DETAILS:
Number System Conversions

Name: Mohsin Ali
Roll Number: 25P-0545
Date: 29-08-2025
Section: BCS-1C

Lab Task 1/Assignment 1:

Information and Communication Technology
Instructor Name: Sir Zakria Bacha

Binary to Decimal Conversion

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

o- Binary to Decimal :

o- 1101_2 :

$$1 \times 2^0 = 1$$
$$0 \times 2^1 = 0$$
$$1 \times 2^2 = 4$$
$$1 \times 2^3 = 8$$

$$1 + 0 + 4 + 8$$
$$1101 = \boxed{13_{10}}$$

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

o- 1010101_2 :

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

$$1010101_2 = 1 + 0 + 4 + 0 + 16 + 0 + 64$$
$$1010101_2 = \boxed{85_{10}}$$

Decimal to Binary Conversion

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

0- Decimal to Binary :

0- 45 :

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

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

0- 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

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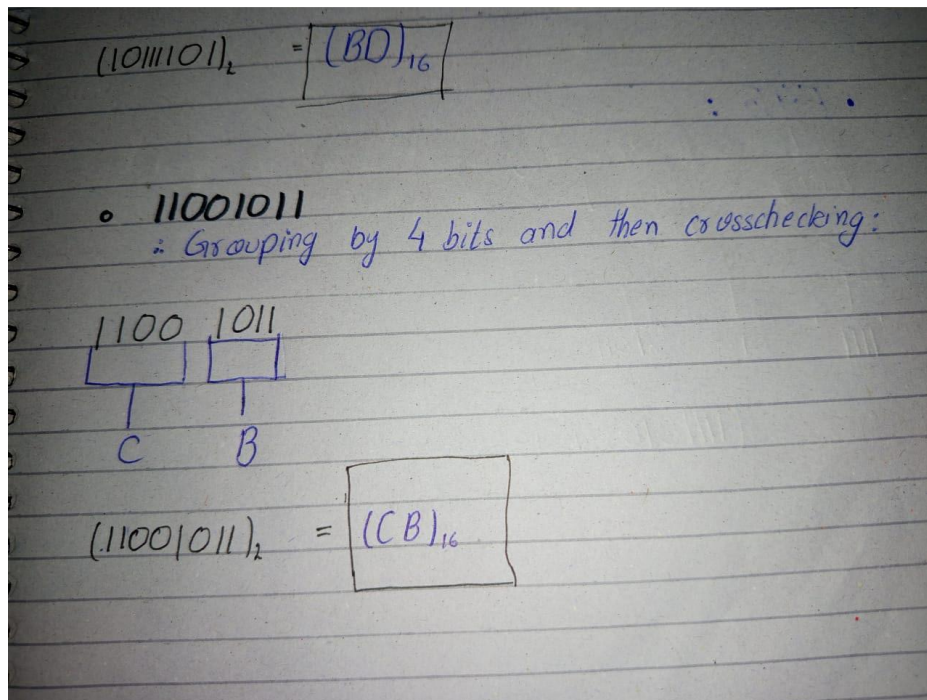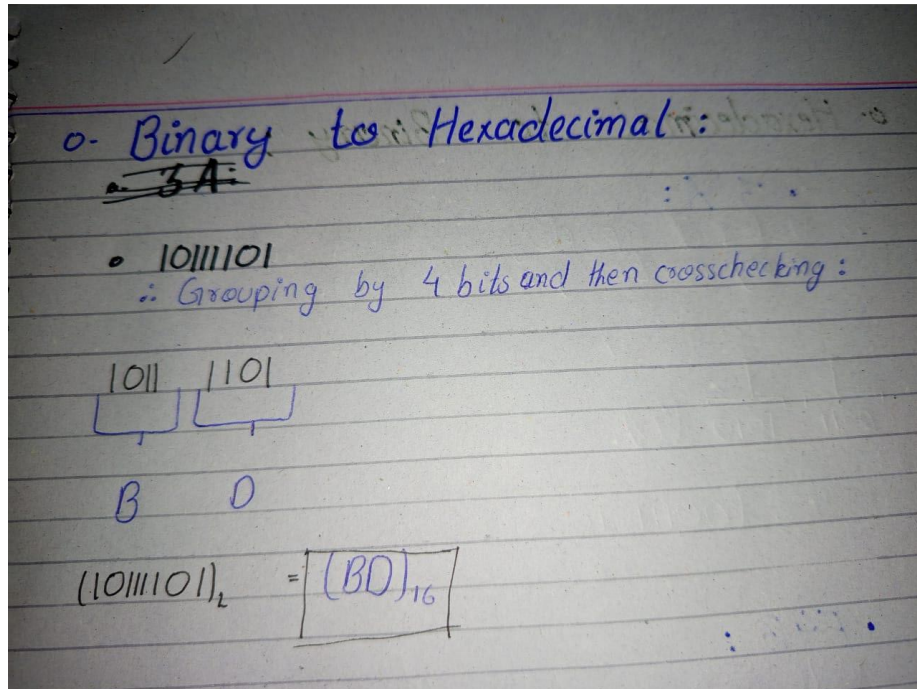
Hexadecimal to Binary

(Hexadecimal to Binary Equivalent Table is provided in the next page)

Hexadecimal	Binary
3A	00111010_2
F4B	111101001011_2

o. Hexadecimal to Binary :

• 3 A :

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

3   A

0011 1010
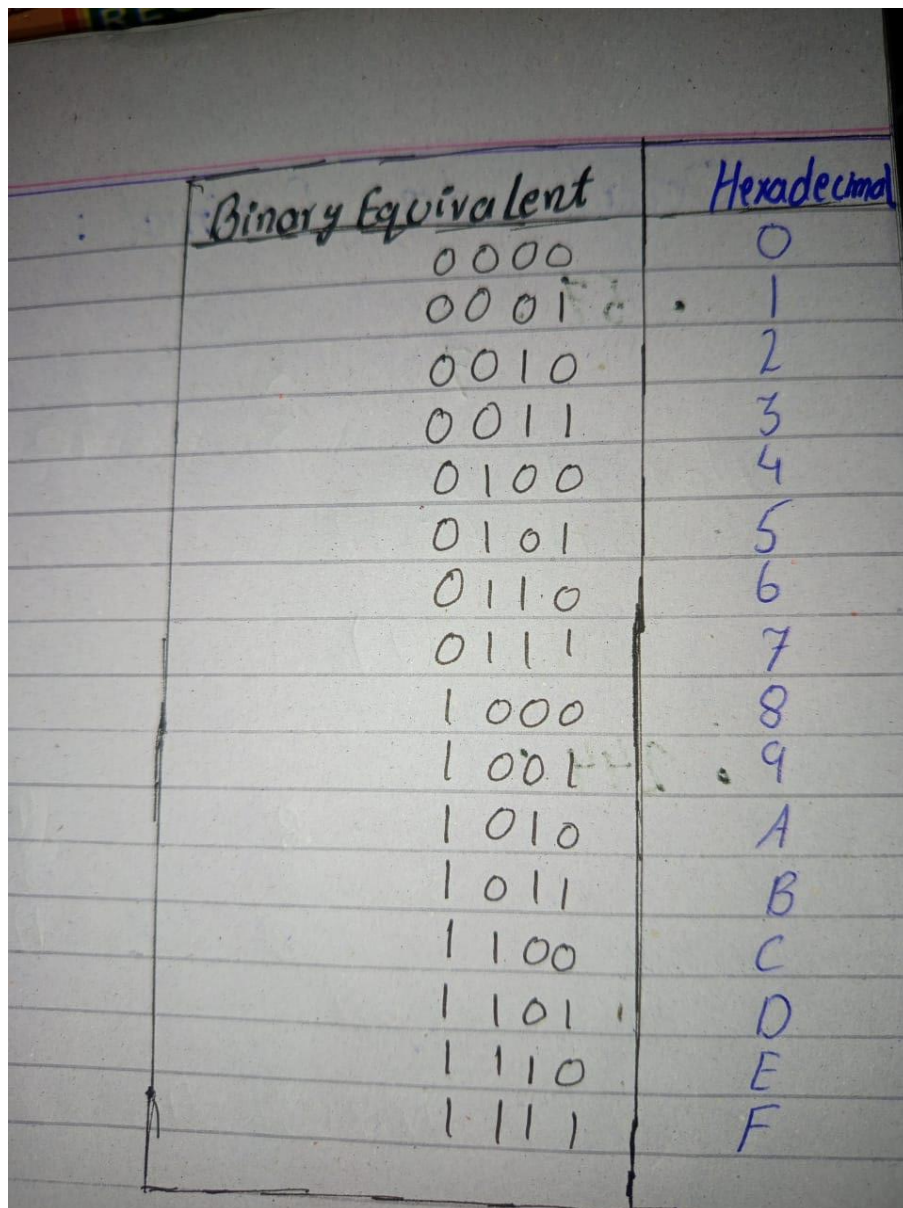
So:

$(3A)_6 = (00111010)_2$

So:

$(3A)_6 = (00111010)_2$

• F4B :

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

f   4   B

1111 0100 1011

So:

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

HEXADECIMAL TO BINARY EQUIVALENT TABLE

Binary Equivalent	Hexadecimal
0 0 0 0	0
0 0 0 1	1
0 0 1 0	2
0 0 1 1	3
0 1 0 0	4
0 1 0 1	5
0 1 1 0	6
0 1 1 1	7
1 0 0 0	8
1 0 0 1	9
1 0 1 0	A
1 0 1 1	B
1 1 0 0	C
1 1 0 1	D
1 1 1 0	E
1 1 1 1	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}

o. Octal to Decimal :

• 57 :

$$7 \times 8^0 = 7$$
$$5 \times 8^1 = 40$$

Now add both:
$$(57)_8 = 40 + 7$$

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

• 244 :

$$4 \times 8^0 = 4$$
$$4 \times 8^1 = 32$$
$$2 \times 8^2 = 128$$

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 :

$$\begin{array}{r|ll}
8 & 156 \\
\hline
8 & 19 & -4 \\
\hline
8 & 2 & -3 \\
& 0 & -2
\end{array}$$

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

    ○ 73 :

$$\begin{array}{r|ll}
8 & 73 \\
8 & 9 & -1 \\
8 & 1 & -1 \\
& 0 & -1
\end{array}$$

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