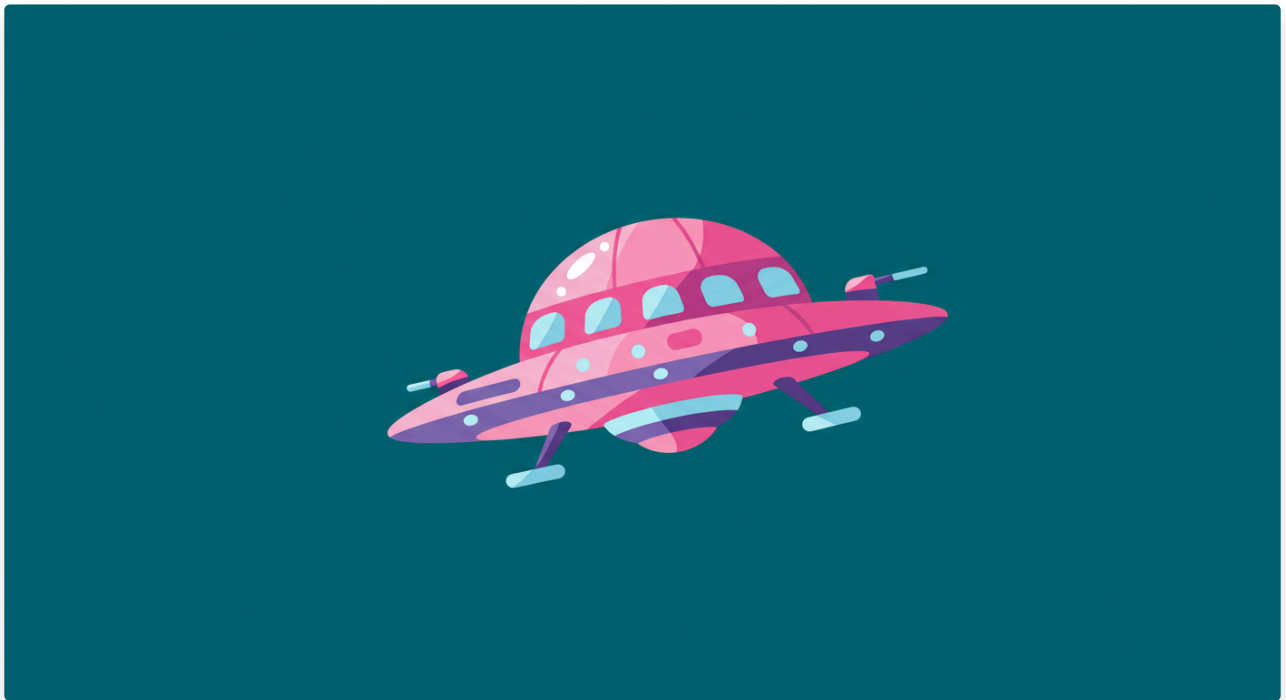


Binary Data

Textbook

Binary Data



The alien documentaries on History Channel say that aliens don't speak any human languages, but do understand one thing—light signals! You can only communicate using a flashlight that blinks in two ways: on and off. With just these two signals, you figure out a way to send messages and understand what people are saying.

This is how [binary](#) works! Computers only understand two things—0s and 1s—but by combining them in different ways, they can store words, pictures, music, and even entire video games! In this lesson, you'll learn how to read and write in binary, the language of computers!



[Binary](#) is a special way of counting and talking to the computer. Instead of using numbers like 1, 2, or 3, we only use two: 0 and 1. It's like a secret language that computers get. When we want to tell computers what to do, we use 0s and 1s to give them directions. Binary is like a computer's own language with just two words: 0 and 1.

There are other ways to represent binary code. Think outside the box as you create your forms of binary code in this lesson's challenges! You will need to use the letter decoding chart below. Each letter corresponds with a binary combination of numbers.

Letter	Number	Letter	Number
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

Critical Thinking Questions

1. If computers can only understand 0s and 1s, how do they process things like pictures, sounds, and videos?
2. What are some everyday technologies that rely on binary code?
3. Can you think of other ways people in history have communicated using symbols or patterns instead of words?

Questions (5)

1. What two numbers are used in binary code?

MULTIPLE CHOICE

Choose the correct answer:

- A. 1 and 2
- B. 0 and 1
- C. 0 and 10
- D. 1 and 100

2. What is binary often compared to in the passage?

MULTIPLE CHOICE

Choose the correct answer:

- A. Cooking
- B. Flashlight signals (on and off)
- C. Playing sports
- D. Using a camera

3. Why is binary called a “secret language” for computers?

Choose the correct answer:

- A. Because it uses emojis
- B. Because it's written in invisible ink
- C. Because it only uses 0s and 1s to send information
- D. Because only aliens use it

4. Why is it helpful to learn how binary code works?

Choose the correct answer:

- A. So we can write long stories faster
- B. So we can make crafts with numbers
- C. So we can better understand how technology communicates
- D. So we can write with pens

5. Why do computers use binary instead of numbers 0 to 9?


Choose the correct answer:

- A. Because binary is faster to type
- B. Because computers only understand two states (on/off)
- C. Because numbers 0 to 9 are too confusing
- D. Because binary looks cooler

Games (2)

1. Binary Data Typing

Full ScreenAudioInstructionsRestartPause



0s100%

By combining 0 and 1 in c

2. Binary Data Memory

Full ScreenAudioInstructionsAnswer KeyPause

Flips: 0

10000010 B

21001011 K

30100111 K

40001010 D

50101010 S


600100010 D

70010010 D

80101010 S

901000010 B B

or10001010 Q



Robotics Challenges (3)

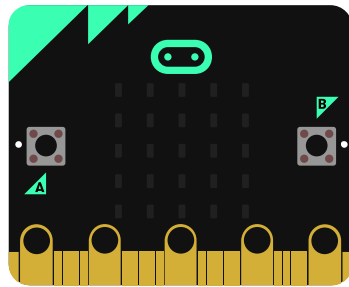
1. X's and Checks

X's and Checks

Use binary code to spell the word "Hi." To do this, flash an X icon to represent 0 and a check mark to represent 1. You will need a clear screen and pause block in between each X or check mark that repeats.

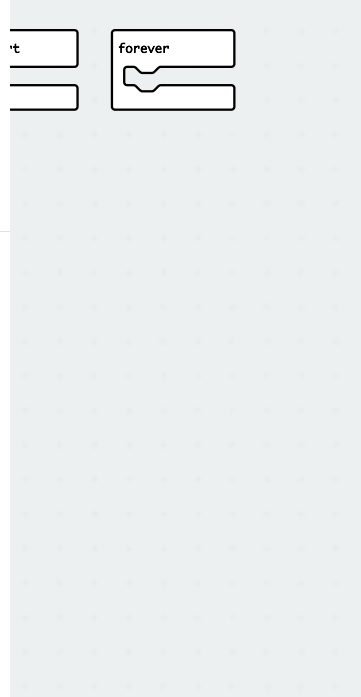
Requirements

- Show an X on the [show icon](#) block to represent every 0 in the binary code.
- Show a check mark on the [show icon](#) block to represent every 1 in the binary code.
- Add a [clear screen](#) and [pause](#) block in between each X or check mark that repeats.



Search...

- Basic
- Input
- Music
- Led
- Radio
- Loops
- Logic
- Variables
- Math
- Extensions
- Advanced



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2. Happy and Angry

Happy and Angry

Use binary code to spell a secret message. To do this, flash a happy face icon to represent 0 and an angry face icon to represent 1. You will need a clear screen and pause block in between each happy face or angry face icon that repeats.

Requirements

- Show a happy face on the [show icon](#) block to represent every 0 in the binary code.
- Show an angry face on the [show icon](#) block to represent every 1 in the binary code.
- Add a [clear screen](#) and [pause](#) block in between each happy face or angry face icon that repeats.

Step 1

Begin with the [on start](#) block.

Happy and Angry Step 1 of 4



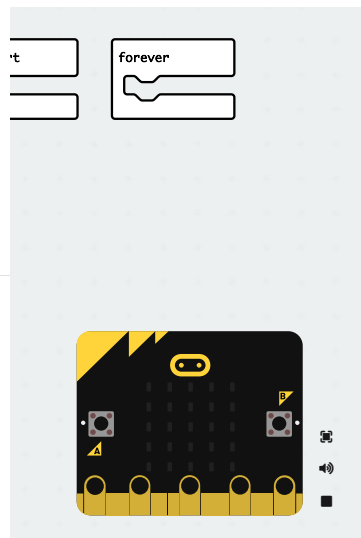
1



Toolbox

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3. Low Tone, High Tone

Challenge

Textbook

Low Tone, High Tone

Use binary code to represent the letter "M." M stands for music. To do this, play a high tone to represent 0 and play a low tone to represent 1. You will need a clear screen and pause block in between each repeating low or high tone.

Requirements

- Play a high tone on the **play tone** block to represent every 0 in the binary code and
- play a low tone on the **play tone** block to represent every 1 in the binary code.

- Add a **clear screen** and **pause** block in between each X or check mark that repeats.

Step 1

Begin with the **on start** block.

Low Tone, High Tone Step 1 of 4



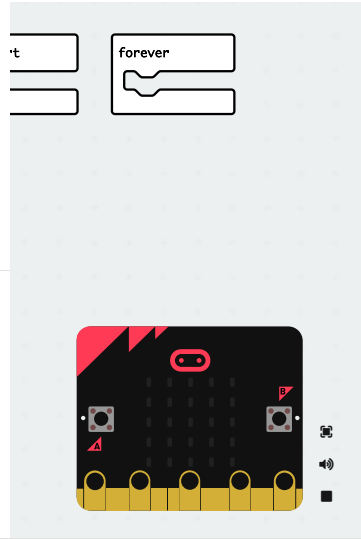
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Next

Toolbox

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Answer Keys & Solutions

Questions

1. What two numbers are used in binary code?

MULTIPLE CHOICE

Correct Answer:

- A. 1 and 2 ✗ Incorrect
- B. 0 and 1 ✓ Correct
- C. 0 and 10 ✗ Incorrect
- D. 1 and 100 ✗ Incorrect

Explanation:

Binary is based on just two digits that computers understand.

2. What is binary often compared to in the passage?

MULTIPLE CHOICE

Correct Answer:

- A. Cooking ✗ Incorrect
- B. Flashlight signals (on and off) ✓ Correct
- C. Playing sports ✗ Incorrect
- D. Using a camera ✗ Incorrect

Explanation:

Think of how aliens might understand light patterns.

3. Why is binary called a "secret language" for computers?

MULTIPLE CHOICE

Correct Answer:

- A. Because it uses emojis ✗ Incorrect

B. Because it's written in invisible ink

✗ Incorrect

C. Because it only uses 0s and 1s to send information

✓ Correct

D. Because only aliens use it

✗ Incorrect

Explanation:

Computers can only read this very simple language.

4. Why is it helpful to learn how binary code works?

MULTIPLE CHOICE

Correct Answer:

A. So we can write long stories faster

✗ Incorrect

B. So we can make crafts with numbers

✗ Incorrect

C. So we can better understand how technology communicates

✓ Correct

D. So we can write with pens

✗ Incorrect

Explanation:

Binary is the "language" behind computers and coding.

5. Why do computers use binary instead of numbers 0 to 9?

MULTIPLE CHOICE

Correct Answer:

A. Because binary is faster to type

✗ Incorrect

B. Because computers only understand two states (on/off)

✓ Correct

C. Because numbers 0 to 9 are too confusing

✗ Incorrect

D. Because binary looks cooler

✗ Incorrect

Explanation:

Think about what electronic devices can easily detect.

1. Binary Data Typing

Typing game - no answer key needed. Students practice typing the provided content.

2. Binary Data Memory

Memory Game Pairs:

1. ↔
2. ↔
3. ↔
4. ↔
5. ↔

Students must find all matching pairs by flipping cards and remembering their positions.