Binary Bracelets

Overview:
This activity introduces Binary Code to participants. Binary code is the "language" computers use to store and transmit data. Binary is generally represented as 1's and 0's.

Goals:
- Encode / Decode letters using Binary Code.

Time Required: <30 minutes

Materials:
- Student Handout
- Pencil
- 3 different color pony beads
- Cord or Pipe Cleaners (to string beads on)

Procedures:
1. Code.org (see additional resources) has nice background information and explanations, review and use as needed.
2. Students will pick on color to represent 1's and one color for 0's, the third color will serve as spaces (used at the start, middle, and end).
3. Instruct students to find the first letter of their first name in the ASCII Code Sheet and write out the code in the boxes on their sheet. Then have them lay out the beads to match the letter.
4. Repeat for the first letter of their last name.
5. Have students string the beads on cord or pipe cleaner – remind them to be sure they keep the beads in the correct order! Use the 3rd color bead to separate the beads for their first and last initial.

Reflection:
1. Why are the spacer beads important in reading your code?
2. What was your favorite part of this activity?

Adapted from the following lessons:

National 4-H Council. "Code Your Communication." *Clover by 4-H*, 19 Dec. 2023, 4-h.org/clover/activities/code-your-communication/.

Additional Resources:

Code.org. "Binary Bracelets - Lesson 15." *Code.Org*, 2022, studio.code.org/s/coursec-2022/lessons/15.

ASCII Code Sheet

Upper Case Letters

A	0 1 0 0 0 0 0 1		N	0 1 0 0 1 1 1 0
B	0 1 0 0 0 0 1 0		O	0 1 0 0 1 1 1 1
C	0 1 0 0 0 0 1 1		P	0 1 0 1 0 0 0 0
D	0 1 0 0 0 1 0 0		Q	0 1 0 1 0 0 0 1
E	0 1 0 0 0 1 0 1		R	0 1 0 1 0 0 1 0
F	0 1 0 0 0 1 1 0		S	0 1 0 1 0 0 1 1
G	0 1 0 0 0 1 1 1		T	0 1 0 1 0 1 0 0
H	0 1 0 0 1 0 0 0		U	0 1 0 1 0 1 0 1
I	0 1 0 0 1 0 0 1		V	0 1 0 1 0 1 1 0
J	0 1 0 0 1 0 1 0		W	0 1 0 1 0 1 1 1
K	0 1 0 0 1 0 1 1		X	0 1 0 1 1 0 0 0
L	0 1 0 0 1 1 0 0		Y	0 1 0 1 1 0 0 1
M	0 1 0 0 1 1 0 1		Z	0 1 0 1 1 0 1 0

Lower Case Letters

a	0 1 1 0 0 0 0 1		n	0 1 1 0 1 1 1 0
b	0 1 1 0 0 0 1 0		o	0 1 1 0 1 1 1 1
c	0 1 1 0 0 0 1 1		p	0 1 1 1 0 0 0 0
d	0 1 1 0 0 1 0 0		q	0 1 1 1 0 0 0 1
e	0 1 1 0 0 1 0 1		r	0 1 1 1 0 0 1 0
f	0 1 1 0 0 1 1 0		s	0 1 1 1 0 0 1 1
g	0 1 1 0 0 1 1 1		t	0 1 1 1 0 1 0 0
h	0 1 1 0 1 0 0 0		u	0 1 1 1 0 1 0 1
i	0 1 1 0 1 0 0 1		v	0 1 1 1 0 1 1 0
j	0 1 1 0 1 0 1 0		w	0 1 1 1 0 1 1 1
k	0 1 1 0 1 0 1 1		x	0 1 1 1 1 0 0 0
l	0 1 1 0 1 1 0 0		y	0 1 1 1 1 0 0 1
m	0 1 1 0 1 1 0 1		z	0 1 1 1 1 0 1 0

Numbers & Select Symbols

0	0 0 1 1 0 0 0 0		5	0 0 1 1 0 1 0 1		#	0 0 1 0 0 0 1 1
1	0 0 1 1 0 0 0 1		6	0 0 1 1 0 1 1 0		&	0 0 1 0 0 1 1 0
2	0 0 1 1 0 0 1 0		7	0 0 1 1 0 1 1 1		+	0 0 1 0 1 0 1 1
3	0 0 1 1 0 0 1 1		8	0 0 1 1 1 0 0 0		!	0 0 1 0 0 0 0 1
4	0 0 1 1 0 1 0 0		9	0 0 1 1 1 0 0 1		-	0 0 1 0 1 1 0 1