



## **Lab Task 1/Assignment 1:**

Information and Communication Technology  
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### **DETAILS:**

Number System Conversions

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Section: BCS-1C

## BINARY TO DECIMAL CONVERSION

Binary	Decimal
$1101_2$	$13_{10}$
$1010101_2$	$85_{10}$

o- Binary to Decimal:

o-  $1101_2$  :

<del>1</del>	<del>x</del>	<del><math>2^0</math></del>	<del>=</del>	<del>1</del>
<del>1</del>	<del>x</del>	<del><math>2^1</math></del>	<del>=</del>	<del>0</del>
<del>0</del>	<del>x</del>	<del><math>2^2</math></del>	<del>=</del>	<del>4</del>
<del>1</del>	<del>x</del>	<del><math>2^3</math></del>	<del>=</del>	<del>8</del>

$1 + 0 + 4 + 8$

$1101 = \boxed{13_{10}}$

$1101 = \boxed{13_{10}}$

o-  $1010101_2$  :

1	x	$2^0$	=	1
0	x	$2^1$	=	0
1	x	$2^2$	=	4
0	x	$2^3$	=	0
1	x	$2^4$	=	16
0	x	$2^5$	=	0
1	x	$2^6$	=	64

$1010101 = 1 + 0 + 4 + 0 + 16 + 0 + 64$

$1010101 = \boxed{85_{10}}$

## DECIMAL TO BINARY CONVERSION

Decimal	Binary
$45_{10}$	$101101_2$
$103_{10}$	$1100111_2$

o- Decimal to Binary :

o- 45 :

2	45	
2	22	-1
2	11	-0
2	5	-1
2	2	-1
2	1	-0
	0	-1

So:

$45_{10} =$   $101101_2$

o- 103 :

2	103	
2	51	-1
2	25	-1
2	12	-1
2	6	-0
2	3	-0
2	1	-1
	0	-1

So:

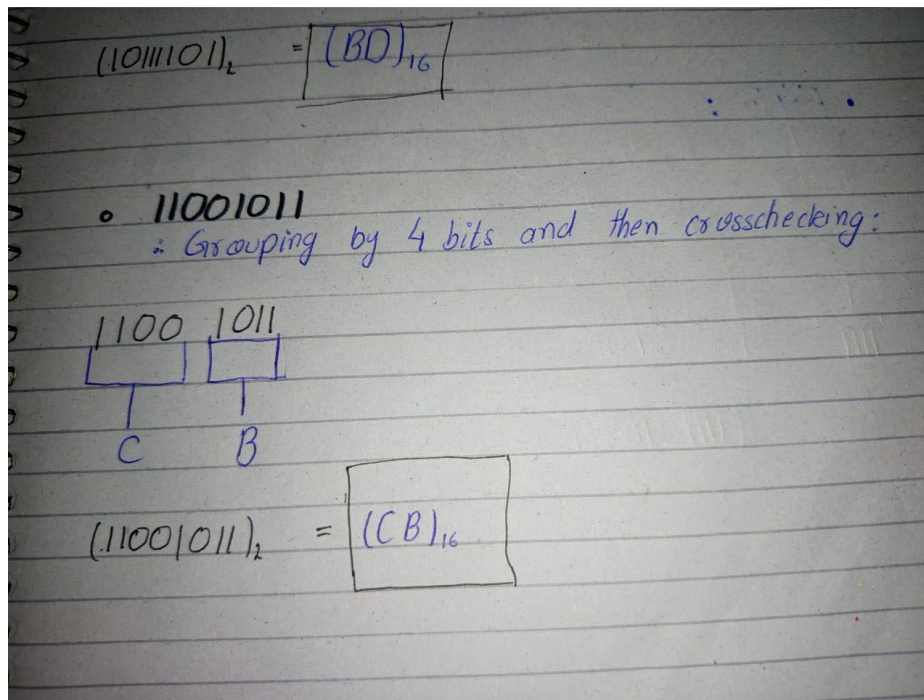
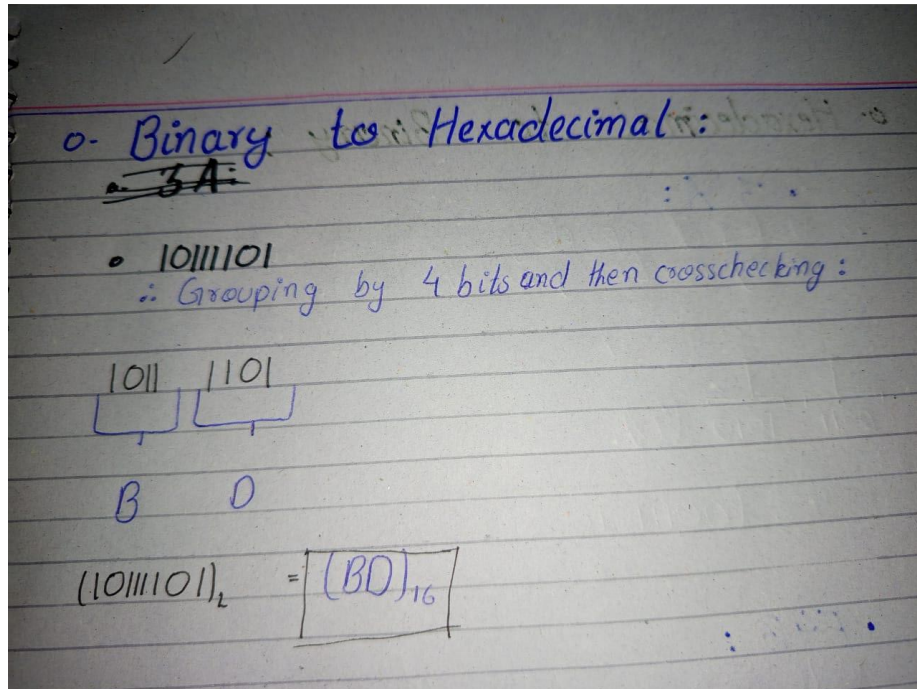
$103_{10} =$   $1100111_2$



## BINARY TO HEXADECIMAL

(HEXADECIMAL TO BINARY EQUIVALENT TABLE IS PROVIDED AFTER 1 PAGE)

Binary	Hexadecimal
$10111101_2$	$BD_{16}$
$11001011_2$	$CB_{16}$



## HEXADECIMAL TO BINARY

(HEXADECIMAL TO BINARY EQUIVALENT TABLE IS PROVIDED IN THE NEXT PAGE)

Hexadecimal	Binary
3A	00111010 <sub>2</sub>
F4B	111101001011 <sub>2</sub>

o- Hexadecimal to Binary :

• 3A:

∴ Write each separately and write its equivalent binary number from the chart.

3      A  
┌───┐ ┌───┐  
0011 1010

So:

$$(3A)_{16} = (00111010)_2$$

So:

$$(3A)_{16} = (00111010)_2$$

• F4B:

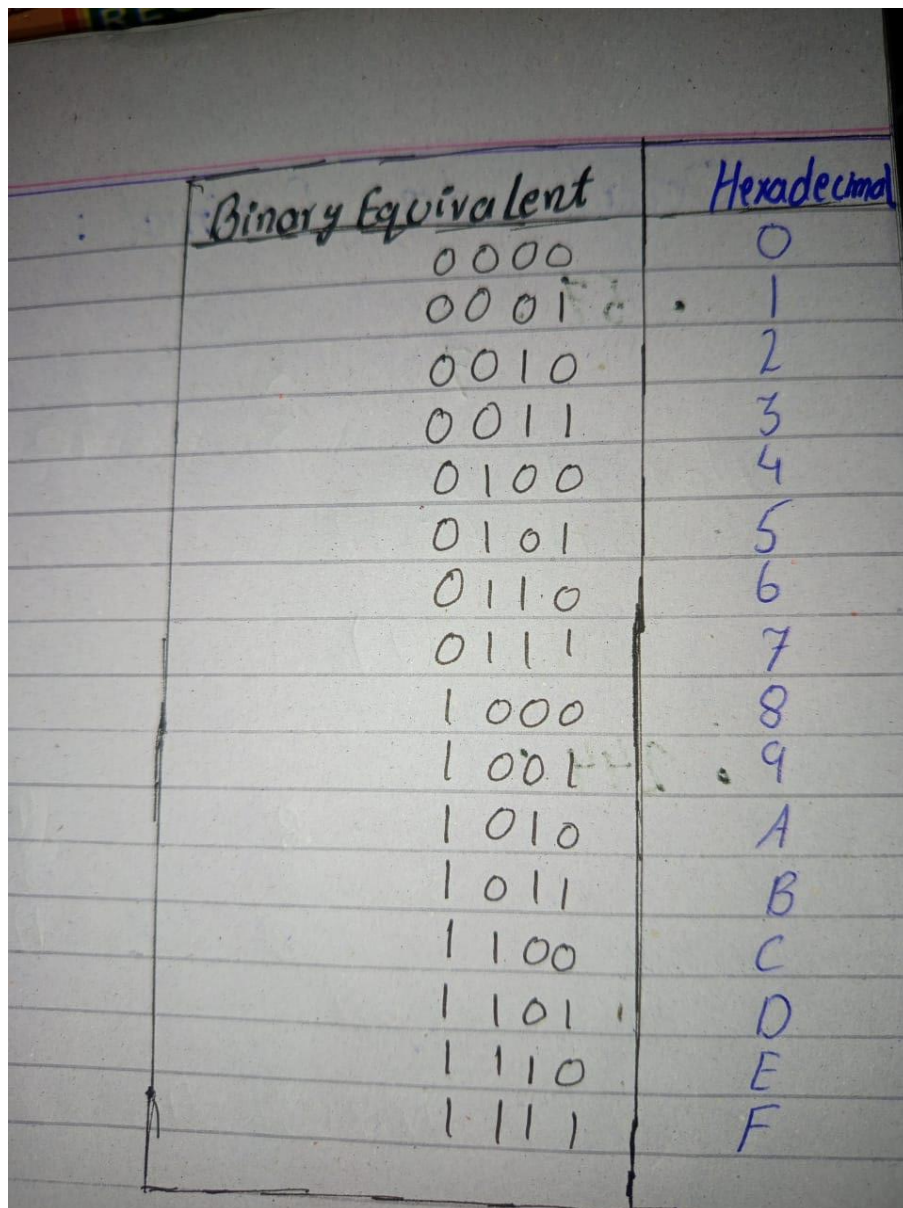
∴ Write each separately and write its equivalent binary number from the chart.

F      4      B  
┌───┐ ┌───┐ ┌───┐  
1111 0100 1011

So:

$$(F4B)_{16} = (111101001011)_2$$

## HEXADECIMAL TO BINARY EQUIVALENT TABLE



A handwritten table on lined paper showing the conversion of 4-bit binary numbers to hexadecimal digits. The table has two columns: 'Binary Equivalent' and 'Hexadecimal'. The binary values range from 0000 to 1111, and the hexadecimal values range from 0 to F.

Binary Equivalent	Hexadecimal
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

Referred to This table for conversion:

1. Binary to Hexadecimal.
2. Hexadecimal to Binary.



## OCTAL TO DECIMAL CONVERSION

Octal	Decimal
$57_8$	$47_{10}$
$244_8$	$164_{10}$

• Octal to Decimal :

•  $57 :$

$$\begin{array}{rcl} 7 & \times & 8^0 = 7 \\ 5 & \times & 8^1 = 40 \end{array}$$

Now add both :

$$(57)_8 = 40 + 7$$
$$(57)_8 = \boxed{(47)_{10}}$$

•  $244 :$

$$\begin{array}{rcl} 4 & \times & 8^0 = 4 \\ 4 & \times & 8^1 = 32 \\ 2 & \times & 8^2 = 128 \end{array}$$

Now add all :

$$(244)_8 = 128 + 32 + 4$$
$$(244)_8 = \boxed{(164)_{10}}$$

## DECIMAL TO OCTAL CONVERSION

Decimal	Octal
$156_{10}$	$234_8$
$73_{10}$	$111_8$

◦ Decimal to Octal:

◦ 156:

8		156	
8		19	-4
8		2	-3
		0	-2

$(156)_{10} = (234)_8$

◦ 73:

8		73	
8		9	-1
8		1	-1
		0	-1

$(73)_{10} = (111)_8$