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MBA, PMOC, PgMP®, PMP®, PMI-RMP®, CM, ITILF, MCPD, MCSD
26+ years of experience


مهم جداً
هذا الملف للمراجعة السريعة واخذ الملاحظات عليه فقط ،لانه يحتوي
على اقل من 20٪ مما يتم شرحه في الفيديوهات
الاستعجال والاعتماد عليه فقط سوف يجعلك تخسر كميه معلومات
وخبرات كثيره
يجب عليك مشاهدة فيديو الدرس كاملا
لاتنسى عمل لايك ومشاركة القناة لتعم الفائدة للجميع
لا تنسونا من دعائكم
ProgrammingAdvices.com
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STOP
PROGRAMMING
ADVICES
LEARN THE
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اساسيات مهمه لكل مبرمج

النظام السادس عشر

Hexadecimal System

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What is Hexadecimal System?

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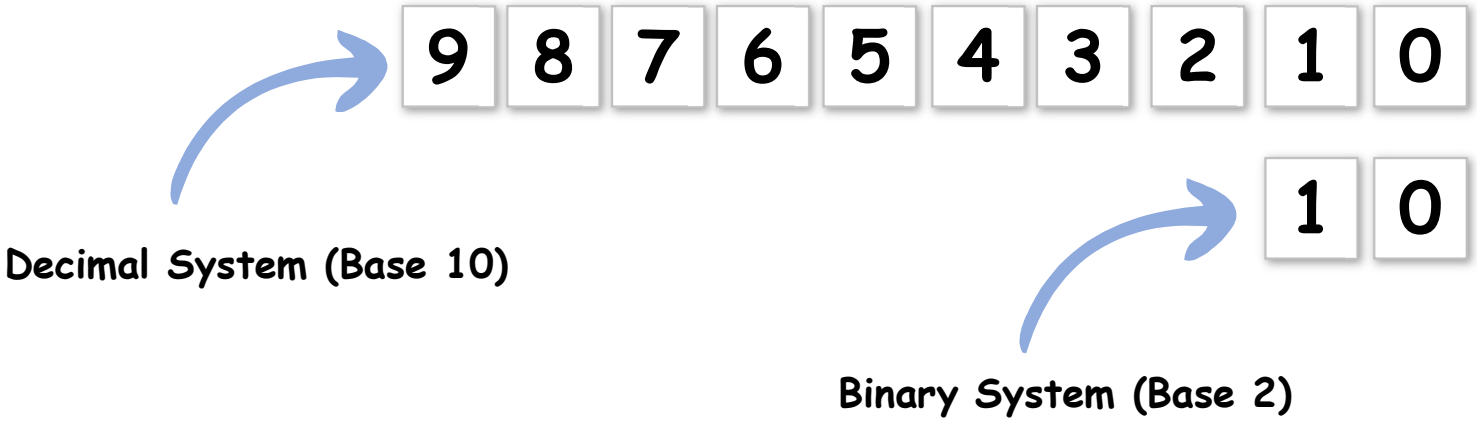
Decimal vs Binary vs Hexadecimal?



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Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

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Why Hexadecimal?

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It's hard for human to read binary!

What does this mean?

01001001 00100000 01001100 01101111 01110110 01100101
00100000 01011001 01101111 01110101 00100001

I Love You!

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Hexadecimal System

Provides a human-friendly representation

11010100 ➔ D4

Each Byte is represented with 2 letters only.

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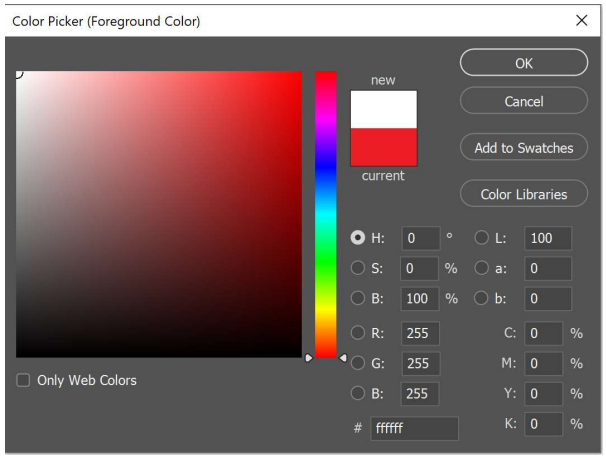
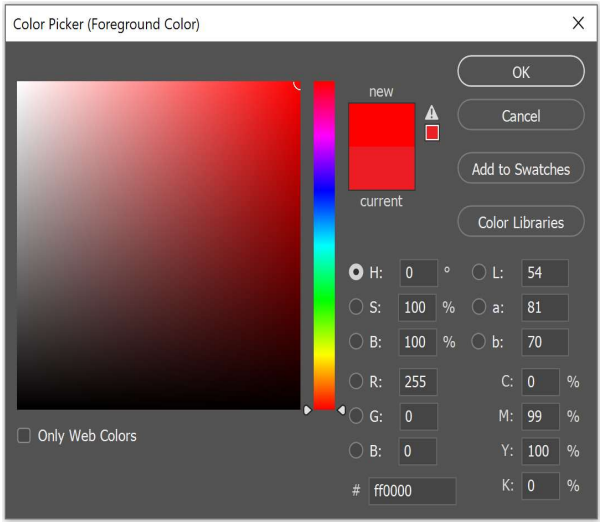
Examples:

- **11010100 ➔** D4
- **1111 1111 1111 1111 1111 ➔ FFFFFF**
- Each Byte is represented with 2 letters only.



11111111111111111111 ➔ FFFFFF



11111111000000000000000 ➔ FF0000

Examples:

Color	CSS Color Name	Hex Code #RPGGBB	Decimal Code (R,G,B)
	Red	#FF0000	rgb (255,0,0)
	Orange	#FFA500	rgb (255,165,0)
	Yellow	#FFFF00	rgb (255,225,0)
	Green	#008000	rgb (0,128,0)
	Cyan	#00FFFF	rgb (0,255,225)
	Blue	#0000FF	rgb (0,0,225)
	Purple	#800080	rgb (128,0,128)
	Pink	#FFC0CB	rgb (255,192,203)
	Gray	#808080	rgb (128,128,128)
	Brown	#A52A2A	rgb (165,42,42)

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Hexadecimal Prefex

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Prefix:

Technology/Language	Prefix	Example
HTML & CSS	#Code	#FFFFFF
C,C++,Java..etc	0xCode	0xC2A4
XML	&#Code	&#C2A4
Unicode	U+Code	U+C2A4

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How Hexadecimal works?

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Remember that binary was base 2.

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	← Base 2
128	64	32	16	8	4	2	1	← Doubling

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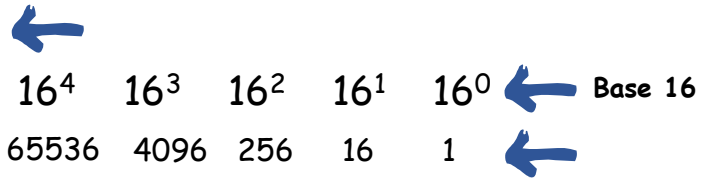
Hexadecimal is base 16.



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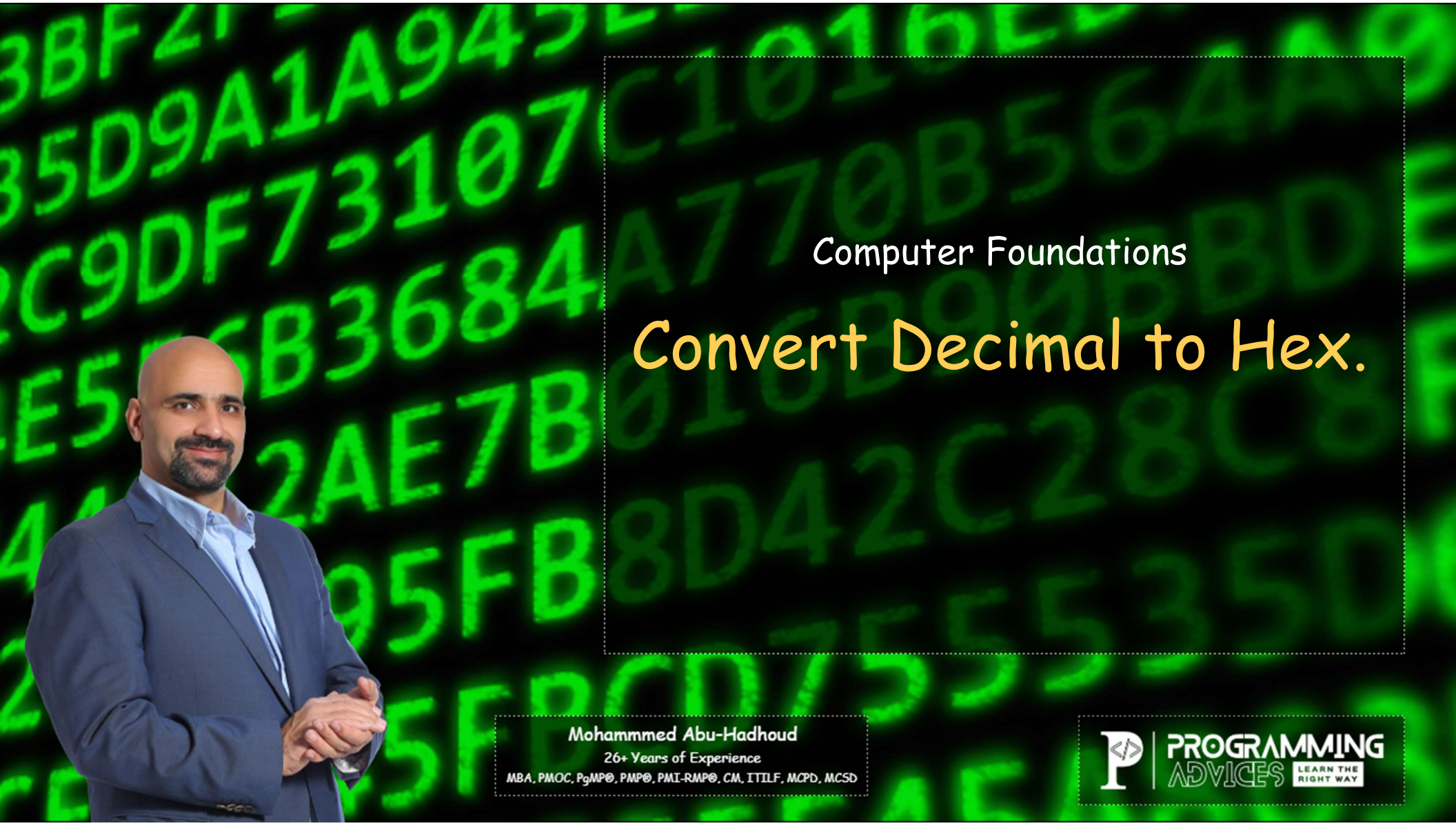
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Convert Decimal to Hex.
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Remember..

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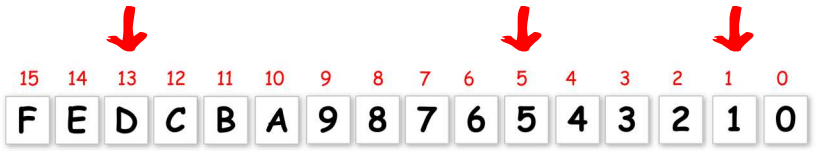
Convert 469 to Hex



Number / 16	Result	Integer	Fraction	Remainder		Hex
469 / 16 =	29.3125	29	0.3125	16 x 0.3125 =	5	5
29 / 16 =	1.8125	1	0.08125	16 x 0.08125 =	13	D
1/16 =	--	--	--		1	1

$469_{10} \rightarrow 1D5_{16}$

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Convert 1513 to Hex

Number / 16	Result	Integer	Fraction	Remainder		Hex
1513 / 16 =	94.5625	94	0.5625	16 x 0.5625 =	9	9
94 / 16 =	5.875	5	0.875	16 x 0.875 =	14	E
5/16 =	--	--	--		5	5

$1513_{10} \rightarrow 5E9_{16}$

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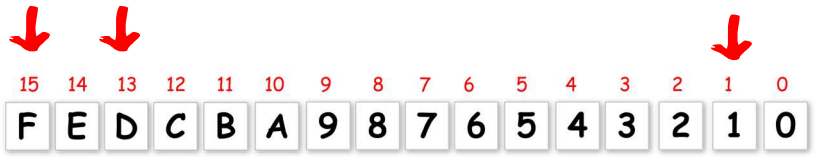
Convert 479 to Hex



Number / 16	Result	Integer	Fraction	Remainder	Hex
479 / 16 =	29.9375	29	0.9375	16 x 0.9375 = 15	F
29 / 16 =	1.8125	1	0.8125	16 x 0.8125 = 13	D
1/16 =	--	--	--	1	1

$479_{10} \rightarrow 1DF_{16}$

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Convert Hex to Decimal.

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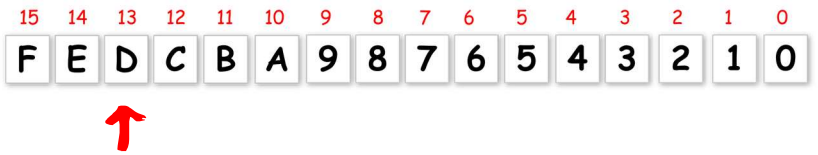
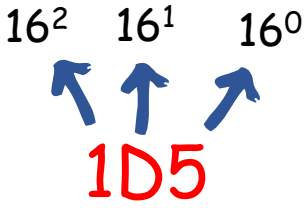
Convert 1D5 to Decimal





$5 \times 16^0 = 5 \times 1 = 5 +$

$D \times 16^1 = 13 \times 16 = 208 +$

$1 \times 16^2 = 1 \times 256 = 256$

469

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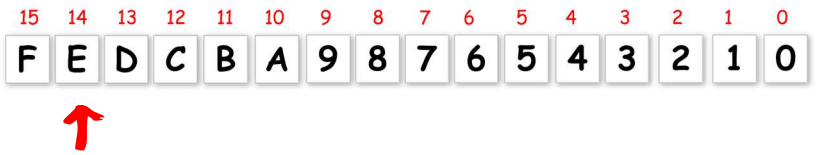
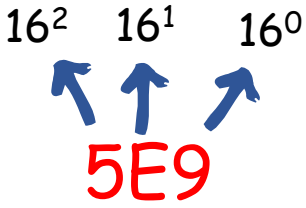
Convert 5E9 to Decimal





$$9 \times 16^0 = 9 \times 1 = 9 +$$
$$E \times 16^1 = 14 \times 16 = 224 +$$
$$5 \times 16^2 = 5 \times 256 = 1280$$
$$1513$$

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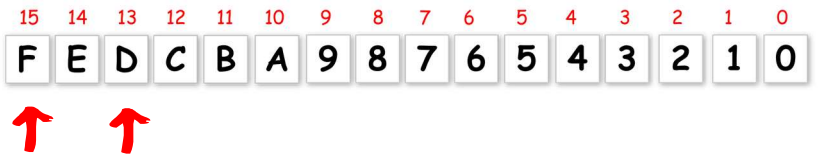
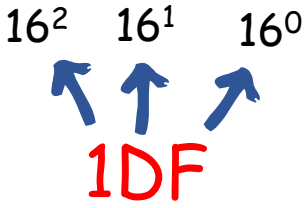
Convert 1DF to Decimal





$$F \times 16^0 = 15 \times 1 = 15 +$$
$$D \times 16^1 = 13 \times 16 = 208 +$$
$$1 \times 16^2 = 1 \times 256 = 256$$
$$479$$

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Convert Hex to Binary.

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How to Convert Hexa to Binary?

- Two steps:
  1. Convert hexa to decimal.
  2. Convert decimal to binary.

That's it.

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Convert 1D5 to Binary

- Two steps:
  1. Convert 1D5 to decimal.
  2. Convert results to binary.

That's it.

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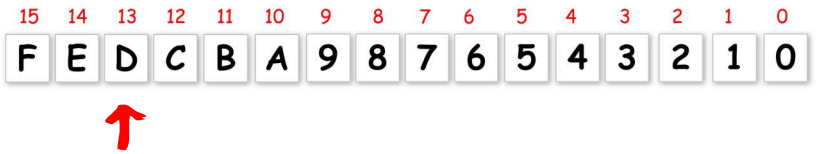
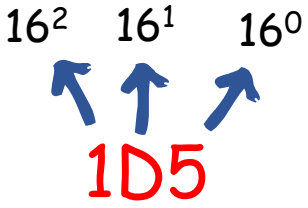
Step1:

Convert 1D5 to Decimal





$5 \times 16^0 = 5 \times 1 = 5 +$

$D \times 16^1 = 13 \times 16 = 208 +$

$1 \times 16^2 = 1 \times 256 = 256$

---

469 → Now convert this to binary

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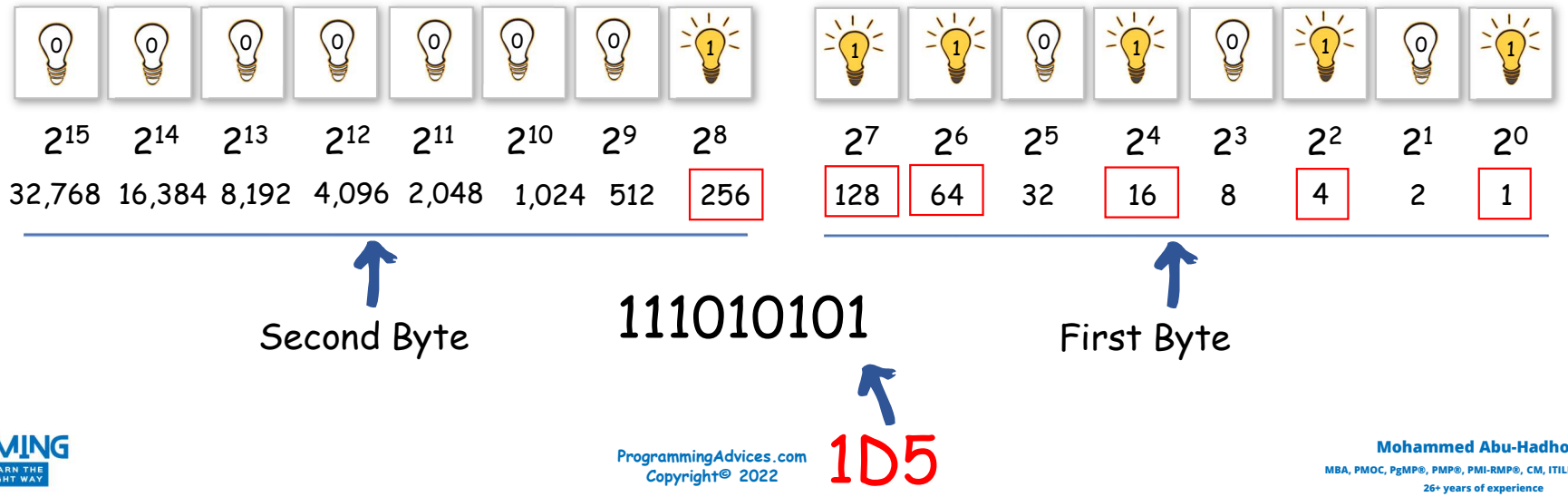
Step 2:

Convert this in binary…

469



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Convert Binary to Hexa.

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How to Convert Binary to Hexa?

- Two steps:
  1. Convert Binary to Decimal.
  2. Convert Decimal to Hexa.

That's it.

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Homework
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1- Convert those Hexadecimal numbers to Decimal:

- 12A4
- 1C35
- 100
- 115C

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2- Convert those decimal numbers to hexadecimal :

- 4722
- 7221
- 256
- 4444

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3- Convert those Hexadecimal numbers to Binary:

- 13B4
- A5

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Solution
Homework
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Solutions:

1:

- 12A4 ➔ 4772
- 1C35 ➔ 7221
- 100 ➔ 256
- 115C ➔ 4444

2:

- 4722 ➔ 1272
- 7221 ➔ 1C35
- 256 ➔ 100
- 4444 ➔ 115C

3:

- 13B4 ➔ 0001001110110100
- A5 ➔ 10100101

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Thank You ☺

54 68 61 6E 6B 20 59 6F 75 20 3A 29

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