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Activity - Binary Code

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Activity: Binary Code

Learning Objectives

Students will be able to:

- Transcribe text into binary code, and vice versa
- Make use of ASCII Tables
- Describe multiple applications of binary systems

At the heart of all modern computing is the binary system, comprised of 0s and 1s. All software, digital music, images, video, email messages, documents and more are really just made up of 0s and 1s - at least as the computer understands them.

Binary code is so important because the circuits in a computer's processor are made up of billions of transistors that switch to "0" (off) or "1" (on) depending on the electrical signals it receives. It is through these electrical signals that humans are able to give a computer instructions.

It's truly amazing what can be communicated simply through 0s and 1s.

An extremely common way of applying the binary system is through text. Each letter and character on your keyboard has a number value (called its "decimal value"), and that number can be converted into 0s and 1s using simple addition.

For example, the letter "A" has a number, or decimal, value of 65. And for us to convert that 65 into binary 0s and 1s, we can use the following table:

128	64	32	16	8	4	2	1

We need to find the combination of values in the bottom row that add up to 65. Then, we place a "1" for each of the values we need, and a "0" for each value that we do not.

0	1	0	0	0	0	0	1
128	64	32	16	8	4	2	1



Those vales in the bottom row never change. Thus, in this example, if we add up all of the values in the bottom row with a corresponding “1”, then $64 + 1 = 65$. Therefore, the letter “A” is represented in binary as 01000001.

We knew that “A” had a value of 65 because the following “ASCII table” – which nearly all computers use - shows the decimal value of every character (you can ignore the middle column labeled “HEX” for now):

ASCII printable characters								
DEC	HEX	Simbolo	DEC	HEX	Simbolo	DEC	HEX	Simbolo
32	20h	espacio	64	40h	@	96	60h	`
33	21h	!	65	41h	A	97	61h	a
34	22h	"	66	42h	B	98	62h	b
35	23h	#	67	43h	C	99	63h	c
36	24h	\$	68	44h	D	100	64h	d
37	25h	%	69	45h	E	101	65h	e
38	26h	&	70	46h	F	102	66h	f
39	27h	'	71	47h	G	103	67h	g
40	28h	(	72	48h	H	104	68h	h
41	29h	)	73	49h	I	105	69h	i
42	2Ah	*	74	4Ah	J	106	6Ah	j
43	2Bh	+	75	4Bh	K	107	6Bh	k
44	2Ch	,	76	4Ch	L	108	6Ch	l
45	2Dh	-	77	4Dh	M	109	6Dh	m
46	2Eh	.	78	4Eh	N	110	6Eh	n
47	2Fh	/	79	4Fh	O	111	6Fh	o
48	30h	0	80	50h	P	112	70h	p
49	31h	1	81	51h	Q	113	71h	q
50	32h	2	82	52h	R	114	72h	r
51	33h	3	83	53h	S	115	73h	s
52	34h	4	84	54h	T	116	74h	t
53	35h	5	85	55h	U	117	75h	u
54	36h	6	86	56h	V	118	76h	v
55	37h	7	87	57h	W	119	77h	w
56	38h	8	88	58h	X	120	78h	x
57	39h	9	89	59h	Y	121	79h	y
58	3Ah	:	90	5Ah	Z	122	7Ah	z
59	3Bh	;	91	5Bh	[	123	7Bh	{
60	3Ch	<	92	5Ch	\	124	7Ch	|
61	3Dh	=	93	5Dh	]	125	7Dh	}
62	3Eh	>	94	5Eh	^	126	7Eh	~
63	3Fh	?	95	5Fh	-			

theASCIIcode.com.ar

1. ASSIGNMENT: Using the attached Worksheet, write your name in binary.
2. ASSIGNMENT: Working with a partner, discover something that you both might have in common. Then come up with a team name for yourselves. Then write down your team name in binary on the second



Worksheet. When finished, trade your worksheet with that of another team's, and figure out each others' team names.

3. There are many other binary systems that use a "presence-and-absence" logic. For example, the light switch in your bedroom that turns on and off, or Morse Code which can communicate non-digital messages (electricity is not required).

Perform research online to discover three other types of binary systems and describe how each of them works.



Binary Code Worksheet

VALUES

TEXT: _____

A	65
B	66
C	67
D	68
E	69
F	70
G	71
H	72
I	73
J	74
K	75
L	76
M	77
N	78
O	79
P	80
Q	81
R	82
S	83
T	84
U	85
V	86
W	87
X	88
Y	89
Z	90

128	64	32	16	8	4	2	1

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128	64	32	16	8	4	2	1

ANSWER



Binary Code Worksheet

VALUES

TEXT: _____

A	65
B	66
C	67
D	68
E	69
F	70
G	71
H	72
I	73
J	74
K	75
L	76
M	77
N	78
O	79
P	80
Q	81
R	82
S	83
T	84
U	85
V	86
W	87
X	88
Y	89
Z	90

128	64	32	16	8	4	2	1

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128	64	32	16	8	4	2	1

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ANSWER

