

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

Lesson	Topic	Class no.
Computer Fundamental	Number System	004

## Fundamental Of Computer

- **Number system**
- **Binary | Decimal | Octal | Hexa Decimal |**
- **Conversion**
- **Question & Answer**

Website : [www.icycc.in](http://www.icycc.in)

Call : 9064800582

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system

#### ➤ Number system

- ✓ Decimal Number system
- ✓ Hexa Decimal Number system
- ✓ Octal Number System
- ✓ Binary Number system

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system

#### What is Number System?

A number system is a way to write numbers using a consistent set of symbols or digits. It provides a unique representation for each number and shows the algebraic and arithmetic structure of numbers.

#### How many types of Number system available?

There are four types of number system –

**(1) Binary, (2) Octal, (3) Decimal, (4) HexaDecimal**

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system

#### Write a short note of all number system ?

##### • Binary

• Uses only the digits 0 and 1. Binary is useful in computers and electronic devices because it can be represented by the two states of on and off.

##### Octal

Uses the digits 0–7. Octal is advantageous because it uses fewer digits than decimal or hexadecimal.

##### • Decimal

• The most common number system, using the digits 0–9. The value of a digit depends on its position in the number. For example, in the number 49,365, the 4 is worth 40,000, the 9 is worth 9,000, and so on.

##### Hexadecimal

Uses the digits 0–9 and the letters A–F. Hexadecimal can represent large numbers with fewer digits.

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system

	Decimal Number system	Hexa Decimal Number system	Octal Number System	Binary Number system
DIGIT	<b>BASE- 10</b> [0-1-2-3-4-5-6-7-8-9]	<b>BASE -16</b> [0-1-2-3-4-5-6-7-8-9-A-B-C-D-E-F]	<b>BASE - 08</b> [0-1-2-3-4-5-6-7-8]	<b>BINARY - 02</b> [0-1]
DIGIT	(529) <sub>10</sub>	(529) <sub>16</sub>	(529) <sub>8</sub>	(529) <sub>2</sub>

Website : [www.icycc.in](http://www.icycc.in)

Call : 9064800582

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

➤ **Decimal to Binary**       $(117)_{10} = (?)_2$

➤ **Decimal to Octal**       $(117)_{10} = (?)_8$

➤ **Decimal to Hexa decimal**       $(117)_{10} = (?)_{16}$

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

### ➤ Decimal to Binary $(117)_{10} = (?)_2$

Decimal to Binary Date .....

Q.  $(117)_{10} = (?)_2$

Method-1

2		117	
2		58	— 1
2		29	— 0
2		14	— 1
2		7	— 0
2		3	— 1
		1	— 1

Ans = ~~1110101~~  $(1110101)_2$

Method 2

128	64	32	16	8	4	2	1
1	1	1	0	1	0	1	

Ans.  $(1110101)_2$

$(117)$   
 $-64$   

---

 $53$   
 $-32$   

---

 $21$   
 $-16$   

---

 $5$   
 $-4$   

---

 $1$



# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

#### ➤ Decimal to Octal $(117)_{10} = (?)_8$

The image shows handwritten notes on a grid background. At the top, it says "Decimal to Octal". Below this, there are two methods for converting the decimal number 117 to octal.

**Method 1: Division by 8**

$$\begin{array}{r} 8 \overline{) 117} \\ 8 \overline{) 14} - 5 \\ \underline{16} \end{array}$$

The result is  $(117)_{10} = (165)_8$ .

**Method 2: Powers of 8**

64	32	16	8	4	2	1
0	0	1	1	1	0	1

  

4	2	1
1	0	1
1	1	0
0	0	1

The result is  $= (165)_8$ .



# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

#### ➤ Decimal to Hexadecimal $(117)_{10} = (?)_{16}$

Decimal to Hexa Decimal

$(117)_{10} = ( )_{16}$

$16 \overline{) 117}$   
 $\underline{7} \quad 5$   
 $= (75)_{16}$

$01110101$   
 $\underline{8 \quad 4 \quad 2 \quad 1}$   
 $0 \quad 1 \quad 0 \quad 1 = 5$   
 $0 \quad 1 \quad 1 \quad 1 = 7$   
 $= (75)_{16}$

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

#### ➤ Binary to Decimal $(10101)_2 = (?)_{10}$

The image shows a handwritten note on lined paper. At the top, it says "Binary to Decimal" with a circled '10' next to it. Below this, the equation  $(10101)_2 = ( )_{10}$  is written. A table of powers of 2 is shown, with the binary digits 1, 0, 1, 0, 1 aligned under the weights 16, 8, 4, 2, and 1 respectively. The calculation  $16 + 4 + 1 = (21)_{10}$  is written at the bottom.

64	32	16	8	4	2	1
		1	0	1	0	1

$16 + 4 + 1$   
 $= (21)_{10}$

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

### ➤ Binary to Octal $(10101)_2 = (?)_8$

Binary to Octal

$$(10101)_2 = (\quad)_8$$

32	16	8	4	2	1
0	1	0	1	0	1

  

4	2	1	
1	0	1	= 5
0	1	0	= 2 ↑

= (25)<sub>8</sub>

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

### ➤ Binary to Octal $(10101)_2 = (?)_{16}$

Binary to Hexa

$(10101)_2 = ( )_{16}$

128	64	32	16	8	4	2	1
0	0	0	1	0	1	0	1

1 + 4 + 1 = 6

$010101 = 5$

$0001 = 1$

$= (15)$

$= (F)_{16}$

$(10101)_2 = (F)_{16}$



# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

#### ➤ Octal to Hexa $(345)_8 = (?)_{16}$

The image shows a handwritten solution for converting the octal number  $(345)_8$  to hexadecimal. The solution is written on lined paper with a date stamp '27 28 29 30 31' and a page number 'Week 28 (190-176)'. The title 'Octal to Hexa' is underlined. The problem is written as  $(345)_8 = (?)_{16}$ . The conversion is done in three steps: 1. Converting each octal digit to its 3-bit binary equivalent: 3 is 011, 4 is 100, and 5 is 101. 2. Grouping the binary digits into pairs from right to left: 011, 100, 101. 3. Converting each binary pair to its hexadecimal equivalent: 011 is 3, 100 is 4, and 101 is 5. The final result is  $(E5)_{16}$ , where E is the hexadecimal digit for 14. The final result is underlined and circled.

Octal to Hexa

$(345)_8 = (?)_{16}$

$\underline{3 \quad 4 \quad 5}$

$\underline{011 \quad 100 \quad 101}$

$= (011100101)_2$

$\begin{array}{r} 4 \quad 2 \quad 1 \\ 1 \quad 0 \quad 1 = 5 \\ 1 \quad 0 \quad 0 = 4 \\ 0 \quad 1 \quad 1 = 3 \end{array}$

$\begin{array}{r} 8 \quad 4 \quad 2 \quad 1 \\ 0 \quad 1 \quad 0 \quad 1 = 5 \\ 1 \quad 1 \quad 1 \quad 0 = 14 \rightarrow E \\ = (E5)_{16} \end{array}$

# Itahar City Youth Computer Centre

Itahar, Porsha, (Opp. Of polytechnic College), Itahar, Uttar Dinajpur, 733128

## Introduction of Computer

### ➤ Number system decimal to conversion

#### ➤ Hexa to Octal $(AEF)_{16} = (?)_{16}$

Handwritten solution for Hexa to Octal conversion:

Hexa to octal  
 $(AEF)_{16} = ( \quad )_8$

Conversion steps:

$(AEF)_{16} = (1010 \ 1110 \ 0101)_2$   
 $(101011100101)_2$

Grouping into 4-bit groups:

$\begin{array}{cccc} 8 & 4 & 2 & 1 \\ 0 & 1 & 0 & 1 = 5 \\ 1 & 1 & 1 & 0 = E \\ 1 & 0 & 1 & 0 = A \end{array}$

Final Octal result:

$(5345)_8$

Verification:

$\begin{array}{cccc} 4 & 2 & 1 & \\ 1 & 0 & 1 & = 5 \\ 1 & 0 & 0 & = 4 \\ 0 & 1 & 1 & = 3 \\ 1 & 0 & 1 & = 5 \end{array}$