A) Binary System

The greatest number occurs when all the bits have a value of 1, and the lowest is when all the bits are O. (Assuming unsigned)

.. The max can be calculated with the Sigma

Sigma was derived
by adding the values
of each bit which is

$$= \frac{2^{9}-1}{2^{-1}}$$

$$= \frac{2^{9}-1}{2^{-1}}$$

$$= \frac{2^{9}-1}{2^{9}-1}$$

$$= \frac{2^{9}-1}{2^$$

meaning 512 numbers can be represented

nexadecimal

B) Hexadecimal Using the same method as above ill be counting the range from occoocoo to FFFFFFF by translating

()Octal

Octal is base & with a range of 000000000 to

(1)77777777 over 9 digits. · Using sigma I will convert this maximum number to a declimat in order to determine how many numbers It can hold

 $7 - \frac{8^{3}-1}{8-1}$

By including O, I can conclude that with 9 digits, an Octal Number Can represent

134217728 different base 10 numbers

999 WEAB1)16 a) (542)8 a • 8°

1.16 = 4.8 11 • 16' = 39 5 . 82 = 320 10.162 = 2560

c)(282), La This is invalid because the highest base 8 digit

14.163 = 57344 60081

d) (10110110)a Two's Complement

001001001

Unsigned Number

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(2) 01001010 27+25+24+22+21 LD 21+23+26

a) 231 -128=103-64=39-32=7-4=3-2=1-1 Lo(11100111)2 \$

20+21+22+24

e) (00010111)2

200010111

 $331 \div 8 = 38 R7$ $3 \div 8 = 3 R4$ $3 \div 8 = 0 R3$

33|
$$\div$$
 | 6 = | 4 R7 — 7

14 \div | 6 = 0 R | 4 E — E7

Ly (E7)₁₆ A

b) | 183

Binary:

183 \div 2 = 591 R 1 — | 1

295 \div 2 = 295 R 1 — | 1

147 \div 2 = 73 R | — | 11 | 1

73 \div 2 = 36 R | — | 11 | 1

18 \div 2 = 18 R0 — | 0011 | 1 | 1

4 \div 2 = 4 R | — | 0011 | 1 | 1

4 \div 2 = 4 R | — | 0010 | 1 | 1 | 1

4 \div 2 = 4 R | — | 0010 | 1 | 1 | 1

1 \div 2 = 0 R | — | 00100 | 1 | 1 | 1

1 \div 3 = 0 R | — | 00100 | 1 | 1 | 1

1 \div 3 = 0 R | — | 00100 | 1 | 1 | 1

1 \div 3 = 18 R | 3 — 37

18 \div 8 = 2 R | 237

2 \div 8 = 0 R | 2 — 237

Hex:
$$(aa37)_8$$
 \Rightarrow $(aa37)_8$ \Rightarrow $(aa37)_8$

4 ÷ 16= 0 R4 — 49F

C) 1928

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Binary:

Octal:

Hex:

4-allnsigned Integer

2 = 10 RO 2 R

ned Integer n-1.

Let $a = \frac{1}{a^{n-1}+1}$ $a = \frac{1}{a^{n-1}+1}$

(1111001000)2

(3610)8

(788),6

b) 2's complement:	lolo	6416	8 N	.Ellu	1
- The last digit is used to so the largest positive no	den c	ite ris	Sic	n	
Ollill			, i	~	
1 24+23+2+2+2					
max =31					

Minimum number is the greatest negative .. The range is -32->31

C) 1's complement

positive number اااا ا

. The range is

-31 to 31.

5.	lolo64168 N.Ellul
5. 0111101	P1010111-11001011
+ 10101001	-6 = 10(10)111 + 00(10)01
C) 0000 0111 × 0000 0101 0000 0111	1 V 1
6.	
ones complement	two's complement
01001000	01001000 3 Positive # 5 are handeled normally
. Ы). <u>О</u>	A A A A A A A A A A A A A A A A A A A
One's Complement	two's complement
00000000 00 1111111	00000000
c) -128	
ones complement	two's complement
•Invalid. The range in 8 bits stops at -127.	1000000

LOIO64168 N.Ellul Two's Complement

One's Complement

1. 00000101 2. 1111010

1.00000101

3/11/10/1

7.

a) 01011000 unsigned:

 $2^{6} + 2^{4} + 2^{3} = 88$ One's comp: $2^{6} + 2^{4} + 2^{3} = 88$

Two's Comp:

26+24+23 =88 Excess-127:

Excess-127:

-127: 88-127 = -39

ess-127:

01001 =169

Excess -127:

10101001 =169

169-127=42

b)10101001 unsigned:

 $2^{7} + 2^{5} + 2^{3} + 2^{6} = 169$ one's compiologia

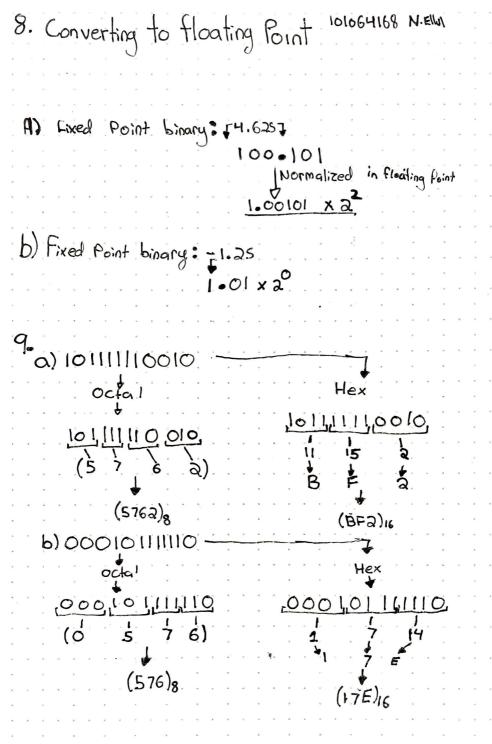
 $3^{4}+3^{4}+3^{2}+3^{4}=\frac{86}{7}$ Two's Comp:

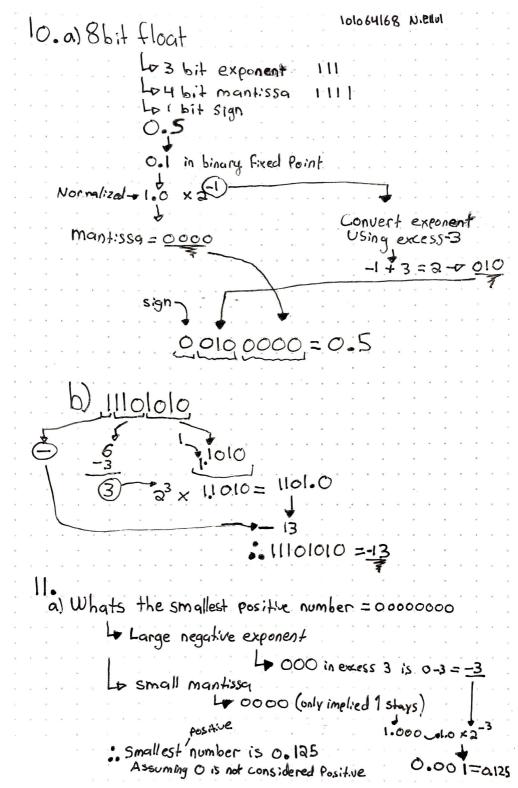
(10101001

01010110

01010111 -(2+2+2+2+2)=-87

-2²+2¹+2⁷=-8





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