Binary - Binary Bracelets

Computers use **binary** to make decisions. Binary is a combination of 0's and 1's that store information. Much like when you must decide with only two possible choices, computers do the same thing with binary.

One (1) – represents; **on, yes or true**
Zero (0) – represents **off, no or false**

"1" or "0" is called a **bit**
8 bits is called a **byte** (01000001)

One kind of data that is stored with binary is the alphabet. Each letter of the alphabet had a different binary image. This is called **ASCII**

Fun Fact – If you change the third bit from the left
from a 0 to a 1, you have the same letter in lower case instead
of upper case!

01000001   01100001
A   a

Binary Bracelets

Computers use binary to make decisions, which is a combination of 0's and 1's that store information. Much like when you have to make a decision with only two possible choices, computers do the same thing with binary! Binary is represented with two numbers: one (1) and zero (0). One (1) represents "on" (such as for a light switch), yes, or true. Zero (0) represents "off", no, or false. When you have one "1" or "0", it's called a bit. Though, when you have a combination of 8 bits (such as "01100001"), it's called a byte!

01101100
01101111
01110110
01100101

Binary Applied

Think of a situation where you have to decide between two choices. This could be deciding between speaking or not speaking, jumping or standing still or turning a light switch on or off. How would you describe each of these choices with binary? Here's an example:
When describing whether a water hose is on (can spray water) or off (does not have water), you can describe when it's on with a 1 and when it's off with a 0.

Computers store information using binary bits ("0" or "1") and bytes (8 bits— like "01100010") in order to store information. One kind of data that is stored with binary is the alphabet! Each letter of the alphabet has a different binary representation, almost like a secret code. This group of binary bytes has a special name, ASCII.

Activity

Use the ASCII table, colored beads, and string to make a bracelet that represents your first name's initial! You can use one of the colors to represent 1 and another to represent 0.

Binary Bracelets Instructions

You will need:

8 beads of two colors (number of each color will depend on which initial you choose) 1 piece of string
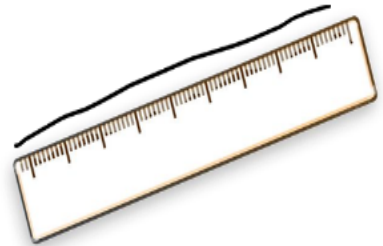
ASCII Binary Bracelet Code Key (see below)

Optional: extra beads (to make more letters/numbers), one being a third color

Instructions:

1. Measure the length of your string so that it will fit around your wrist with a little bit of extra length. If you need to cut your string, get help from an adult to cut it with scissors!

2. Decide which letter/number/character you are going to represent on your bracelet. Then, decide which bead color

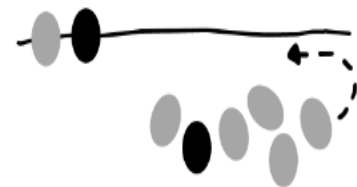3. will represent a 1 and which will represent a 0.

4. Use the ASCII key to lay out your beads and

5. make the same combination of 1's and 0's with your beads. Put the beads on your string in the order of the 0's and 1's. If you have extra beads, place one of the beads with your third color, and make the next bead combination. Doing this will allow you to distinguish between the two codes!

6. Tie your bracelet together with a few very strong knots.

B

0 1 0 0 0 0 1 0

ASCII Binary Bracelet Code Key

Symbol	Binary	Symbol	Binary
A	0100 0001	S	0101 0011
B	0100 0010	T	0101 0100
C	0100 0011	U	0101 0101
D	0100 0100	V	0101 0110
E	0100 0101	W	0101 0111
F	0100 0110	X	0101 1000
G	0100 0111	Y	0101 1001
H	0100 1000	Z	0101 1010
I	0100 1001	[	0101 1011
J	0100 1010	\	0101 1100
K	0100 1011	]	0101 1101
L	0100 1100	^	0101 1110
M	0100 1101	_	0101 1111
N	0100 1110	`	0110 0000
O	0100 1111	a	0110 0001
P	0101 0000	b	0110 0010
Q	0101 0001	c	0110 0011
R	0101 0010	d	0110 0100

Binary Alphabet

A	01000001	N	01001110
B	01000010	O	01001111
C	01000011	P	01010000
D	01000100	Q	01010001
E	01000101	R	01010010
F	01000110	S	01010011
G	01000111	T	01010100
H	01001000	U	01010101
I	01001001	V	01010110
J	01001010	W	01010111
K	01001011	X	01011000
L	01001100	Y	01011001
M	01001101	Z	01011010

01010100 01001000 01000001 01001110 01001011 01010011

_____ _____ _____ _____ _____ _____

01000110 01001111 01010010

_____ _____ _____

01000010 01000101 01001001 01001110 01000111

_____ _____ _____ _____ _____

01000011 01001000 01000101 01000101 01010011 01011001

_____ _____ _____ _____ _____ _____

01010111 01001001 01010100 01001000

_____ _____ _____ _____

01010101 01010011

_____ _____