

Fondamenti di Elaborazione dei Dati Digitali

Lezione 3

Mario Verdicchio

Università degli Studi di Bergamo

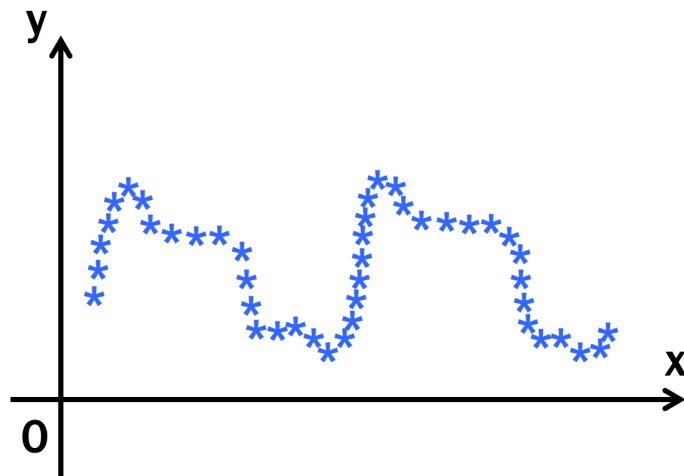
A.A. 2026-2027

USASCII code chart

b₇ b₆ b₅ Bits b₄b₃b₂b₁					0 00 00 10 11 01 01 11 1							
Row b₀ Column					0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	o	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	
1	1	0	1	13	CR	GS	-	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	_	o	DEL

x y r g b

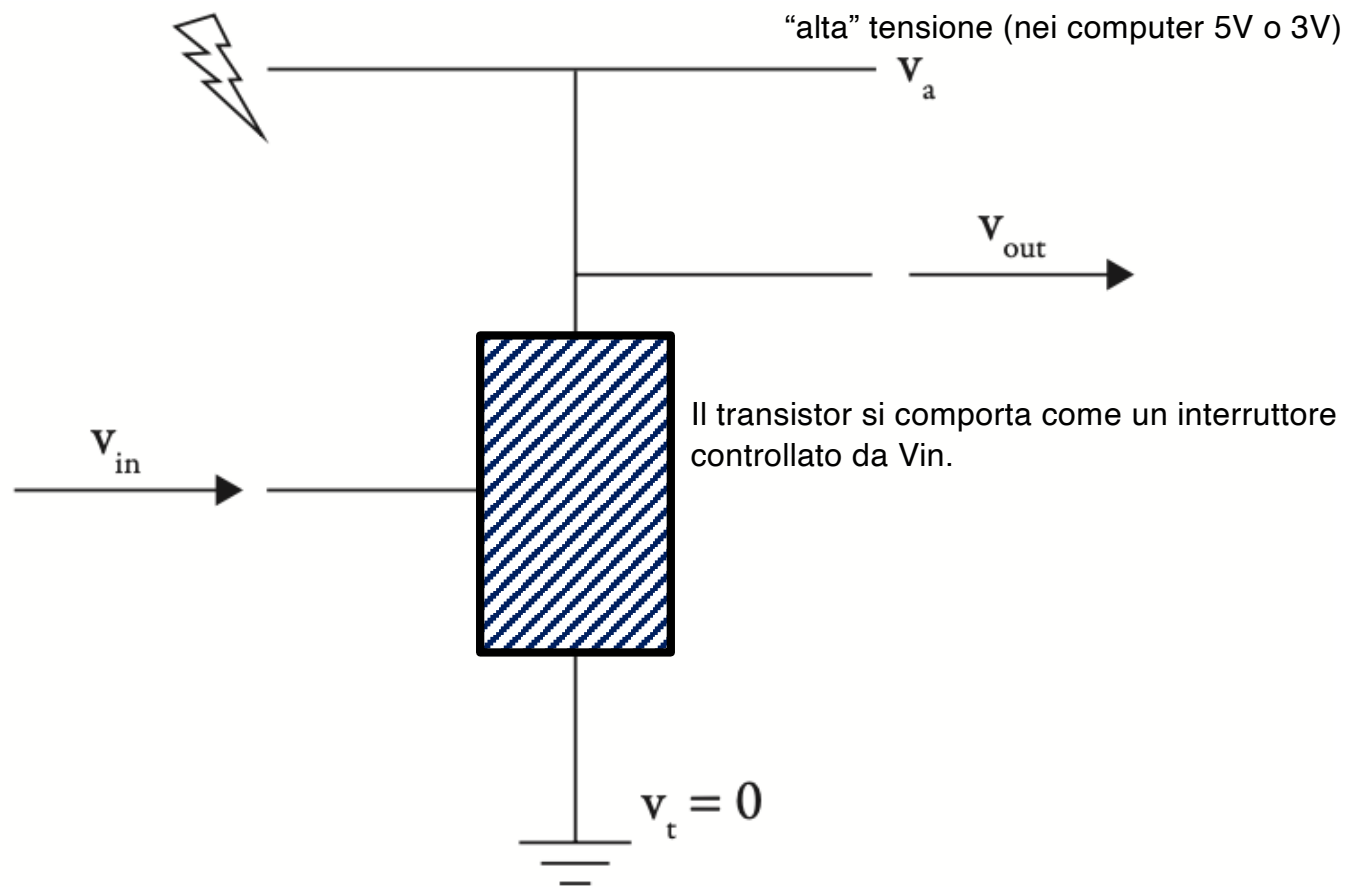
(9,14,245,133,167)



567872872983093948748974987498748467101
 187627862876783546354137676129123621352
 413651243873614983502385746754779090939
 423847293847283478237492384723894728347
 298374283647165155155625465463546354376
 473658475984759824757671511019824928493
 849340283918091740375474783474736478364
 734637843940109134813409463074560384756
 038476501837465087314650138746507834560
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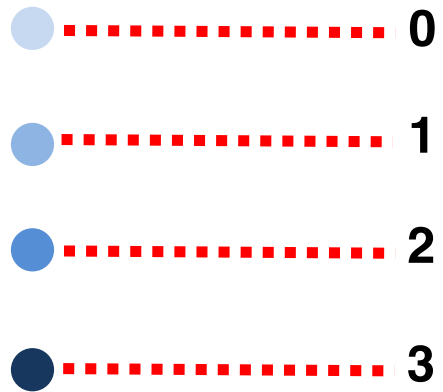
Un transistor



Il transistor si comporta come un interruttore controllato da V_{in} .

Terra: non c'è tensione qui. L'elettricità scorre da punti a tensione più alta a punti a tensione più bassa.

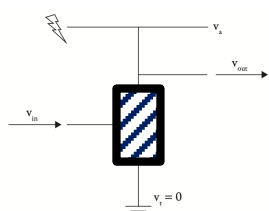
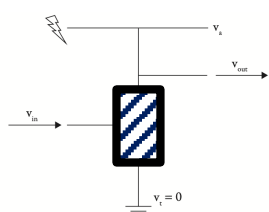
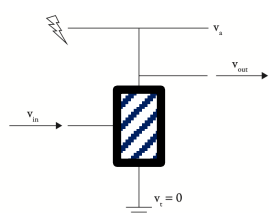
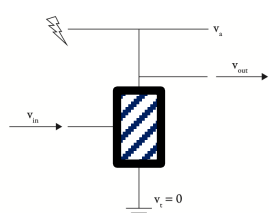
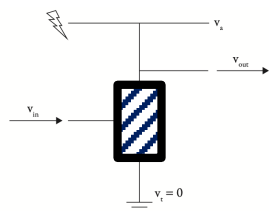
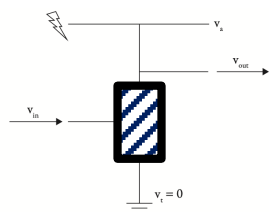
CODIFICA

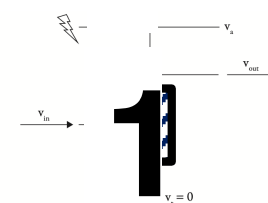
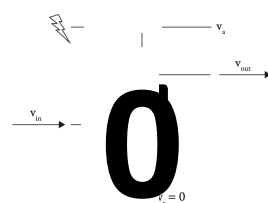
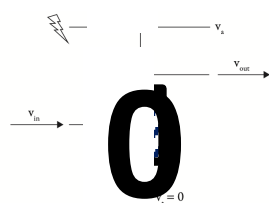
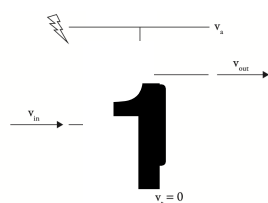
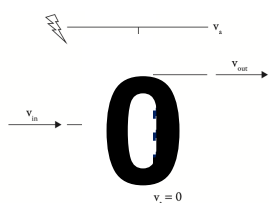
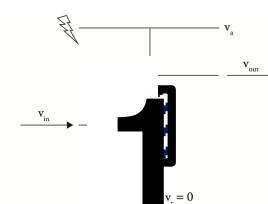
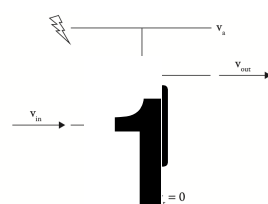
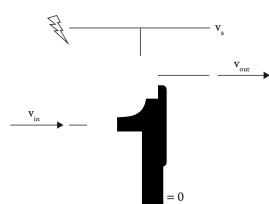
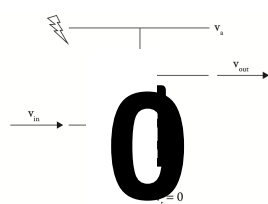
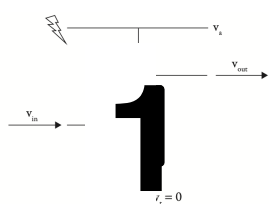
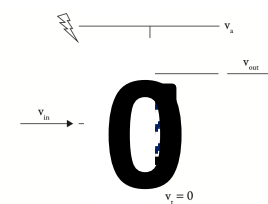
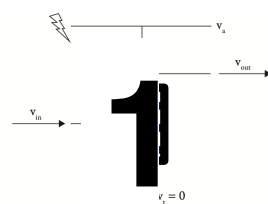
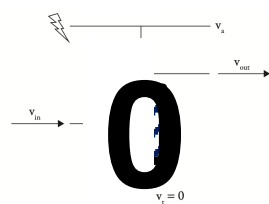
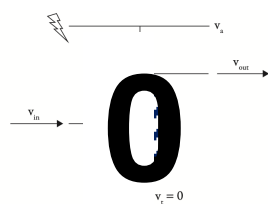
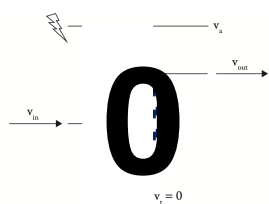
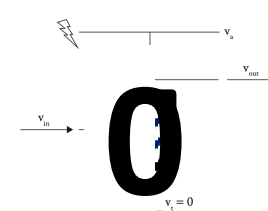
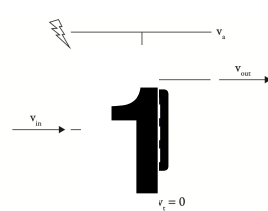
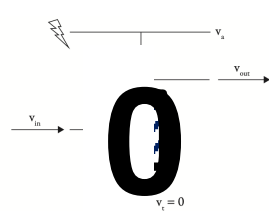
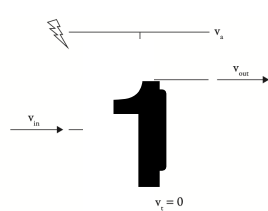
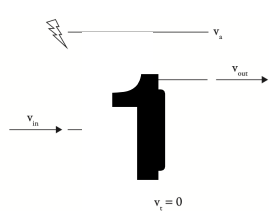
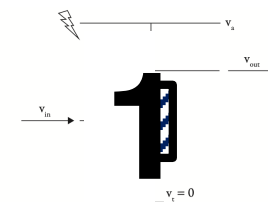
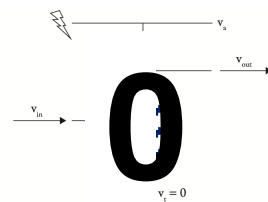
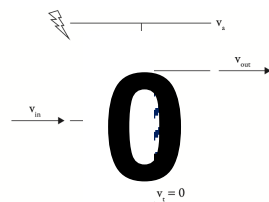
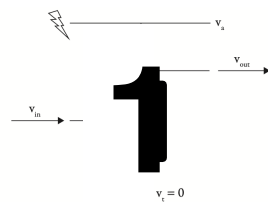
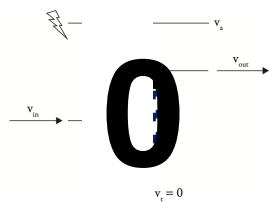
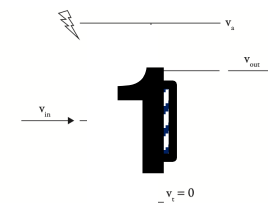
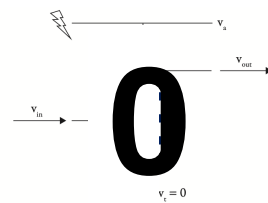
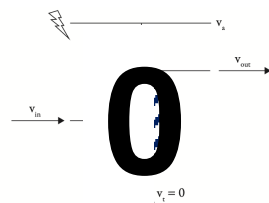
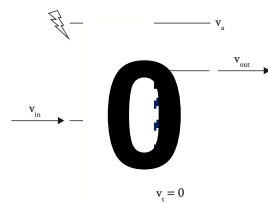
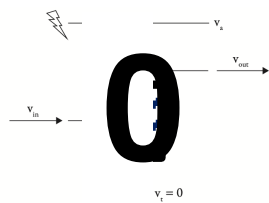


CODIFICA BINARIA

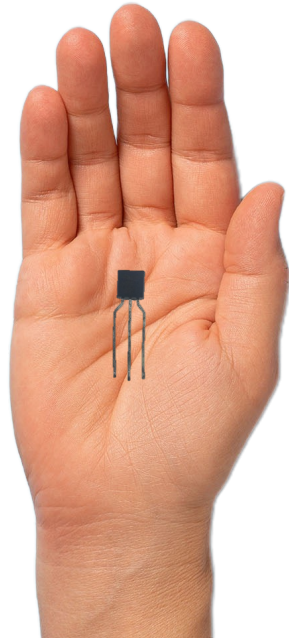
v_{out} bassa 0

v_{out} alta 1





un transistor degli anni '50



1,3 centimetri

un transistor oggi

2 nanometri

0

1

bit

binary digit

Multipli

1 Kb (kilo) = 1000 b

1 Mb (mega) = 1 milione b

1 Gb (giga) = 1 miliardo b

1 Tb (tera) = 1000 miliardi b

bit e Byte

8 bit (b) = 1 Byte (B)

00101100


un Byte

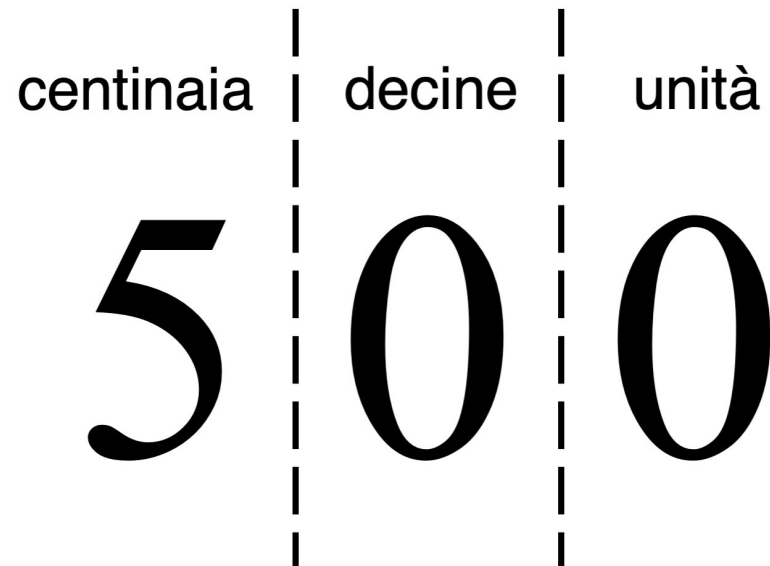
Multipli

1 KB (kilo) = 1000 B

1 MB (mega) = 1 milione B

1 GB (giga) = 1 miliardo B

1 TB (tera) = 1000 miliardi B



**Sistema “digitale”:
sistema basato su cifre il cui significato
è determinato dalla loro posizione.**

10^2	10^1	10^0
centinaia	decine	unità
5	0	0

Sistema a base 10
Sistema decimale

Il sistema decimale

**{0;1;2;3;4;
5;6;7;8;9}**

237

237

2

1

0

$$2 \times 10^2 = 200$$

$$3 \times 10^1 = 30$$

$$7 \times 10^0 = 7$$

X^2

X^1

X^0

~~centinaia~~

~~decine~~

~~unità~~

Sistema a base X

Il sistema binario $\{0;1\}$

$$\begin{array}{ccc} 2^2 & 2^1 & 2^0 \\ 1 & 1 & 0 \end{array}$$

Sistema a base 2

101

2

2

$$1 \times 2^2 = 4$$

1

1

$$0 \times 2^1 = 0$$

0

0

$$1 \times 2^0 = 1$$

101

in binario

esprime

il numero 5

101_2

$=$

5_{10}

237

2

2

$$2 \times 10^2 = 200$$

1

1

$$3 \times 10^1 = 30$$

0

0

$$7 \times 10^0 = 7$$

**Qual è la sequenza
di bit che esprime
237
in binario?**

$$237 =$$

$$128 + 64 + 32$$

$$+ 8 + 4 + 1$$

**(cercare una combinazione
di potenze di 2)**

$$237 =$$

$$2^7 + 2^6 + 2^5$$

$$+ 2^3 + 2^2 + 2^0$$

$$237 =$$

$$2^7 + 2^6 + 2^5$$

$$+ 2^3 + 2^2 + 2^0$$

(mettere un 1 nelle posizioni
indicate dagli esponenti
e 0 nelle altre)

11101101

⋮

7

⋮

6

⋮

5

⋮

4

⋮

3

⋮

2

⋮

1

⋮

0

11101101_2

$=$

237_{10}

2345678901234
3456789012345
4567890123456
5678901234567
3456789012345
1567890123456
5678901234567
2789012345678

11100010101010
10111010101010
10101110101010
01110101010101
10111000101010
10101110101011
01101110000111
101010111101

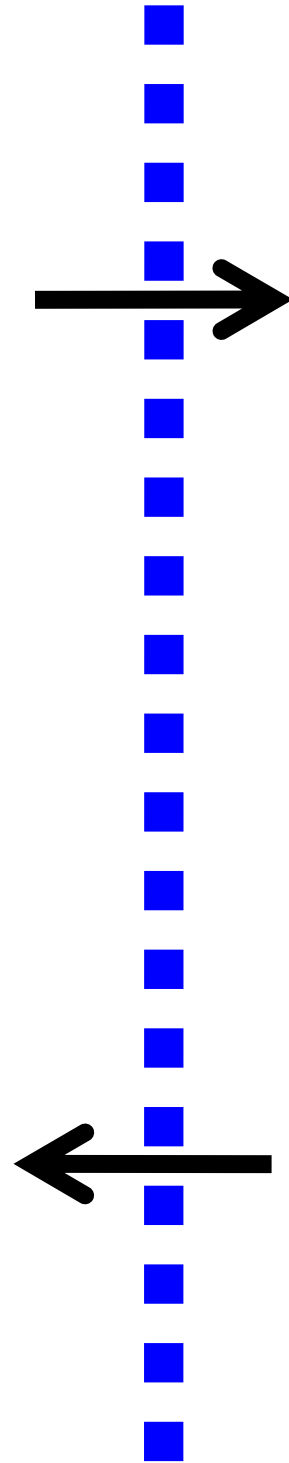
Esercizio

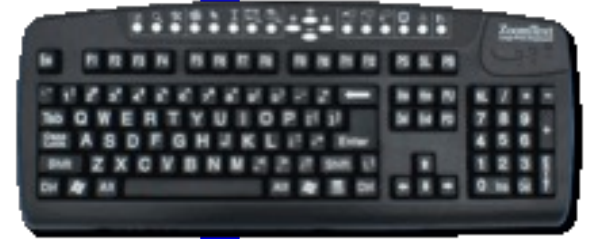
**Convertite i seguenti numeri da
base 2 a base 10:
101, 1000, 11011.**

Esercizio

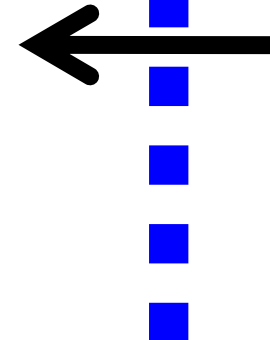
**Convertite i seguenti numeri da
base 10 a base 2:
8, 23, 144, 201.**

Periferiche





Periferiche di input





**Periferiche
di output**



Periferiche di input e output

Wii controller
(Nintendo)



PS3 Dual Shock
controller (Sony)



iPhone touch
screen (Apple)



USB stick
(Lacie)



External Hard
Disk (WD)

