

Binary, Octal, Hex ←

Fractions ←

Negative integers

EEL201: Digital Electronic Circuits

-125

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July-December 2009

⊖ 101101

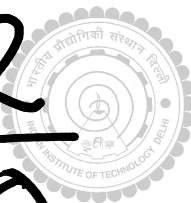
Modulo arithmetic

$$\begin{array}{r} + 7 \longrightarrow 1 \\ + 5 \longrightarrow 2 \\ \hline 12 \longrightarrow 0 \end{array}$$

mod-3 arithmetic

$$\begin{array}{r} 7 \longrightarrow 1 \\ \times 5 \longrightarrow 2 \\ \hline 35 \longrightarrow 2 \end{array}$$

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mod 2^N arithmetic

N-bits

$$N = 3$$

mod - 8 arithmetic

$$\begin{array}{r} 49 \rightarrow 1 \\ + 88 \rightarrow 0 \\ \hline \end{array}$$

$$137 \rightarrow 1$$

Fix number of digits

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8 - bits

00000101

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Negative numbers

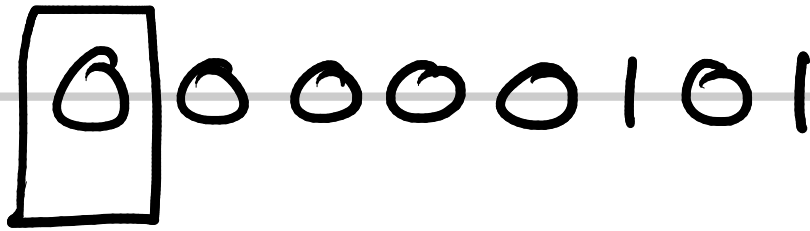
- ✓ 1. Sign magnitude
- ✓ 2. One's complement
- ✓ 3. Two's complement
- 4. Offset binary



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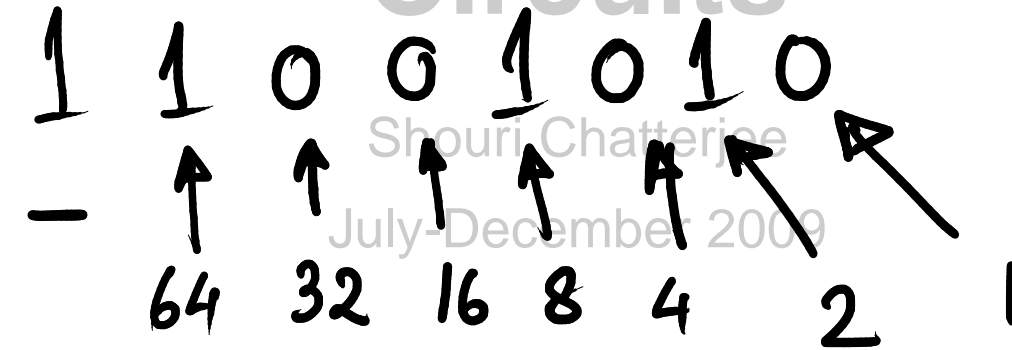
8-bits

+5



SIGN
MAGNITUDE

-5



Range

→ -127 ↔ +127

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1's COMPLEMENT

9's complement

+5 → 00000101

-456

543

-5 → 1111010

-499 to +499

10110101 → -74

↓
64

↓
8

↓
2

Range

-127 to +127

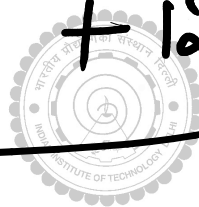
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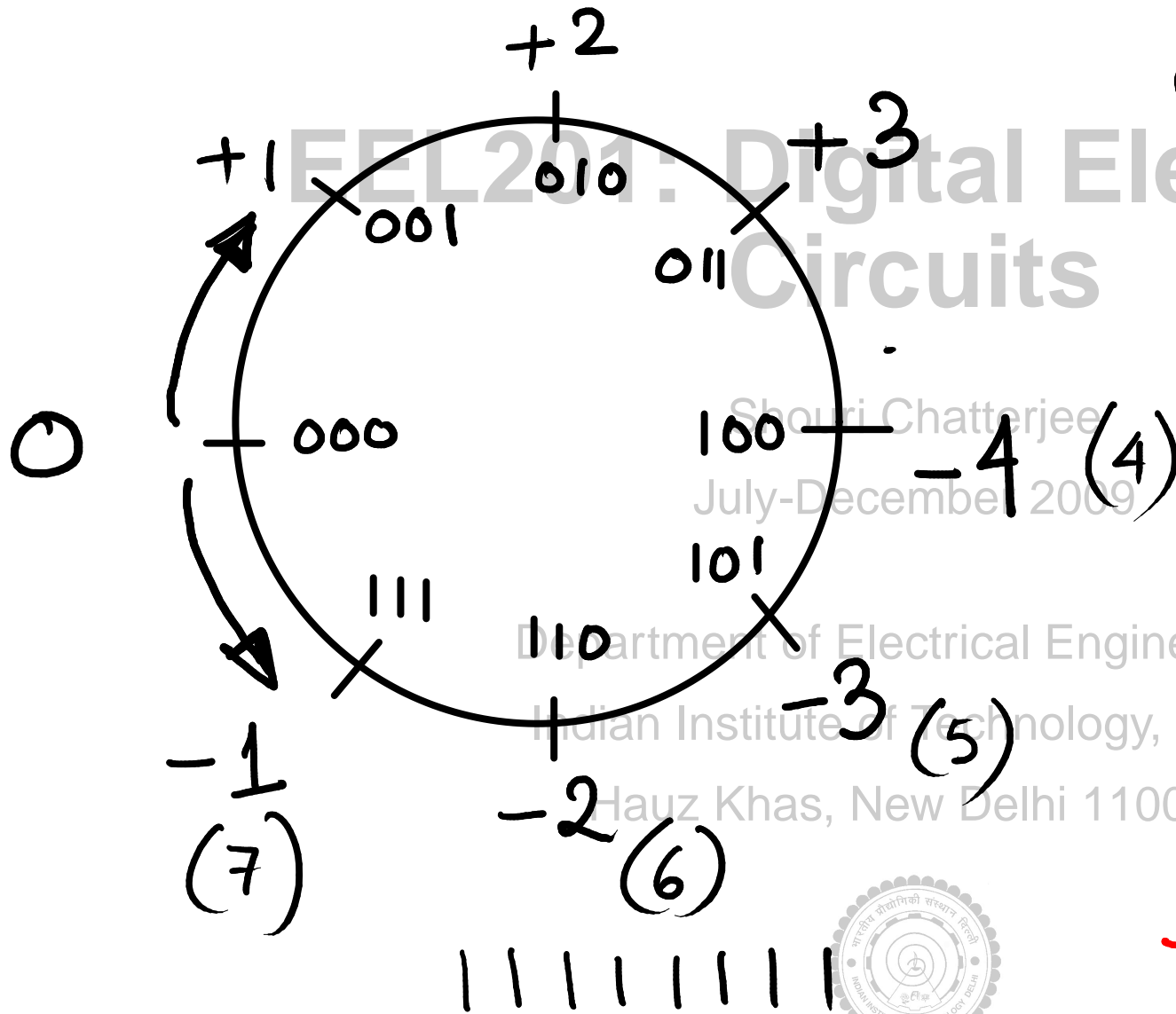
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Two's Complement

10's complement

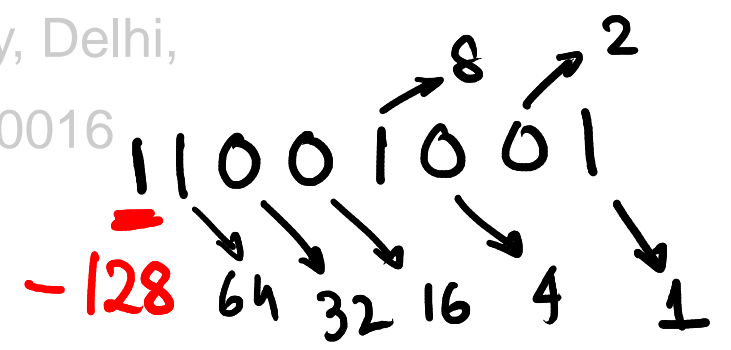


$$-128 \leftrightarrow +127$$

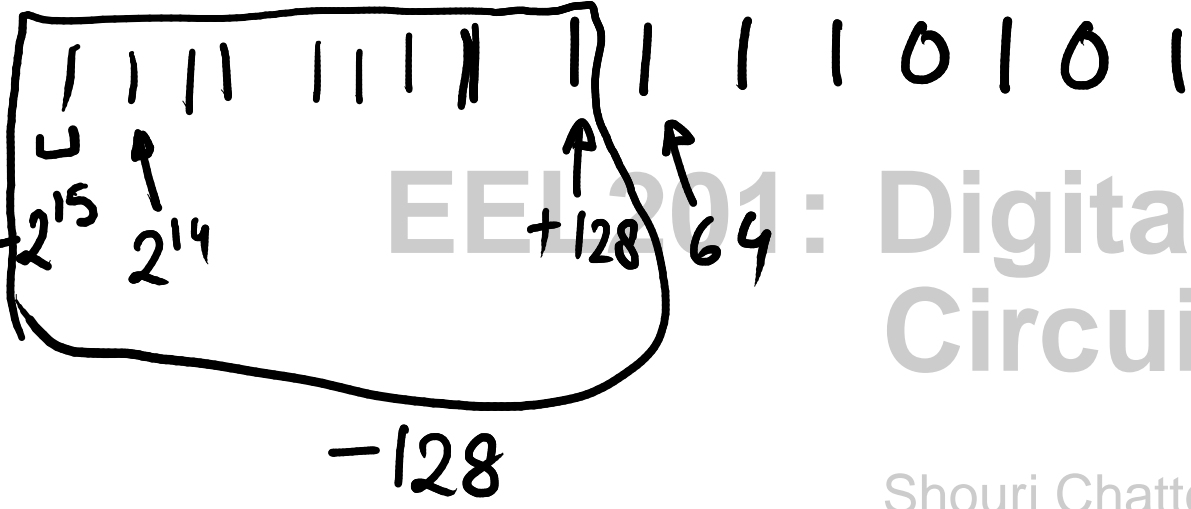
10000000
01111111

10000001

$$2^N - 55 = 201$$



0000 0000 0000 1011



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