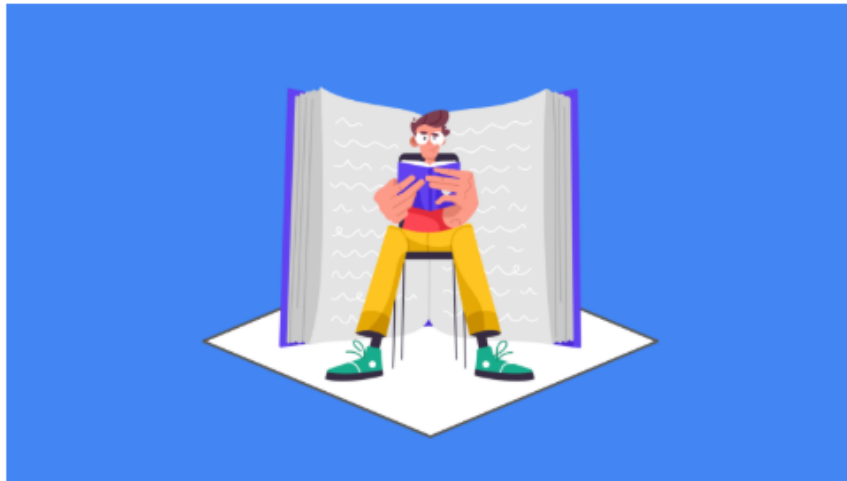


Introduction to Coding: Algorithms

Textbook

Introduction to Coding: Algorithms



Dance Party: Following Steps

One rainy afternoon, Katie and Maggie were in Katie's room when she said, "Let's make a robot dance!" Maggie laughed. "Okay! But how do we make it dance?"

Katie thought for a second. "We can give it steps to follow. Like: **step forward, spin, clap, and bow!**"

"Like a recipe for dancing!" Katie said. "We're making an **algorithm!**"

"What's an **algorithm?**" Maggie asked.

"It's a **sequence** that tells you how to do something," Katie explained. "Think about getting ready for school. You have to put on your socks, then your shoes, right? You wouldn't put your shoes on before your socks! That's an algorithm—a list of steps, in the right order, to finish a task."

Algorithms Are Everywhere

Algorithms are all around us! When you brush your teeth, you follow steps: pick up toothbrush, add toothpaste, brush up and down, rinse your mouth. When you make a sandwich, you follow steps: get bread, add peanut butter, add jelly, put bread together.

If you change the order of steps, things don't work right. Try putting your shoes on before your socks—it doesn't work! Try adding jelly before peanut butter—it's messy! **Order matters** in algorithms.

Algorithms in Computer Science

In computer science, an **algorithm** is like a special set of instructions you give to a computer. Computers are super good at following instructions, but they need them to be very clear and in the correct order. Just like our robot dance steps or your morning routine, computers need to know exactly what to do, step by step, to solve a problem or make something happen.

Soon, we'll use special **coding blocks** to tell computers these steps. Each block will be like one step in our algorithm, helping us create amazing computer programs! We'll learn to plan out our steps, put them together using blocks, and then see if our computer follows our algorithm exactly as we planned.

Think About It!

Can you think of other daily tasks that have steps? Making your bed, feeding a pet, or washing your hands all use algorithms too!

Critical Thinking Questions

1. What could happen if you follow the steps of an algorithm in the wrong order?
2. How can using a loop help make your instructions easier to follow?
3. Think of a task you do every day. What are the steps? Can you turn it into an algorithm?

Sentence Stems

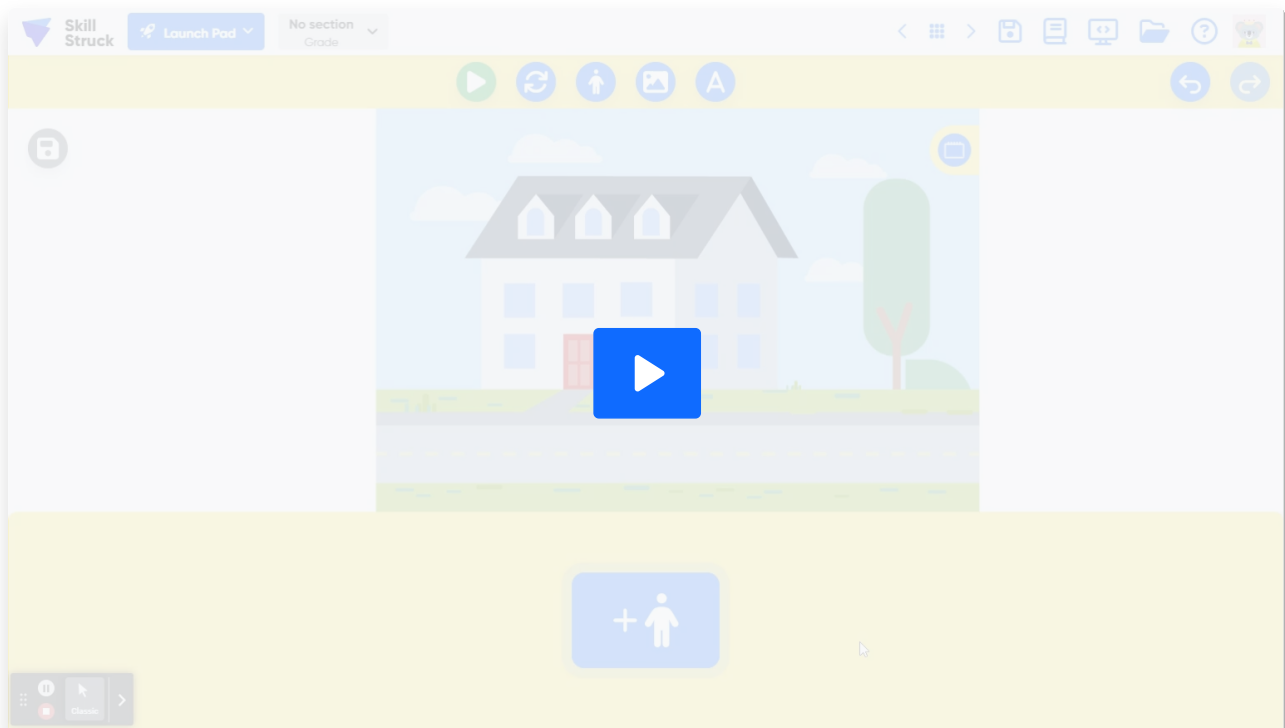
When you read or listen to the word, (blank), think of a word or an example that you can use to fill that space. For instance, if you see a sentence that says "My favorite color is (blank)," you should fill that (blank) space with your favorite color.

These sentence starters help us talk about algorithms:

1. **"An algorithm is (blank) because it shows us (blank)."**
2. **"First I (blank), then I (blank), and last I (blank)."**
3. **"If I change the order, then (blank) will happen."**

Blocks Platform

Watch the video below to learn about the Blocks platform.



Questions (5)

1. What is an algorithm?

MULTIPLE CHOICE

Choose the correct answer:

- A. A type of food
- B. A robot's name
- C. A list of steps to solve a problem
- D. A fun dance move

2. What happens when you follow the steps in the wrong order?

MULTIPLE CHOICE

Choose the correct answer:

- A. The task might not work
- B. You win a prize
- C. You make a new algorithm
- D. The steps disappear

3. What is a loop?

MULTIPLE CHOICE

Choose the correct answer:

- A. A kind of toy
- B. A way to repeat steps in an algorithm
- C. A magic trick
- D. A password

4. Why do we use algorithms?

MULTIPLE CHOICE

Choose the correct answer:

- A. To eat lunch faster
- B. To make coloring pages
- C. To skip chores
- D. To solve problems or give instructions

5. What should you do if your algorithm doesn't work right?

Choose the correct answer:

- A. Give up
- B. Debug it and fix the steps
- C. Eat a snack
- D. Write the same step many times

Games (3)

1. Baking Bread Ordering

Create a bread algorithm. Order the pictures to show the order you would bake bread.

Full Screen

Audio

Instructions



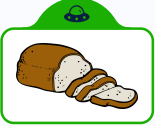
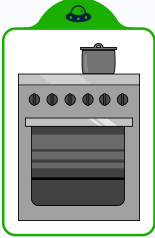
Answer Key

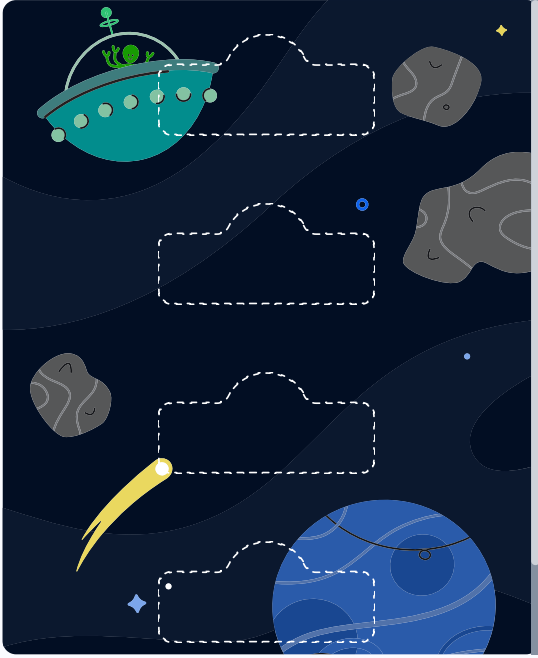
Pause



Clear All

Check Matches

Attempts: 0







2. Smoothie Ordering

Create an algorithm. Order the pictures to show the order you would make a smoothie.

Full Screen

Audio

Instructions


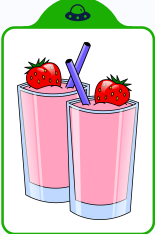

Answer Key

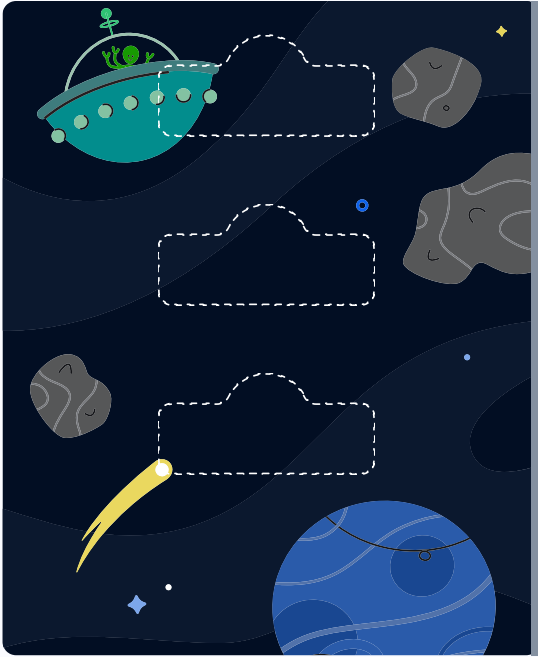
Pause



Clear All

Check Matches

Attempts: 0







3. Algorithms Typing Race


Full Screen

Audio

Instructions

Restart

Pause



0s

100%

f

ollow the steps

Blocks Challenges (5)

1. Going for a Walk



Going for a Walk

Program your sprite to look like they are walking down the street 4 steps. Then have your sprite hop 1. Use the motion blocks to do this.

Hint: Remember to have a trigger block to start your algorithm and a red stop block to end!

1 5 1



Submit ↑



2. Center Stage



Center Stage

Use the stage backdrop.

Code your sprite to look like they are walking back and forth across the stage.

Hint: To select a backdrop, remember to click the picture icon above the scene.

1 6 1



Submit ↑



3. Buzzing Around

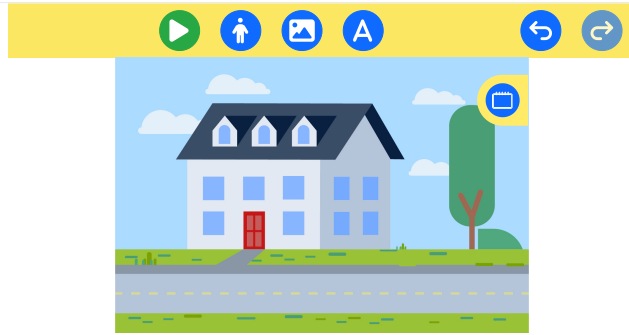


Buzzing Around

Did you know bees fly in a special way called "hovering"? They are amazing flyers and can fly backward, sideways, and even upside down!

Select the bee sprite and using the different motion blocks, have the bee "hover" in your scene.

1 → 6 1



Submit ↑



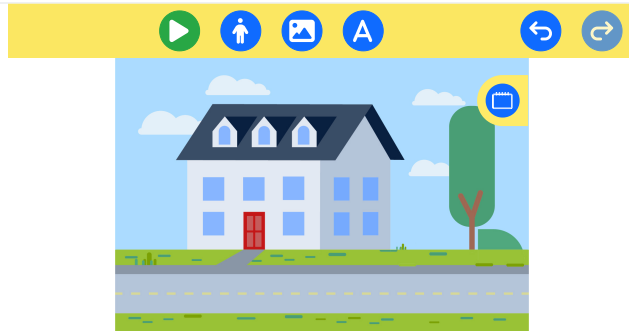
4. Blast off!



Blast off!

Help your rocket ship blast off.

1 → 5 1



Submit ↑



5. Zoo Escape!



Zoo Escape!

Oh no! A monkey has escaped from the zoo! Monkeys love being curious and exploring their surroundings.

Program your monkey to explore it's surroundings outside of the zoo.



1



6



1



Submit ↑



Answer Keys & Solutions

Questions

1. What is an algorithm?

MULTIPLE CHOICE

Correct Answer:

- A. A type of food ✗ Incorrect
- B. A robot's name ✗ Incorrect
- C. A list of steps to solve a problem ✓ Correct
- D. A fun dance move ✗ Incorrect

Explanation:

It's something you follow to get something done.

2. What happens when you follow the steps in the wrong order?

MULTIPLE CHOICE

Correct Answer:

- A. The task might not work ✓ Correct
- B. You win a prize ✗ Incorrect
- C. You make a new algorithm ✗ Incorrect
- D. The steps disappear ✗ Incorrect

Explanation:

Order matters in a sequence!

3. What is a loop?

MULTIPLE CHOICE

Correct Answer:

- A. A kind of toy ✗ Incorrect

B. A way to repeat steps in an algorithm

✓ Correct

C. A magic trick

✗ Incorrect

D. A password

✗ Incorrect

Explanation:

Think about something that happens again and again.

4. Why do we use algorithms?

MULTIPLE CHOICE

Correct Answer:

A. To eat lunch faster

✗ Incorrect

B. To make coloring pages

✗ Incorrect

C. To skip chores

✗ Incorrect

D. To solve problems or give instructions

✓ Correct

Explanation:

Computers and people both use them to follow steps!

5. What should you do if your algorithm doesn't work right?

MULTIPLE CHOICE

Correct Answer:

A. Give up

✗ Incorrect

B. Debug it and fix the steps

✓ Correct

C. Eat a snack

✗ Incorrect

D. Write the same step many times

✗ Incorrect


Explanation:


It's okay to make mistakes—you can fix them!

1. Baking Bread Ordering

Correct Order:

1.  ingredients-575730_1280.png

2.  mixer-23482_1280.png

3.  stove-5412363_1280.png

4.  bread-29006_1280.png

Scoring:

- Gold: 1 attempts or fewer
- Silver: 3 attempts or fewer
- Bronze: 5 attempts or fewer


Students must arrange items in the correct sequence.

2. Smoothie Ordering

Correct Order:

1.  fruit-4202929_1280.png

2.  banana-4489567_1280.png

3.  drinks-34377_1280.png

Scoring:

- Gold: 1 attempts or fewer
- Silver: 3 attempts or fewer
- Bronze: 5 attempts or fewer

Students must arrange items in the correct sequence.

3. Algorithms Typing Race

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