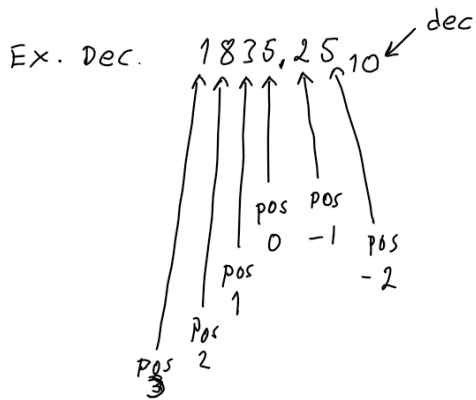


TALSYSTEM

den 15 augusti 2021
16:32

	TECKEN	BAS
- BINÄRA	0,1	2
- OKTALA	0,1,2,3,4,5,6,7	8
- DECIMALA	0,1,2,3,4,5,6,7,8,9	10
- HEXADECIMALA	0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F	16

POSITION



VIKTA

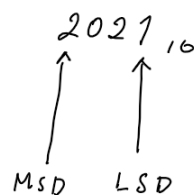
$$1 \cdot 10^3 + 8 \cdot 10^2 + 3 \cdot 10^1 + 5 \cdot 10^0 + 2 \cdot 10^{-1} + 5 \cdot 10^{-2}$$

$$1000 + 800 + 30 + 5 + 0,2 + 0,05 = 1835,25_{10}$$

SIGNIFIKANT

MEST / MINST

Ex.



Most
significant
digit

Least
significant
digit

BINÄRA

BASEN = 2

0-1

Ex. 1011₂

Omvandla till decimalt.

$$1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0$$

$$8 + 0 + 2 + 1 = 11_{10}$$

Omvandla decimalt tal till binärt Ex. 37₁₀

DIV	HELTAL	REST	KONTROLL
37/2	18	1	37 - 2 · 18 = 1
18/2	9	0	18 - 2 · 9 = 0
9/2	4	1	9 - 2 · 4 = 1
4/2	2	0	4 - 2 · 2 = 0
2/2	1	0	2 - 2 · 1 = 0
1/2	0	1	1 - 2 · 0 = 1

1 0 0 1 0 1₂

MSB LSB

OKTALA

0-7

BASEN = 8

Ex. 47_8

Omvandla till decimalt.

$$4 \cdot 8^1 + 7 \cdot 8^0$$

$$32 + 7 = 39_{10}$$

Omvandla decimalt tal till oktalt. Ex 120_{10}

DIV	HELTAL	REST	KONTROLL
$120/8$	15	0	$120 - 8 \cdot 15 = 0$
$15/8 \leftarrow$	1	7	$15 - 8 \cdot 1 = 7$
$1/8 \leftarrow$	0	1	$1 - 8 \cdot 0 = 1$
			↓ ↓ ↓
			170_8

HEXADECIMALT

0-9, A-F

BASEN = 16

Ex. $1C2_{16}$

$$1 \cdot 16^2 + 12 \cdot 16^1 + 2 \cdot 16^0$$

$$256 + 192 + 2 = 450_{10}$$

1

↓

9

A = 10

B = 11

C = 12

D = 13

E = 14

F = 15

Omvandla decimalt tal till hexadecimalt. Ex. 2021_{10}

DIV	HELTAL	REST	KONTROLL
$2021/16$	126	5	$2021 - 16 \cdot 126 = 5$
$126/16 \leftarrow$	7	14	$126 - 16 \cdot 7 = 14$
$7/16 \leftarrow$	0	7	$7 - 16 \cdot 0 = 7$
			↓ ↓ ↓
			$7E5_{16}$

OMVANDLA DECIMALER

Decimalt till binärt₂ Ex. $124,375_{10}$

DIV	HELTAL	REST	KONTROLL
$124/2$	62	0	$124 - 2 \cdot 62 = 0$
$62/2 \leftarrow$	31	0	$62 - 2 \cdot 31 = 0$
$31/2 \leftarrow$	15	1	$31 - 2 \cdot 15 = 1$
$15/2 \leftarrow$	7	1	$15 - 2 \cdot 7 = 1$
$7/2 \leftarrow$	3	1	$7 - 2 \cdot 3 = 1$
$3/2 \leftarrow$	1	1	$3 - 2 \cdot 1 = 1$
$1/2 \leftarrow$	0	1	$1 - 2 \cdot 0 = 1$
			↓ ↓ ↓ ↓ ↓ ↓ ↓
			$1111100,0112$

MUL BRÅKDEL HELTAL

$$0,375 \cdot 2 \rightarrow 0,75$$

$$0,75 \cdot 2 \leftarrow 1,5$$

$$0,5 \cdot 2 \leftarrow 1,0$$

0

1

1

Decimal till oktalt. Ex. $52,6_{10}$

DIV	HELTAL	BEST	KONTROLL
$52/8$	6	4	$52 - 8 \cdot 6 = 4$
$6/8$	0	6	$6 - 8 \cdot 0 = 6$
		6 4, 4 6 ...	
MUL	BRÄKDEL	HELTAL	
$0,6 \cdot 8$	0,8	4	
$0,8 \cdot 8$	0,4	6	
$0,4 \cdot 8$	0,2	3	
$0,2 \cdot 8$	0,6	1	
$0,6 \cdot 8$	0,8	4	
	∞		

Omvandla decimal till hexadecimalt. Ex. $120,5_{10}$

DIV	HELTAL	BEST	KONTROLL
$120/16$	7	8	$120 - 16 \cdot 7 = 8$
$7/16$	0	7	$7 - 16 \cdot 0 = 7$
		7 8, 8	
MUL	BRÄKDEL	HELTAL	
$0,5 \cdot 16$	0,0	8	

BCD - KOD Binary Coded Decimal "8421-kod"

Varje siffra skrivs med hjälp av 4 st bitar.

Ex. Omvandla decimala talet 4782_{10} till BCD-kod.

0/1	0/1	0/1	0/1
8	4	2	1

$4 \quad 7 \quad 8 \quad 2$
 $0100 \quad 0111 \quad 1000 \quad 0010 \Rightarrow 0100 \ 0111 \ 1000 \ 0010_{BCD}$

Ex. Omvandla BCD-talet $0110 \ 1001 \ 0011_{BCD}$ till decimalt

$0110 \quad 1001 \quad 0011$
 $4+2 \quad 8+1 \quad 2+1$
 $6 \quad 9 \quad 3 = 693_{10}$

OMVANDLA BINÄRT₂ TAL TILL OKTALT₈

- ① Omvandla till decimalt
- ② Omvandla till oktalt

Ex. $0101,011_2$

$$\begin{aligned} 1. \quad & 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0, 0 \cdot 2^{-1} + 1 \cdot 2^{-2} + 1 \cdot 2^{-3} \\ & 0 + 4 + 0 + 1 +, 0 + 0,25 + 0,125 = \underline{\underline{5,375_{10}}} \end{aligned}$$

$$\begin{array}{r} 2. \quad \begin{array}{ccc} \text{DIV} & \text{HELTAL} & \text{REST} \\ \hline 5/8 & 0 & 5 \end{array} \quad \downarrow \\ \begin{array}{ccc} \text{MUL} & \text{BRÄKDEL} & \text{HELTAL} \\ \hline 0,375 \cdot 8 & 0 & 3 \end{array} \quad \uparrow \end{array}$$

$5,3_8$

Omvandla hexadecimalt tal till binärt

① ↓

decimalt $\xrightarrow{\text{②}}$ binärt