	X	X	X	X	0	X	X	X	0=D4
1	0	0	X	X	X	X	1	X	X	X	1=D4
1	0	1	X	X	X	X	X	0	X	X	0=D5
1	0	1	X	X	X	X	X	1	X	X	1=D5
1	1	0	X	X	X	X	X	X	0	X	0=D6
1	1	0	X	X	X	X	X	X	1	X	1=D6
1	1	1	X	X	X	X	X	X	X	0	0=D7
1	1	1	X	X	X	X	X	X	X	1	1=D7

Y=D0S2'S1'S0'+D1S2'S1'S0+D2S2'S1S0'+D3S2'S1S0+D4S2S1'S0'+D5S2S1'S0+D6S2S1S0'+D7S2S1S0
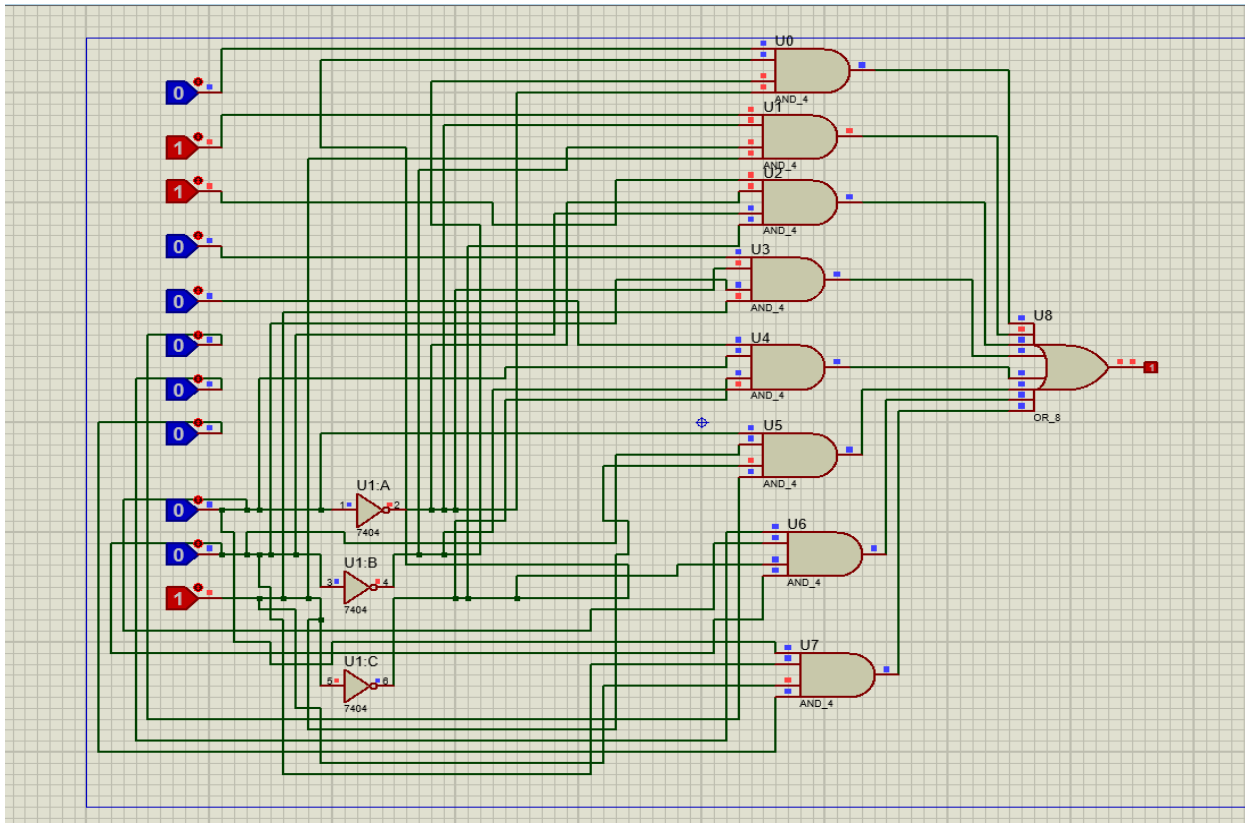
e- Build a 1x8 Demultiplexer using basic gate

Data input	Input			Output							
A	S2	S1	S0	D7	D6	D5	D4	D3	D2	D1	D0
A	0	0	0	0	0	0	0	0	0	0	A
A	0	0	1	0	0	0	0	0	0	A	0
A	0	1	0	0	0	0	0	0	A	0	0
A	0	1	1	0	0	0	0	A	0	0	0
A	1	0	0	0	0	0	A	0	0	0	0
A	1	0	1	0	0	A	0	0	0	0	0
A	1	1	0	0	A	0	0	0	0	0	0
A	1	1	1	A	0	0	0	0	0	0	0
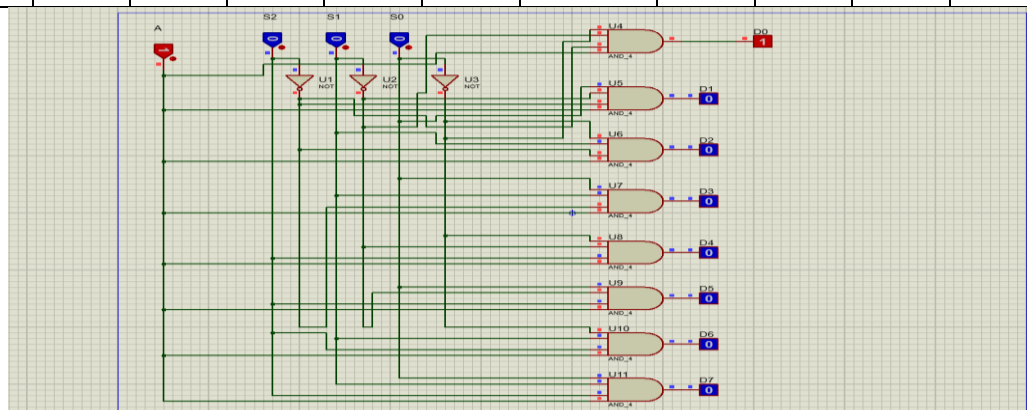
2- Design a circuit which uses an SN74151 to implement a sum-of-product expression , as follows:

A-convert the following expression into summation form

$$Y=f(A,B,C)=AB'+B'C$$

F=AB'(C+C')+B'C(A+A')

  =AB'C+AB'C'+AB'C+A'B'C

  =AB'C+AB'C'+A'B'C

  =m5+m4+m1

  ={1,4,5

A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	0
0	1	0	0
1	0	1	1
1	0	1	1
1	1	0	0
1	1	0	0

B- sketch on figure 1 the input necessary to implement the function in part a observe that the input are connected to 0 or 1 depending on the value of the function for that minterm