DACD LAB 6

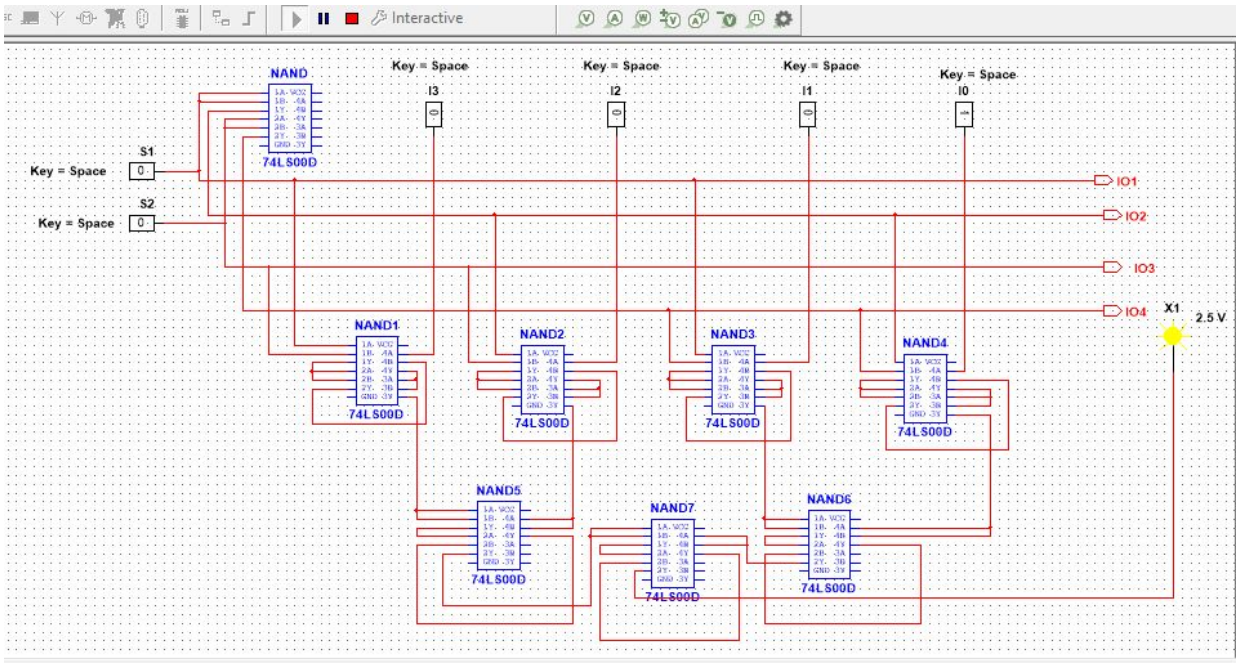
CED19I027

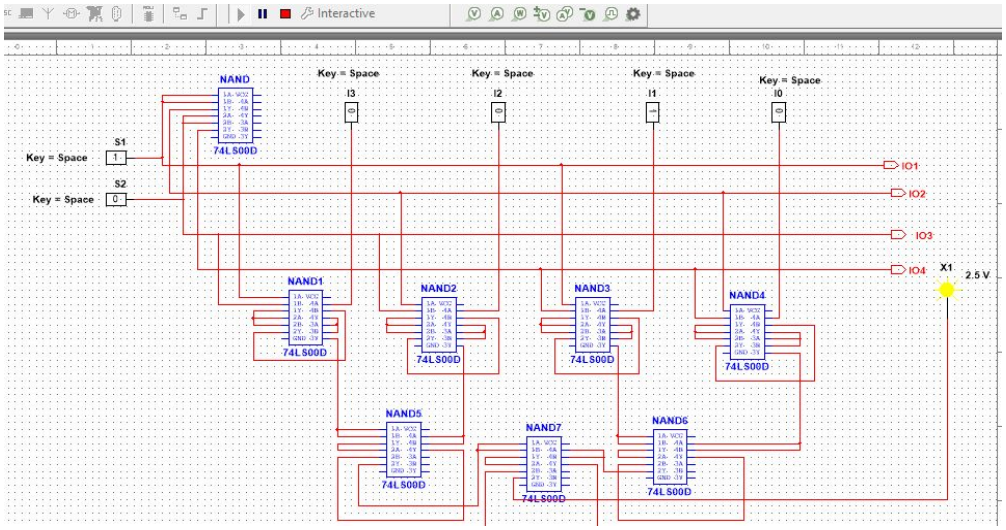
1) **4X1 Multiplexer**

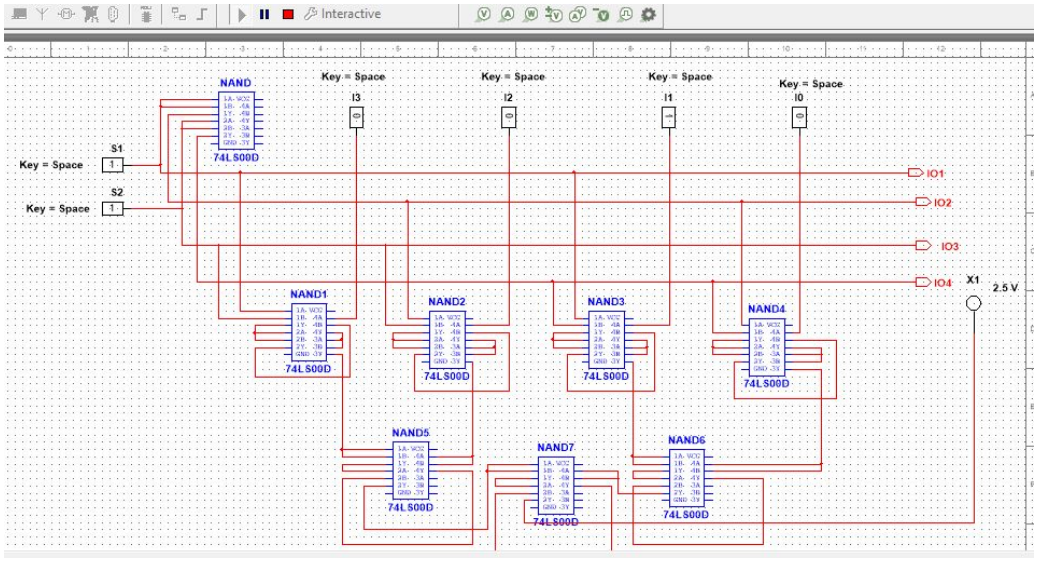
A multiplexer should be designed in such a way that if S1,S2 are the select lines and I0,I1,I2,I3 are the data input lines ,then the output Y should be as shown in the truth table below:

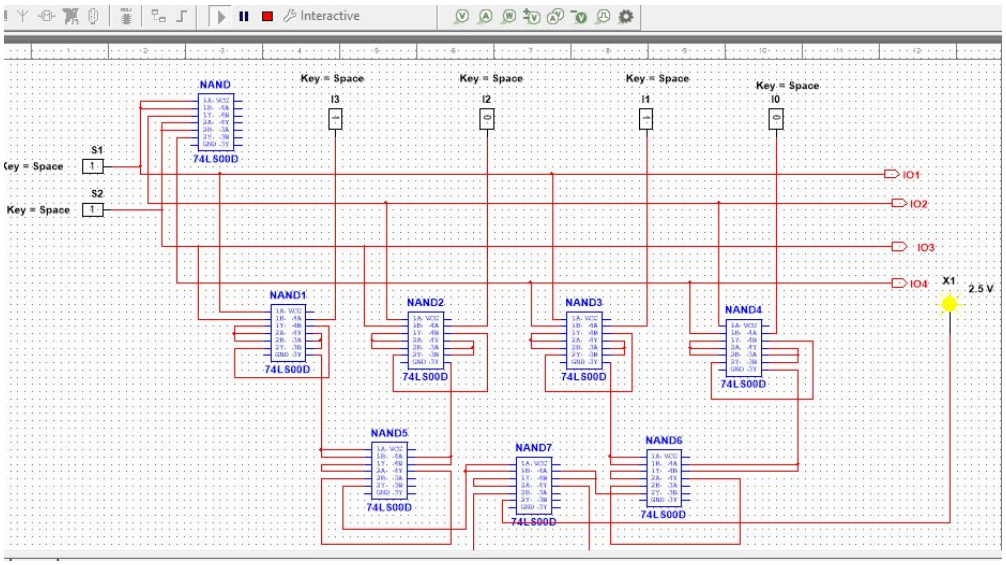
S2	S1	**Y**
0	0	**I0**
0	1	**I1**
1	0	**I2**
1	1	**I3**

Y=(S2)'(S1)'(I0) + (S2)'(S1)(I1) + (S2)(S1)'(I2) + (S2)(S1)(I3)




Interactive
NAND
74LS00D
Key = Space
I3
I2
I1
I0
S1
S2
IO1
IO2
IO3
IO4
X1
2.5 V
NAND1
NAND2
NAND3
NAND4
NAND5
NAND7
NAND6


Interactive
NAND
74LS00D
Key = Space
I3
I2
I1
I0
S1
S2
IO1
IO2
IO3
IO4
X1
2.5 V
NAND1
NAND2
NAND3
NAND4
NAND5
NAND7
NAND6

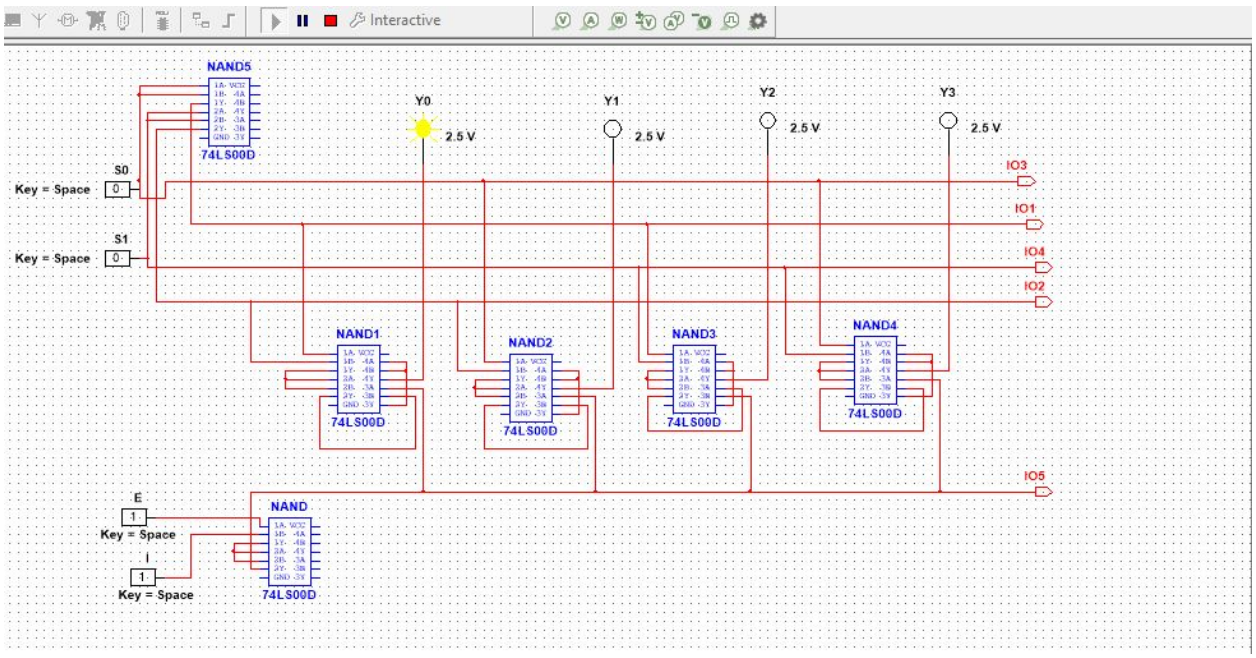

Interactive
NAND
74LS00D
Key = Space
I3
I2
I1
I0
S1
S2
IO1
IO2
IO3
IO4
X1
2.5 V
NAND1
NAND2
NAND3
NAND4
NAND5
NAND7
NAND6

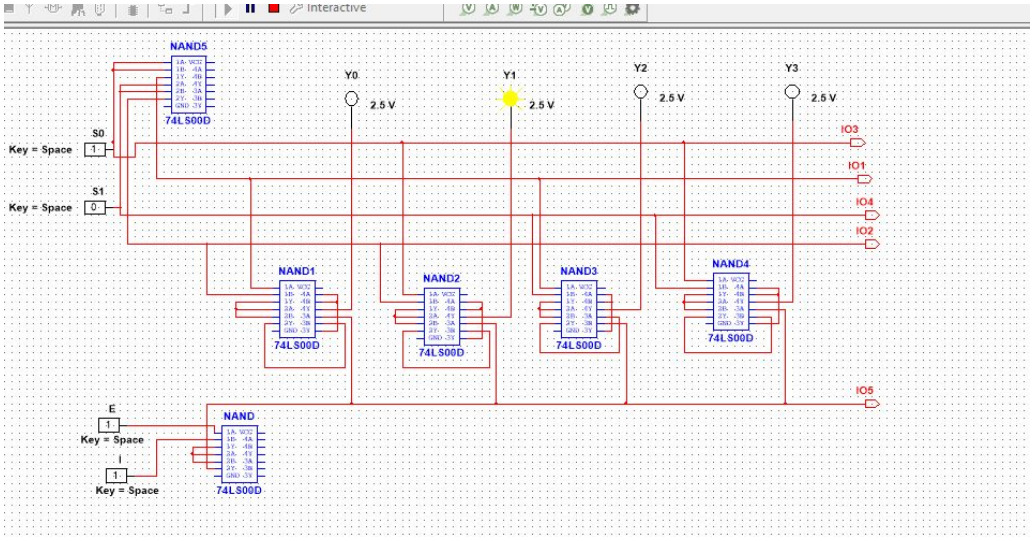
2) 1X4 Demultiplexer

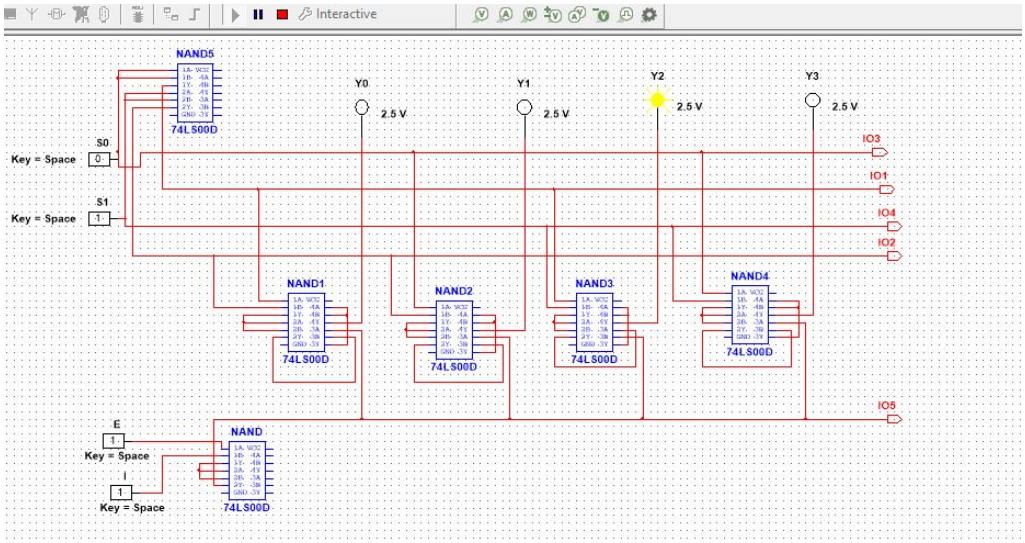
A Demultiplexer should be designed in such a way that for select line S0,S1 and outputs Y0,Y1,Y2,Y3 and E is enable.Truth Table for this is given below:

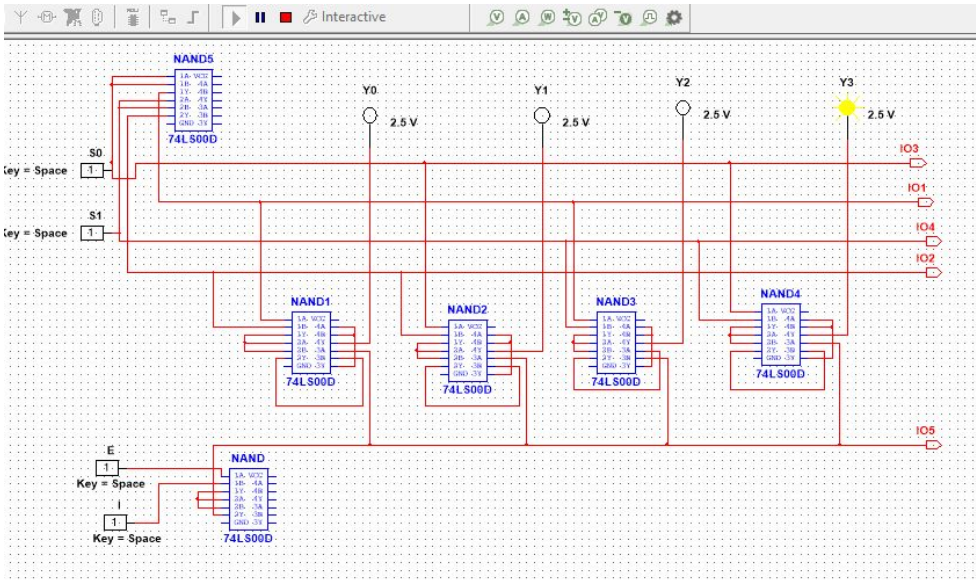
E	S1	S0	**Y0**	**Y1**	**Y2**	**Y3**
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	0	0	0
0	1	1	0	0	0	0
1	0	0	**I**	0	0	0
1	0	1	0	**I**	0	0
1	1	0	0	0	**I**	0
1	1	1	0	0	0	**I**

Y0=(E)(S1)'(S0)'(I)
Y1=(E)(S1)'(S0)(I)
Y2=(E)(S1)(S0)'(I)
Y3=(E)(S1)(S0)(I)




Interactive
NAND5
74LS00D
Y0
2.5 V
Y1
2.5 V
Y2
2.5 V
Y3
2.5 V
S0
Key = Space
1
S1
Key = Space
0
IO3
IO1
IO4
IO2
NAND1
NAND2
NAND3
NAND4
IO5
E
Key = Space
1
NAND
i
Key = Space
1


Interactive
NAND5
74LS00D
Y0
2.5 V
Y1
2.5 V
Y2
2.5 V
Y3
2.5 V
S0
Key = Space
0
S1
Key = Space
1
IO3
IO1
IO4
IO2
NAND1
NAND2
NAND3
NAND4
IO5
E
Key = Space
1
NAND
i
Key = Space
1


Interactive
NAND5
74LS00D
Y0
2.5 V
Y1
2.5 V
Y2
2.5 V
Y3
2.5 V
S0
1
S1
1
IO3
IO1
IO4
IO2
NAND1
NAND2
NAND3
NAND4
IO5
E
Key = Space
1
NAND
i
Key = Space
1

3) Given logic :

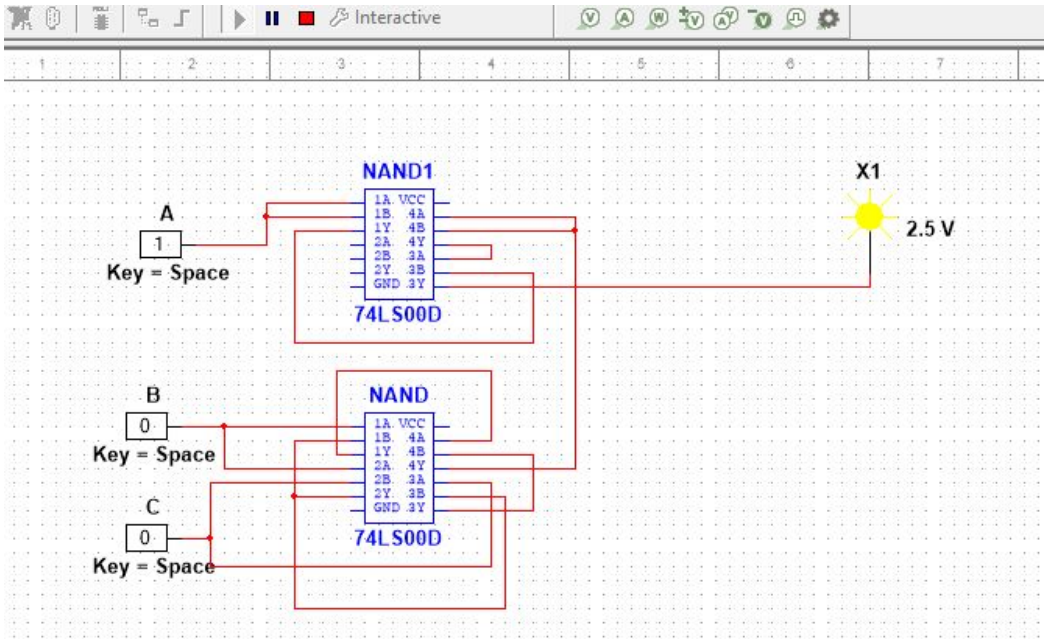
- **Output X will equal A when control inputs B and C are the same.**
- **X will remain HIGH when B and C are different.**

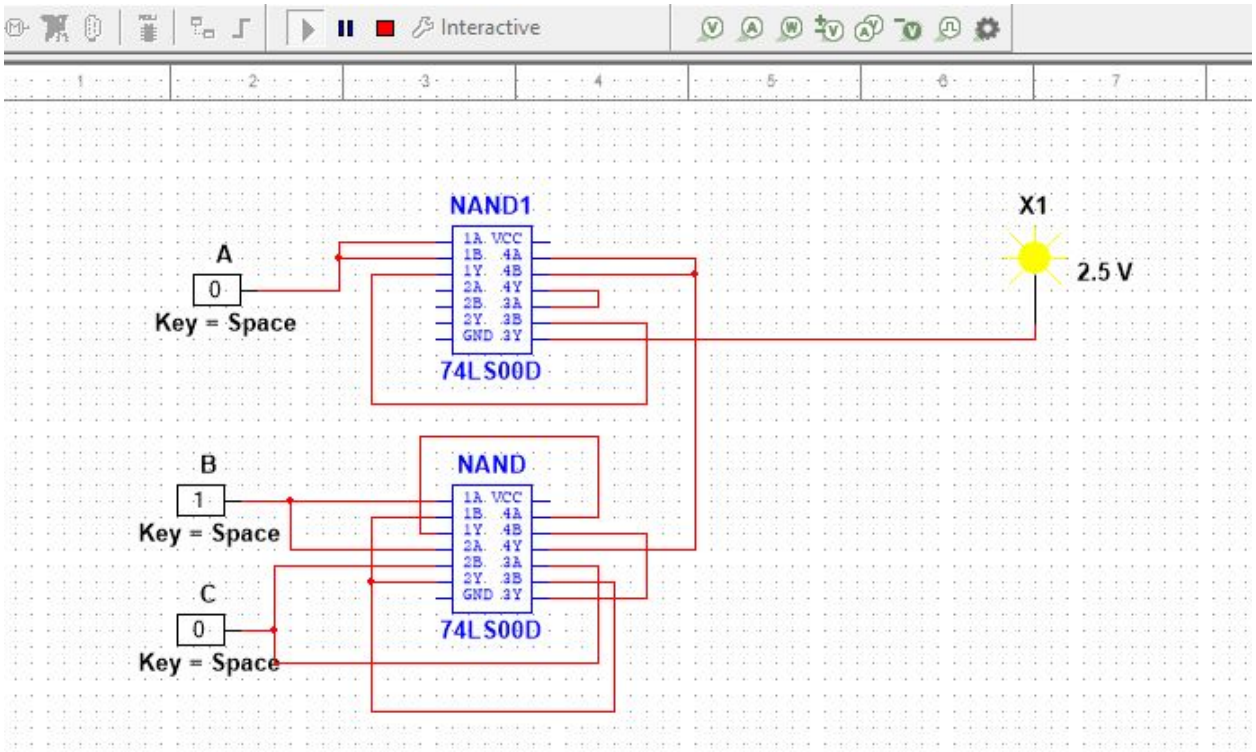
Truth table for the above logic is as follows:

A	B	C	**X**
1	0	0	**1**
0	0	0	**0**
1	1	1	**1**
0	1	1	**0**
1	0	1	**1**
0	0	1	**1**
0	1	0	**1**
1	1	0	**1**

On using K-maps and finding an equation , we get the minimum equation as:

X = A + XOR(B,C)




Interactive
NAND1
1A VCC
1B 4A
1Y 4B
2A 4Y
2B 3A
2Y 3B
GND 3Y
74LS00D
A
0
Key = Space
X1
2.5 V
NAND
B
1
Key = Space
C
0
Key = Space