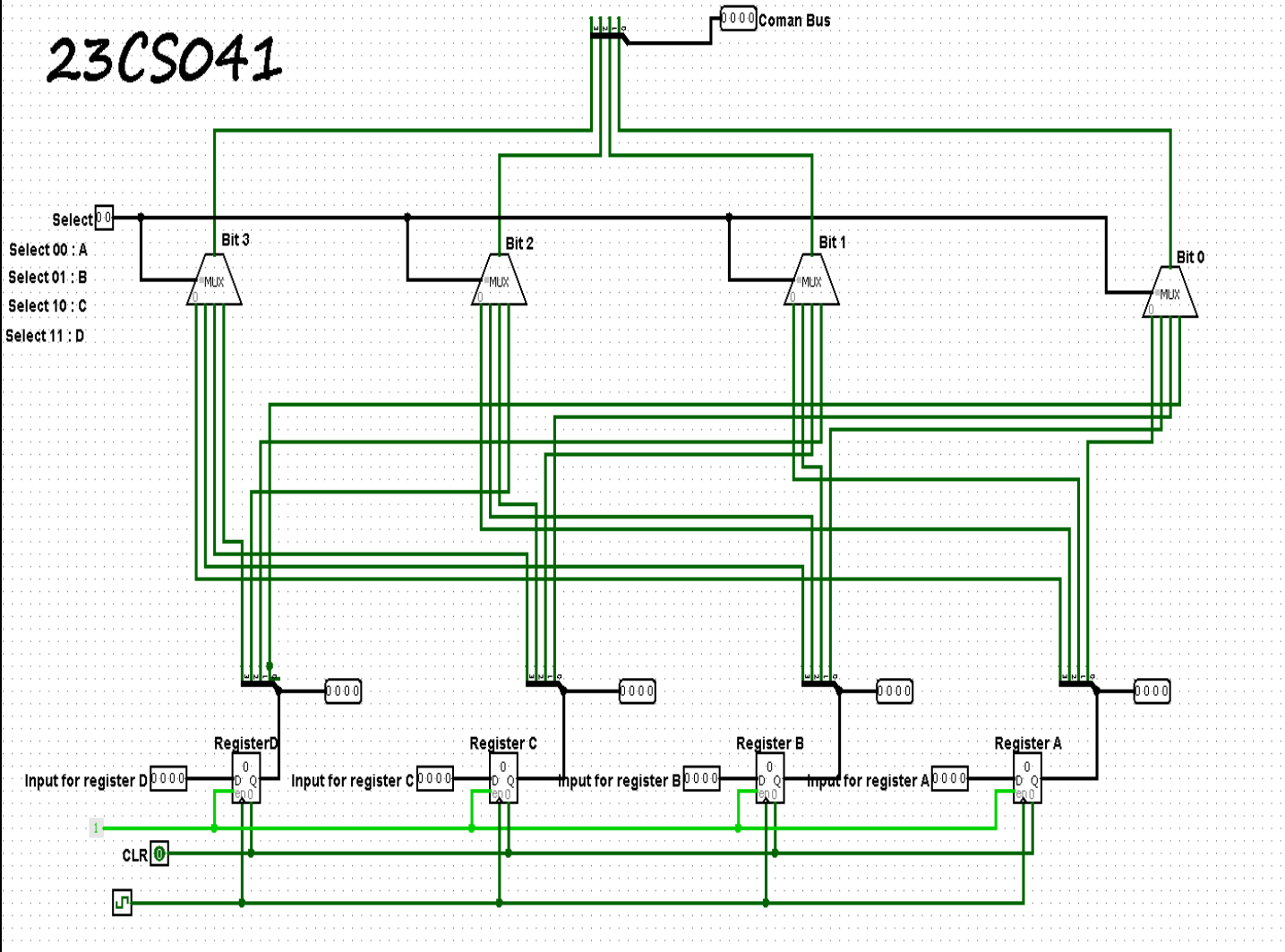
Date:

EXPERIMENT NO. 3

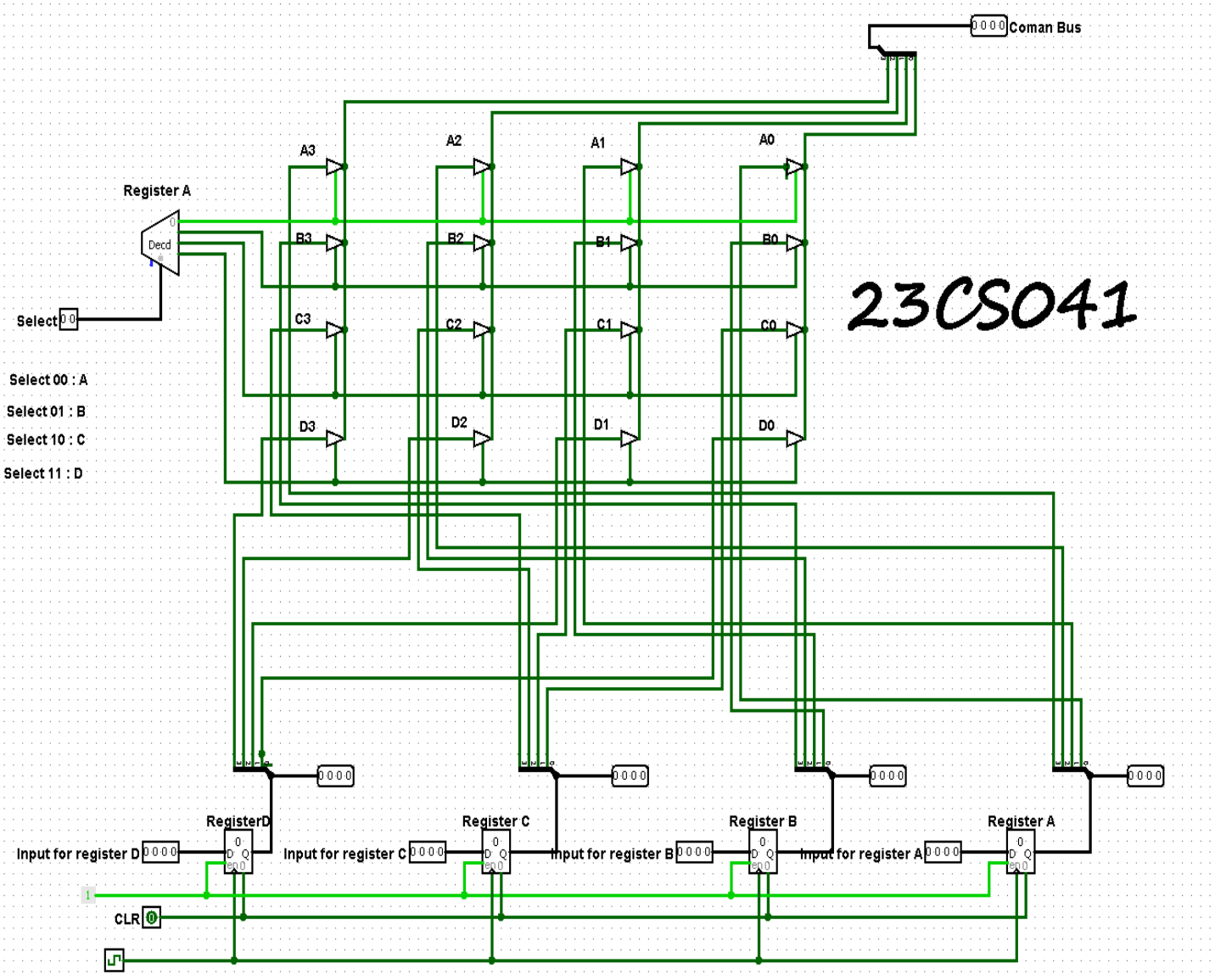
AIM: Implement a 4-bit common bus system to interface four 4-bit registers with a common bus using i. Multiplexer and ii. Decoder and tristate buffers.

CIRCUITS:

1) Multiplexer

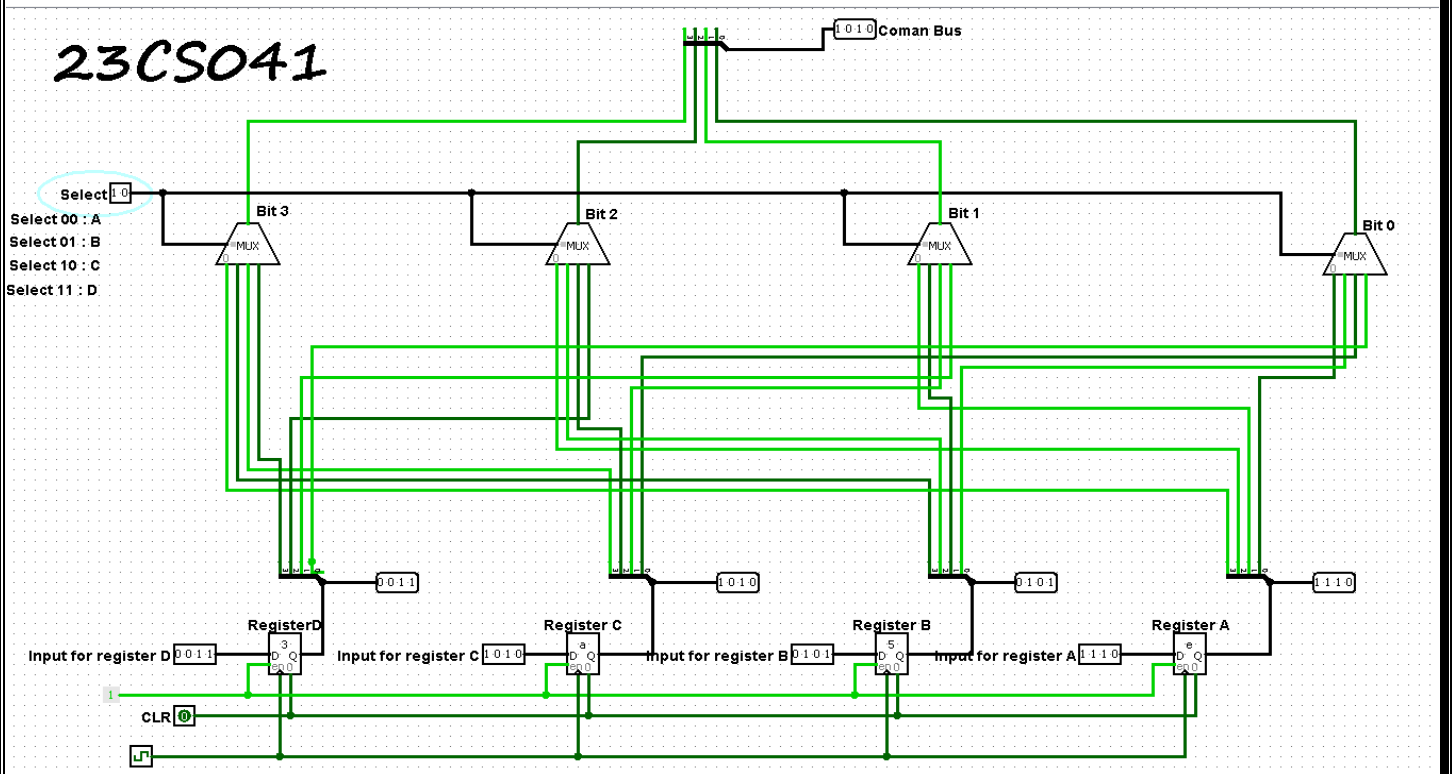


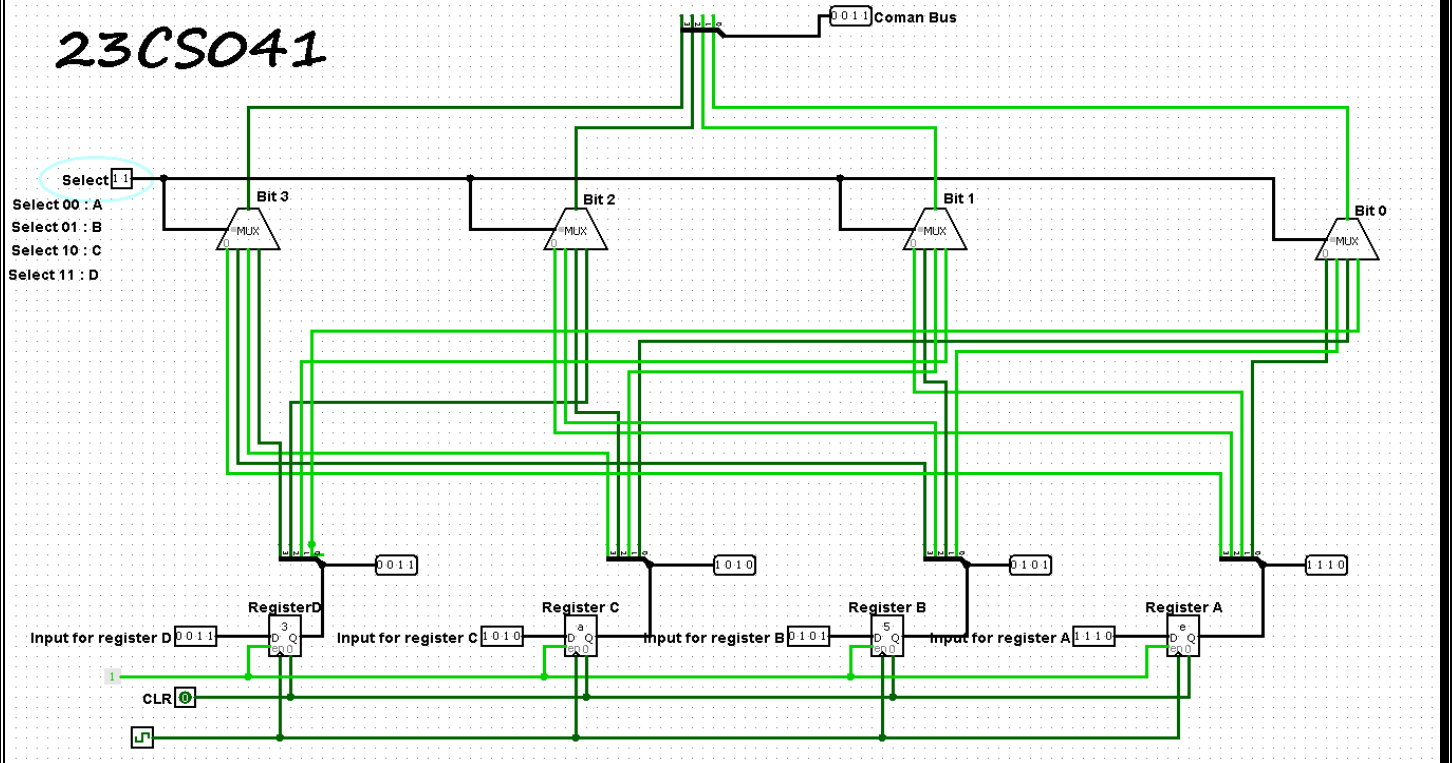
2) Decoder & tristate buffers



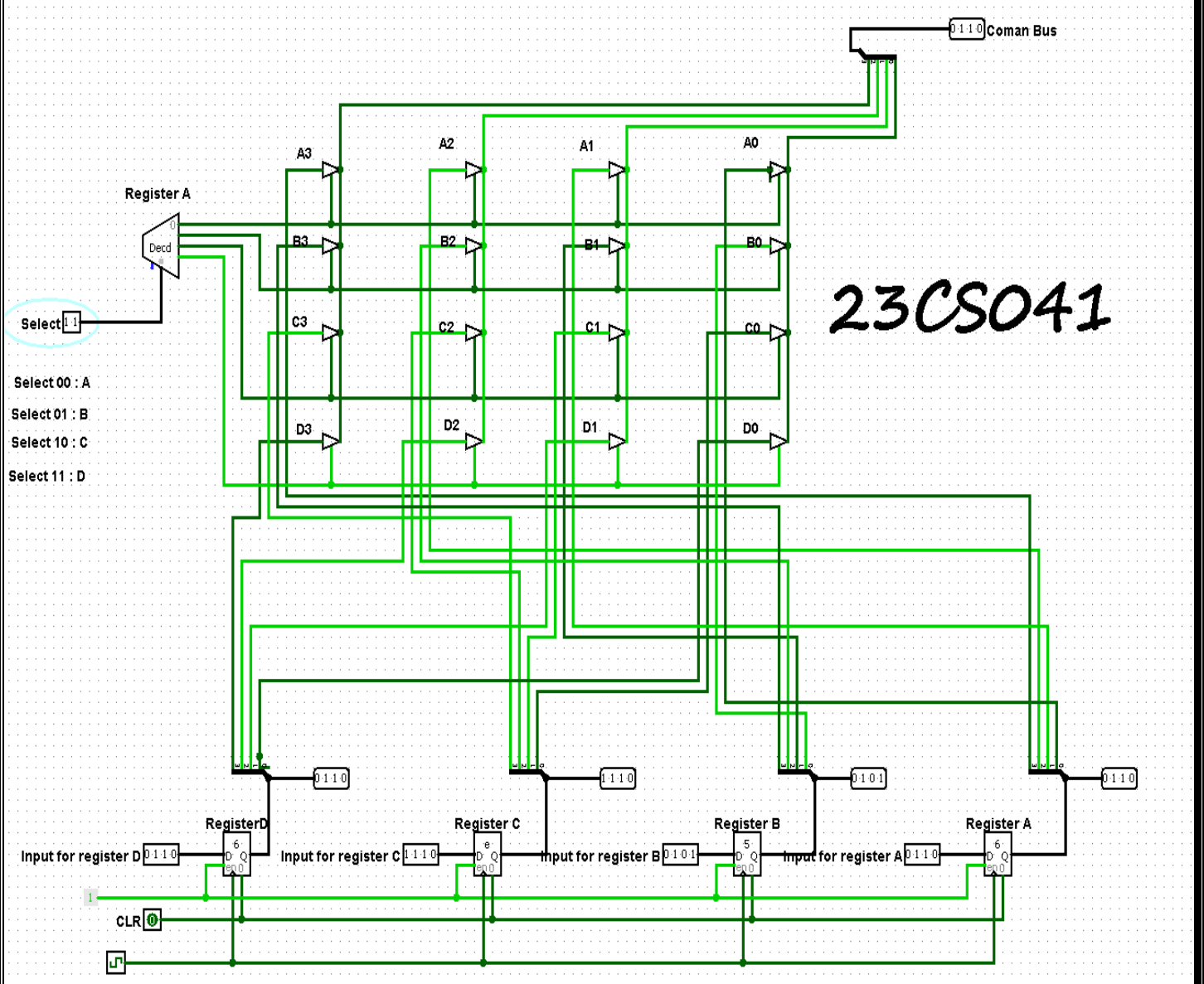
OUTPUTS:

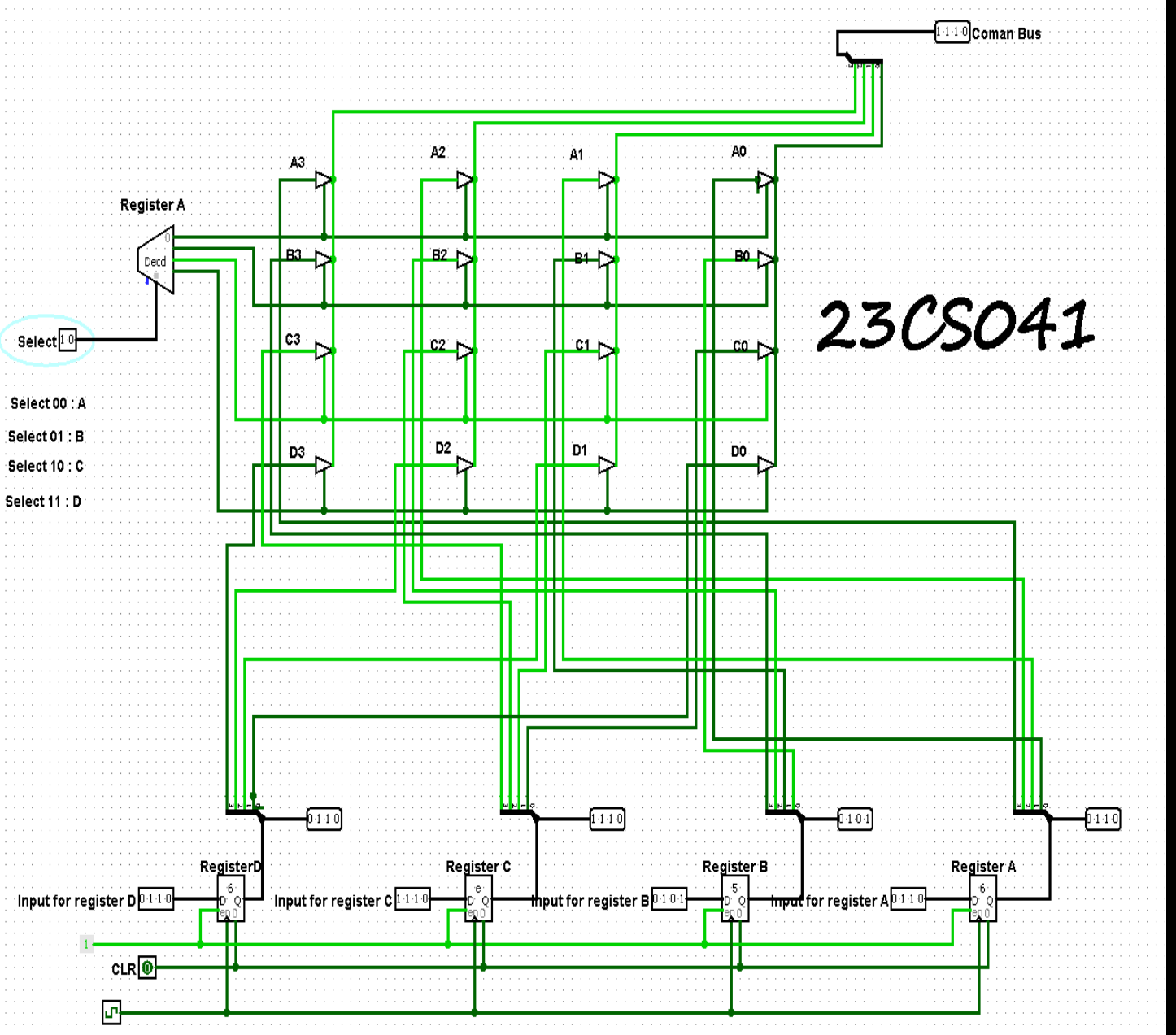
1)


23CS041
1010 Coman Bus
Select 10
Select 00 : A
Select 01 : B
Select 10 : C
Select 11 : D
Bit 3
Bit 2
Bit 1
Bit 0
MUX
0011
1010
0101
1110
RegisterD
Register C
Register B
Register A
Input for register D 0011
Input for register C 1010
Input for register B 0101
Input for register A 1110
CLR


23CS041
0011 Coman Bus
Select 11
Select 00 : A
Select 01 : B
Select 10 : C
Select 11 : D
Bit 3
Bit 2
Bit 1
Bit 0
MUX
0011
1010
0101
1110
RegisterD
Register C
Register B
Register A
Input for register D 0011
Input for register C 1010
Input for register B 0101
Input for register A 1110
CLR

2)


Coman Bus
Register A
Decd
Select
Select 00 : A
Select 01 : B
Select 10 : C
Select 11 : D
A3
A2
A1
A0
B3
B2
B1
B0
C3
C2
C1
C0
D3
D2
D1
D0
23CS041
RegisterD
Register C
Register B
Register A
Input for register D
Input for register C
Input for register B
Input for register A
CLR


Coman Bus
A3
A2
A1
A0
Register A
Decd
B3
B2
B1
B0
Select
C3
C2
C1
C0
Select 00 : A
Select 01 : B
Select 10 : C
Select 11 : D
D3
D2
D1
D0
23CS041
RegisterD
Register C
Register B
Register A
Input for register D
Input for register C
Input for register B
Input for register A
CLR

CONCLUSION:

POST SESSION EXCERCISES:

1. Find a number M=(MOD(Last Three Digits of your enrolment number, 5)+3) and find a number N=(MOD(Last Three Digits of your enrolment number, 3)+3). Implement a M-bit common bus system to interface N M-bit registers with a common bus using i. Multiplexer and ii. Decoder and tristate buffers.

→ Last Three Digits of my enrolment number is 041.

M = 41%5 + 3
= 1 + 3
M = 4

N = 41%3 + 3
N = 2 + 3
N = 5

Number of Multiplexers: 4

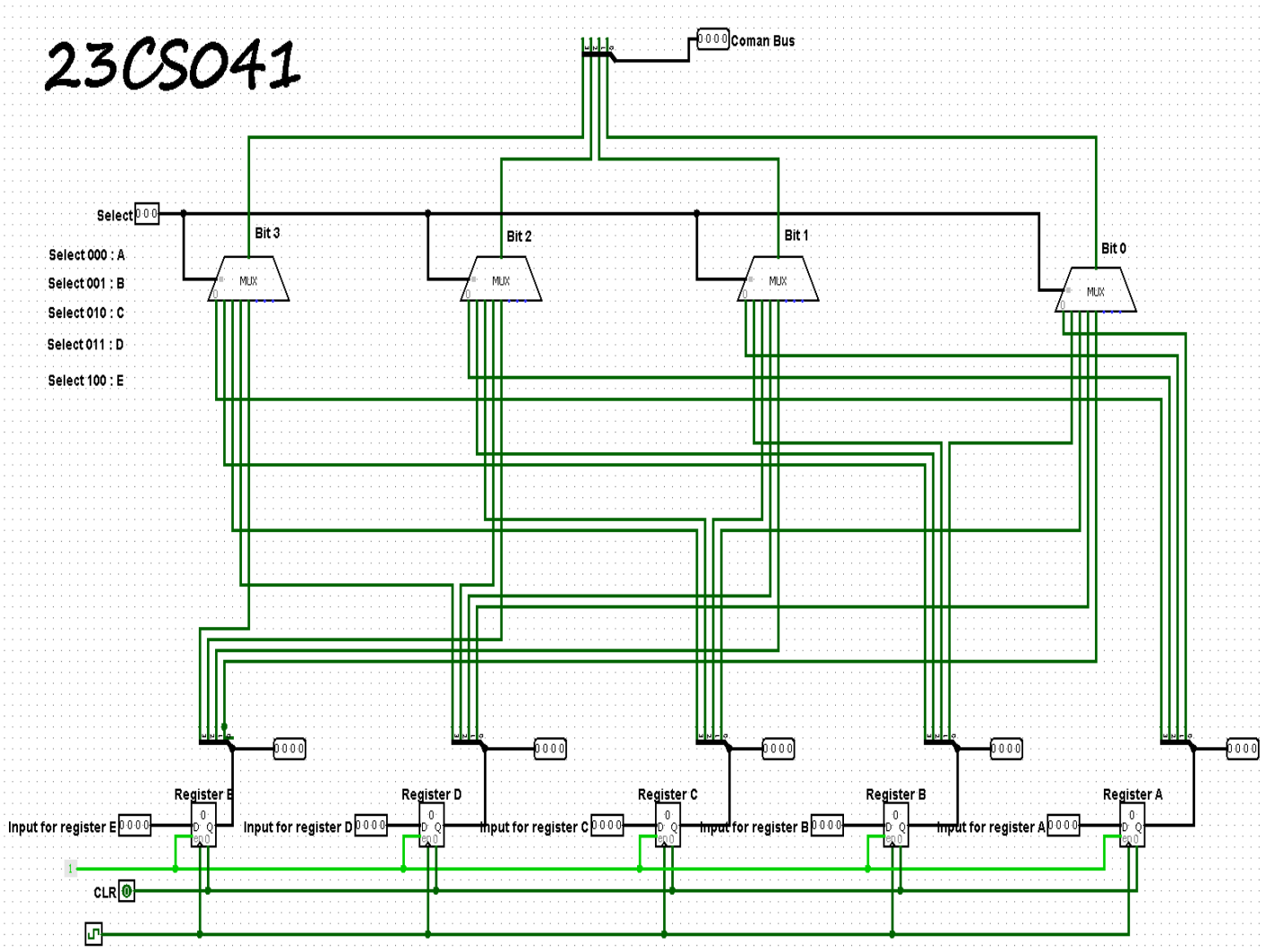
Number of registers, N = 5

Since N = 5, we need a 3-to-8 decoder .
Number of Decoders = 1

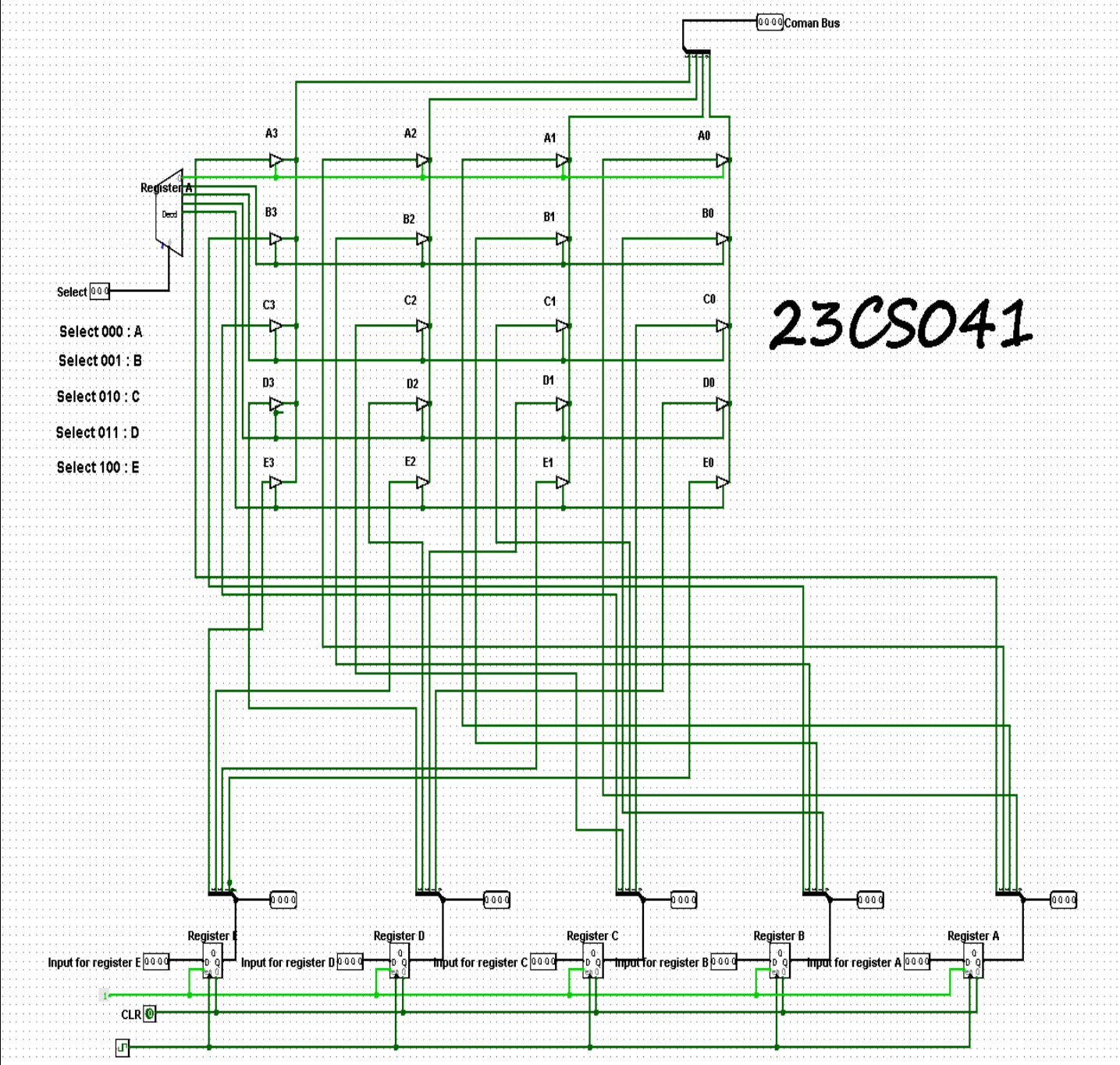
we need N x M (5 x 4) tristate buffers.
A Number of Tristate Buffers = N × M = 5x4 = 20.

CIRCUITS:

1) Multiplexer

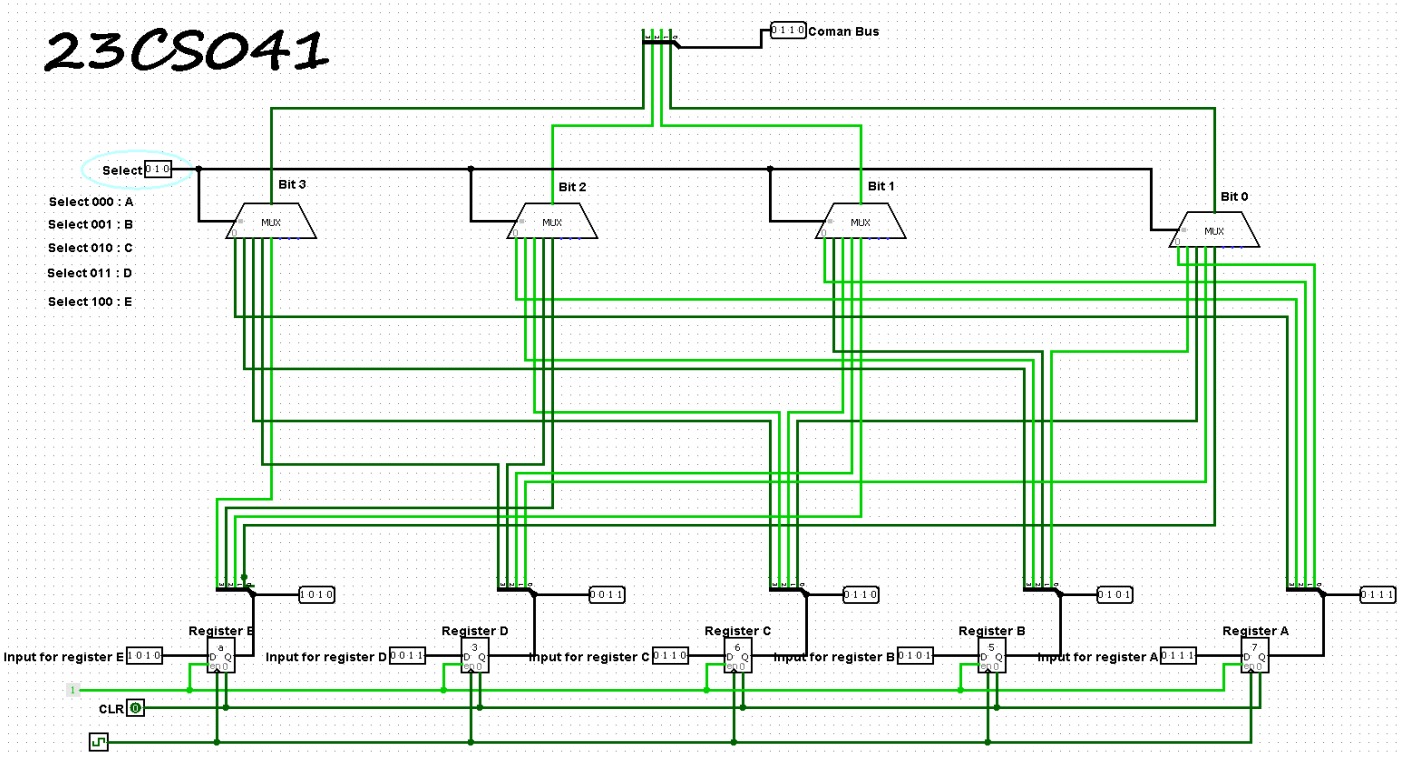


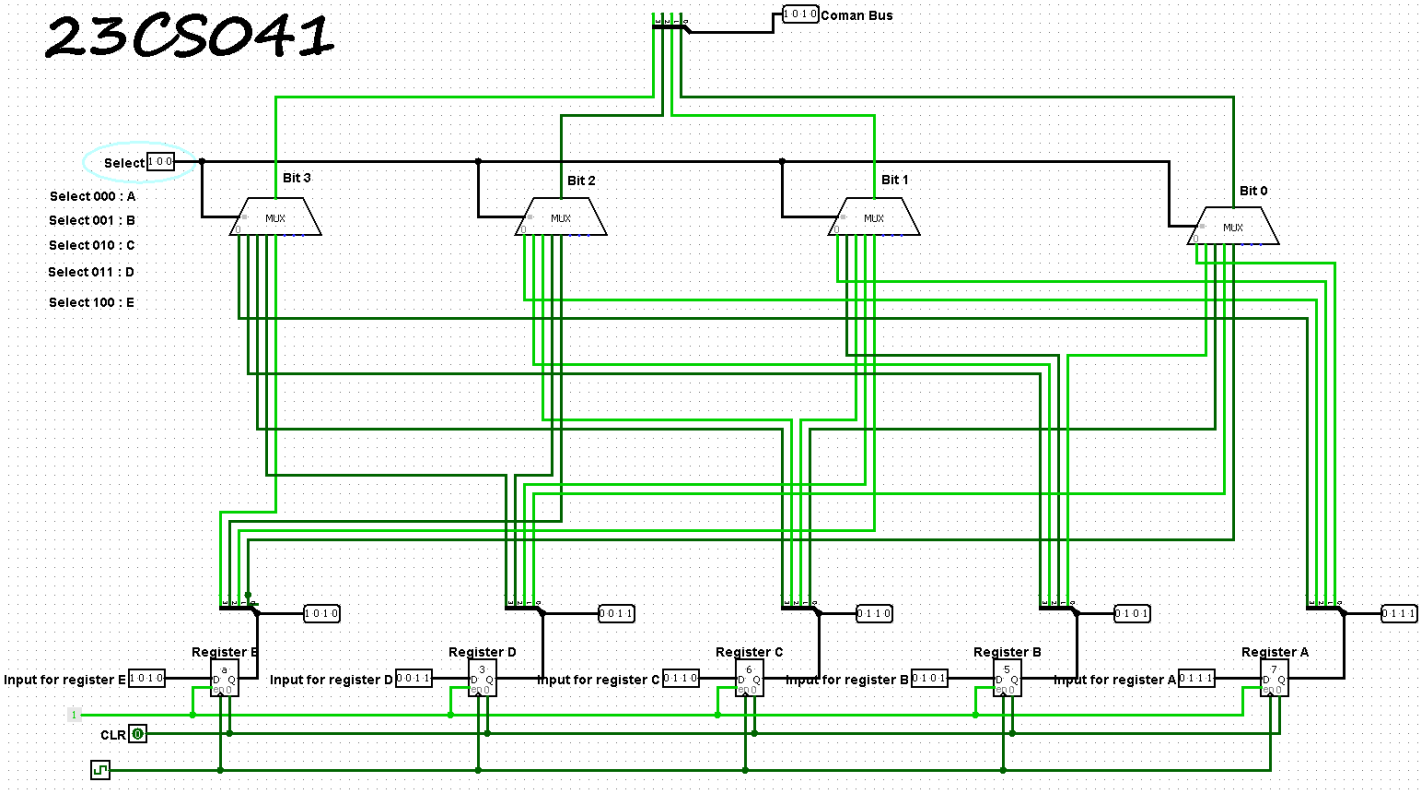
2) Decoder & tristate buffers



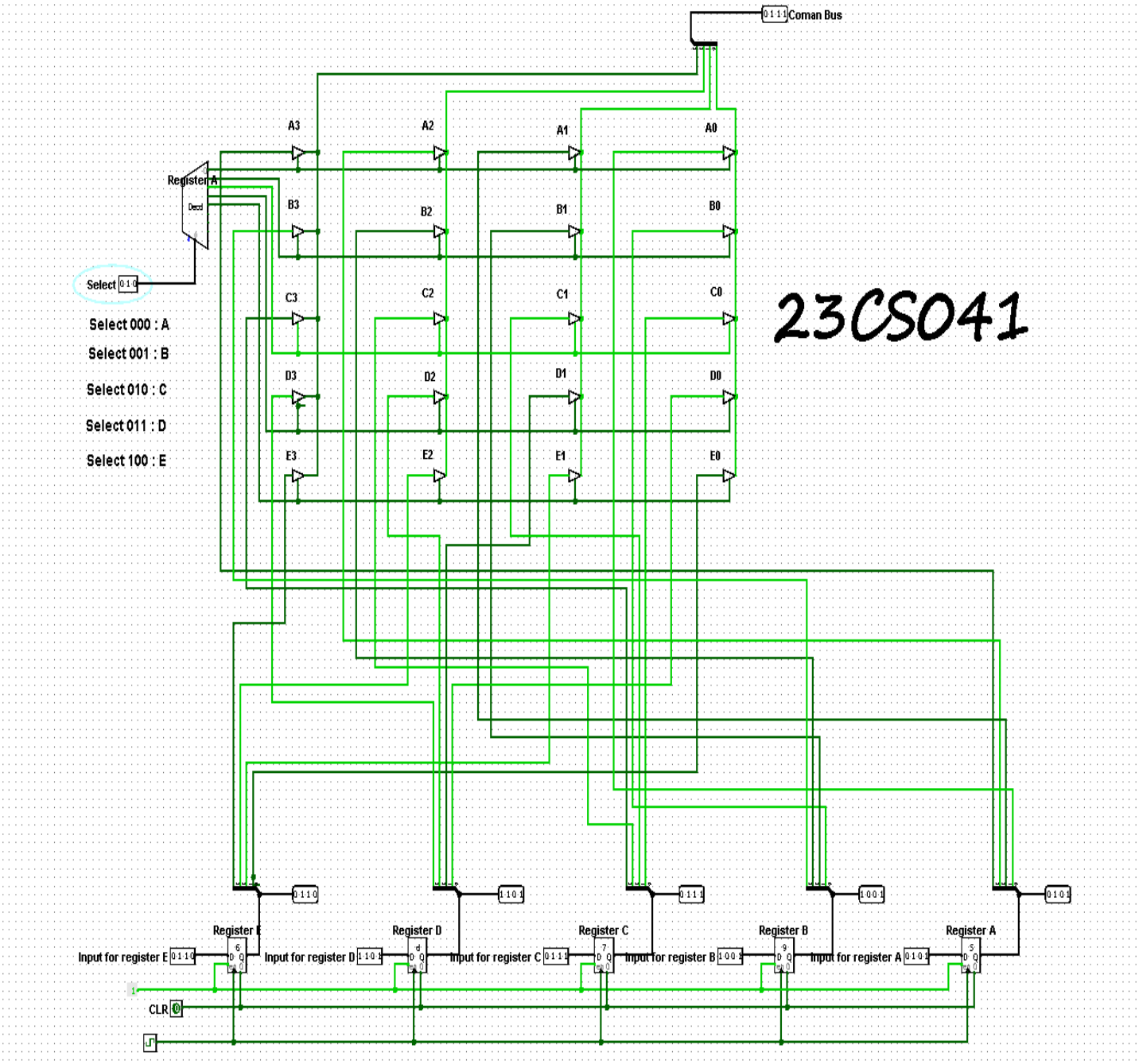
OUTPUTS:

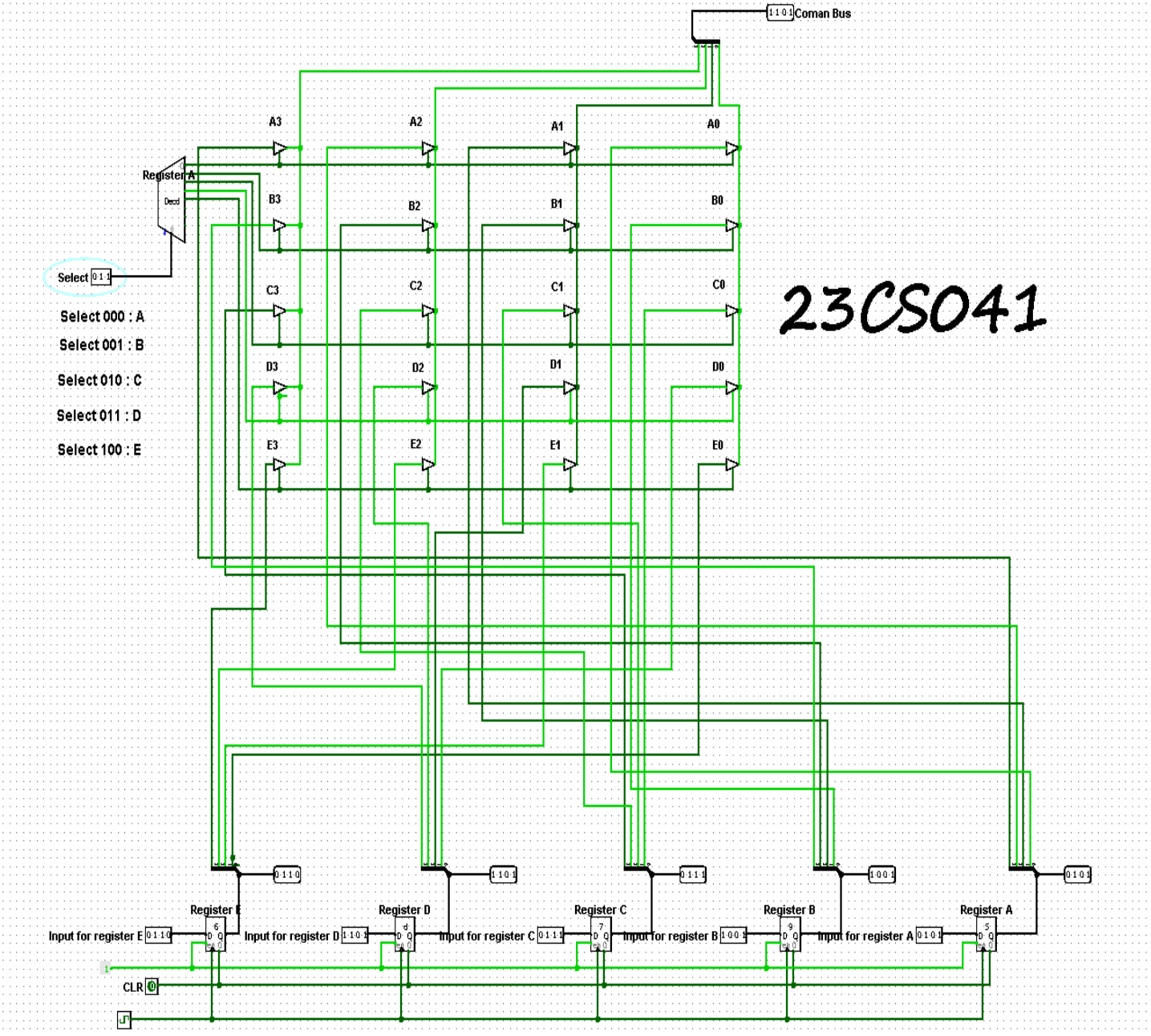
1)


23CS041
Coman Bus
Select
Select 000 : A
Select 001 : B
Select 010 : C
Select 011 : D
Select 100 : E
Bit 3
Bit 2
Bit 1
Bit 0
MUX
Register E
Register D
Register C
Register B
Register A
Input for register E
Input for register D
Input for register C
Input for register B
Input for register A
CLR


23CS041
Coman Bus
Select
Select 000 : A
Select 001 : B
Select 010 : C
Select 011 : D
Select 100 : E
Bit 3
Bit 2
Bit 1
Bit 0
MUX
Register E
Register D
Register C
Register B
Register A
Input for register E
Input for register D
Input for register C
Input for register B
Input for register A
CLR

2)


Coman Bus
A3
A2
A1
A0
Register A
B3
B2
B1
B0
Select
C3
C2
C1
C0
Select 000 : A
Select 001 : B
Select 010 : C
Select 011 : D
Select 100 : E
D3
D2
D1
D0
E3
E2
E1
E0
23CS041
Register E
Register D
Register C
Register B
Register A
Input for register E
Input for register D
Input for register C
Input for register B
Input for register A
CLR



23CS041—DHRUV LOKADIYA