

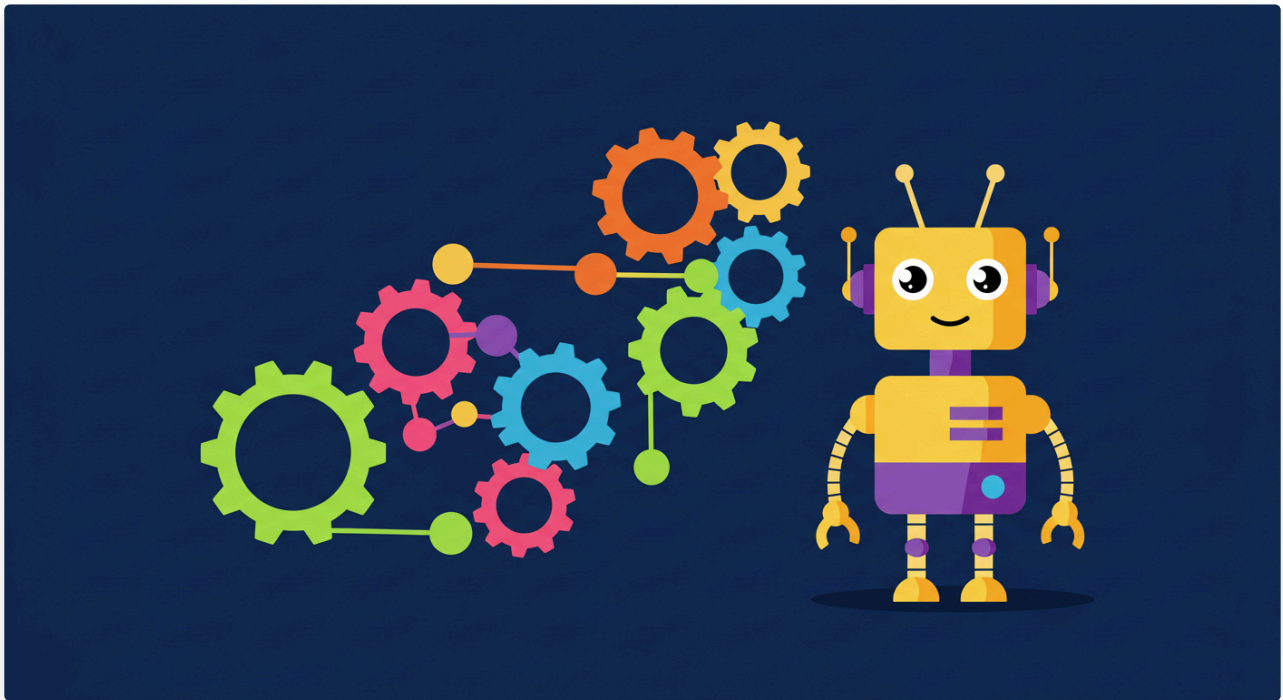
## Computer Devices and Computer Systems

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### Textbook

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## Computer Devices and Computer Systems



Just like players in a game need to pass the ball and follow the rules, computers need to share information clearly to work their best. That's where a network comes in!

## Computer Devices



All of these pictured devices, the micro:bit, and more are examples of computers. A desktop computer, tablet, and phone are all considered computers. Computers are machines that quickly process and work with information. Do you use any of these devices at home or school?

Computers use many different parts to work. Some parts are for putting information IN, and some are for getting information OUT!

## Input Devices (Putting Information IN)

These are the tools we use to give commands or information to a computer. Think of them as the computer's "senses."

- **Keyboard:** You type words and numbers into the computer.
- **Mouse:** You click on things and move around the screen.
- **Microphone:** You speak, and the computer hears your voice.
- **Controller (like for a game):** You press buttons and move joysticks to play games.
- **Touchscreen:** You tap or swipe directly on the screen to tell the computer what to do.
- **Webcam:** It captures images or videos for the computer.

## Output Devices (Getting Information OUT)

These are the tools computers use to show us information or perform actions based on our commands. Think of them as the computer's "voice" or "actions."

- **Monitor/Screen:** You see pictures, videos, and words.
- **Speakers/Headphones:** You hear sounds, music, and voices.

- **Printer:** It puts pictures or words from the computer onto paper.
- **Vibration (in a phone or controller):** You feel a buzz or shake.
- **Robot Arm:** It moves or grabs things based on computer commands.

# Mastering Technology

## Becoming a Keyboard Pro!

The keyboard is one of the most important tools for using a computer. Not only do you type words and numbers, but you can also use special key combinations to do things super fast! These are called keyboard shortcuts. Learning them can make you much faster and more efficient!

Look at a real keyboard or a picture of one. Can you find all the different keys? There are letters, numbers, and special keys like **Ctrl** (Control), **Alt**, and **Shift**.

**Proper Finger Placement:** Learning to place your fingers in the right spot on the keyboard helps you type faster and more accurately. This is called **touch typing**. Imagine your fingers have a "home row" where they rest:

- For your **left hand:** your pinky rests on 'A', ring finger on 'S', middle finger on 'D', and index finger on 'F'. Your left thumb rests on the spacebar.
- For your **right hand:** your index finger rests on 'J', middle finger on 'K', ring finger on 'L', and pinky on ';'. Your right thumb also rests on the spacebar.

Practice placing your fingers on these keys without looking at your hands. This helps your fingers "learn" where the keys are!

**Important Keyboard Shortcuts:** Here are some common shortcuts that can save you a lot of time! Remember, these often use the **Ctrl** key (on Windows computers) or the **Command** key (on Apple computers). **Not all computers use the exact same shortcuts, but many are very similar!**

Let's explore some of them:

**Copy:** Press Ctrl + C (or Command + C). This makes a copy of selected text or an image.

**Paste:** Press Ctrl + V (or Command + V). This puts the copied item where your cursor is.

**Cut:** Press Ctrl + X (or Command + X). This removes selected text/image and copies it.

**Select All:** Press Ctrl + A (or Command + A). This selects everything on the page.

**Find:** Press Ctrl + F (or Command + F). This opens a search bar to find words on a page.

**Undo:** Press Ctrl + Z (or Command + Z). This undoes your last action. Made a mistake? Just hit undo!

Being good at using technology to get things done is called **digital fluency**. It means you can use computer devices and digital tools smoothly and smartly to solve problems.

Here's how you're using digital fluency to create:

- **Choosing the Right Tools:** You are selecting and using the micro:bit and specific code blocks (like the light level variable and IF ELSE blocks) because they are the perfect digital tools for this task.
- **Building on What You Know:** You are relating previously learned concepts to new concepts! You're using your knowledge of variables and IF ELSE statements from past lessons in a brand new way with the light sensor.

- **Developing and Refining:** You will develop your program, test it to see if the nightlight turns on and off correctly in different light levels, and then refine (make better) your code based on that feedback. This is how you solve problems using technological processes efficiently.
- **Keyboard Skills:** As you type in numbers or search for blocks, using proper keyboarding skills helps you work faster and more accurately.
- **Responsible Use:** You're using the micro:bit's features responsibly to create something useful, like an automatic nightlight.

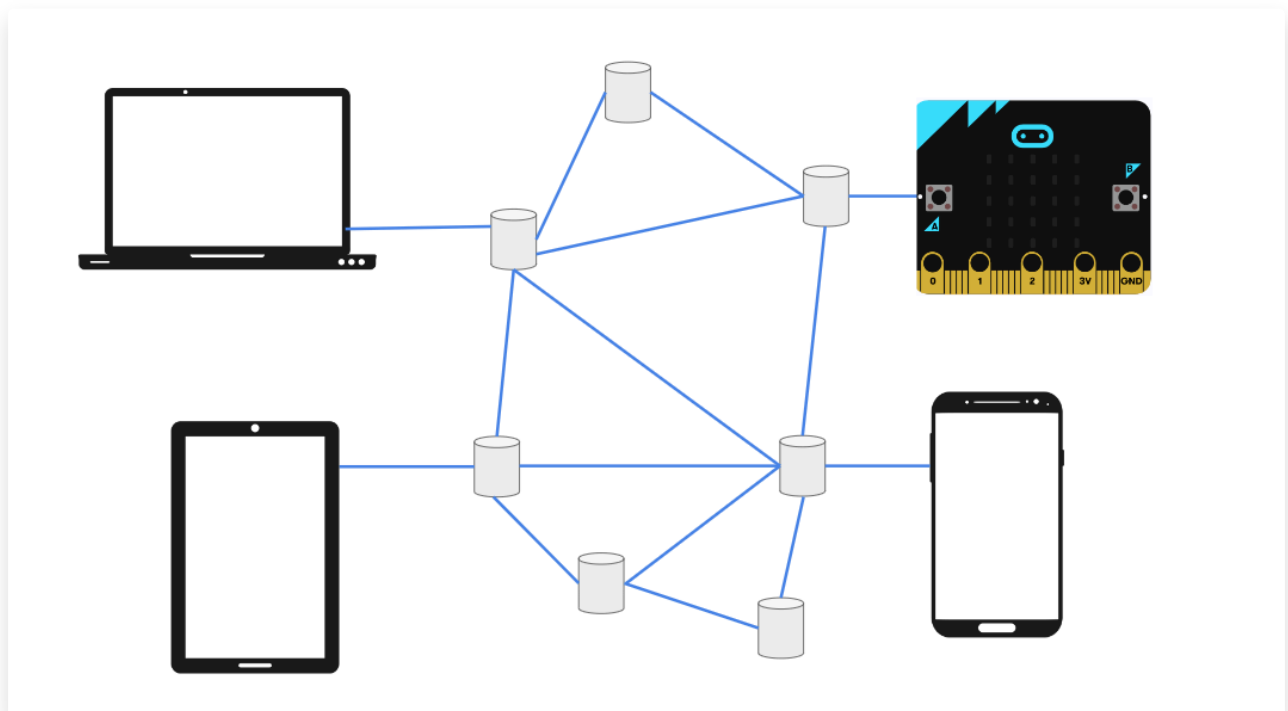
By finishing this task, you're practicing important tech skills and learning how to use digital tools better.

## Computer Systems

Computers can talk to each other and share information, just like when you send a text from one phone to another or an email from one computer to another. Something called a **network** makes this possible.

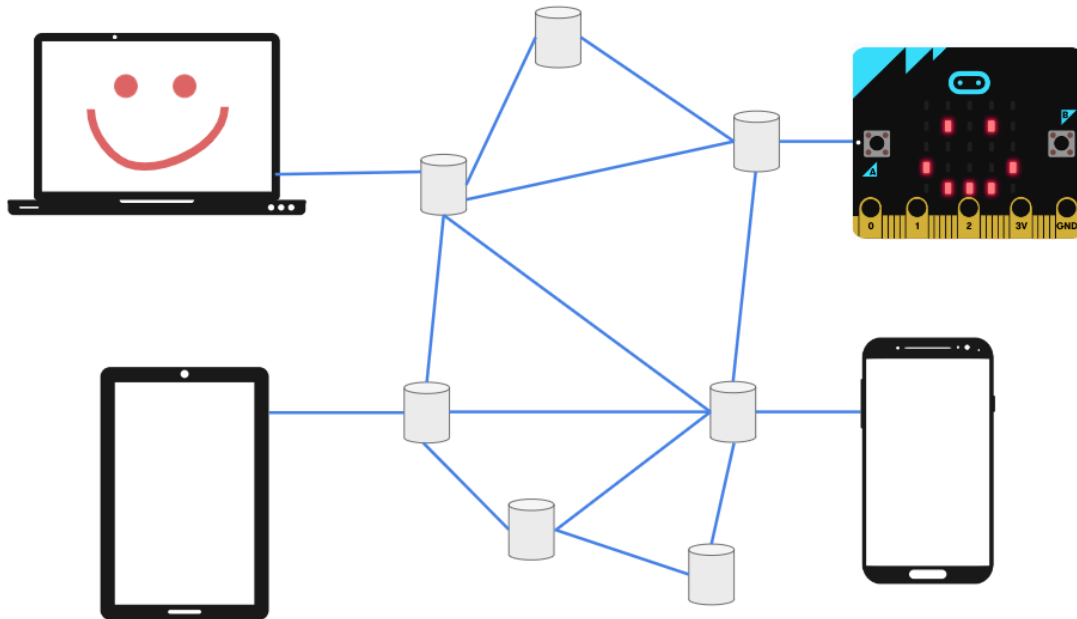
A **computer network** is when lots of computers and gadgets are connected to each other by special lines (like wires or invisible signals like Wi-Fi).

These lines let the computers and gadgets send information to each other through something called **nodes**. A network is made of these nodes. A node can get information and send it to other computers.



## How Computers Communicate and Transfer Data:

When information is sent across a network (like a picture from your phone to a friend's phone), it's split into tiny parts called **packets**. Imagine a big letter being torn into tiny pieces, each with the address on it. Each packet goes on its own journey (sometimes taking different paths!) and then gets put back together when it arrives at the right computer. This way, lots of information can travel at the same time without getting mixed up.



## Connecting to a Network:

Physical devices are needed for the internet (a very big network!) to work on a computer:

- The **hub** joins different devices together in a small network.
- **Routers** and **switches** are like traffic cops. They help send those packets along the best paths to where they need to go, making sure they reach the correct computer. Your home Wi-Fi box is usually a router!

## Troubleshooting Network Problems:

Sometimes, computers can't connect to the internet or share information. Here are some quick steps to try to fix it:

1. **Check the Cables:** Make sure all wires are plugged in tightly to your computer and the router.
2. **Restart the Router:** Unplug your internet router for about 30 seconds, then plug it back in. Wait a few minutes for it to start up completely. This often fixes many common network problems.
3. **Restart Your Computer/Device:** Sometimes your device itself just needs a fresh start to connect properly.
4. **Check Wi-Fi:** Make sure your Wi-Fi is turned on and you're connected to the correct network.

## Critical Thinking Questions

1. What are some examples of devices that rely on computer networks in your daily life?
2. How can a network of computers help solve problems more quickly?

## Questions (5)

### 1. What is a computer network?

MULTIPLE CHOICE

Choose the correct answer:

- A. A type of phone
- B. A machine that prints papers
- C. A group of connected computers and devices
- D. A storage space for pictures

### 2. What are nodes in a computer network?

MULTIPLE CHOICE

Choose the correct answer:

- A. Video game characters
- B. Packets of data
- C. Devices or connection points in a network
- D. Passwords used to connect to Wi-Fi

### 3. What are packets?

MULTIPLE CHOICE

Choose the correct answer:

- A. Full copies of websites
- B. Pieces of a computer keyboard
- C. Small parts of information sent across a network
- D. Boxes used to ship laptops

### 4. Why do routers and switches matter in a network?

MULTIPLE CHOICE

Choose the correct answer:

- A. They make your screen brighter
- B. They help send data packets to the right places
- C. They play music
- D. They store your passwords

## 5. What happens to information before it travels across a network?

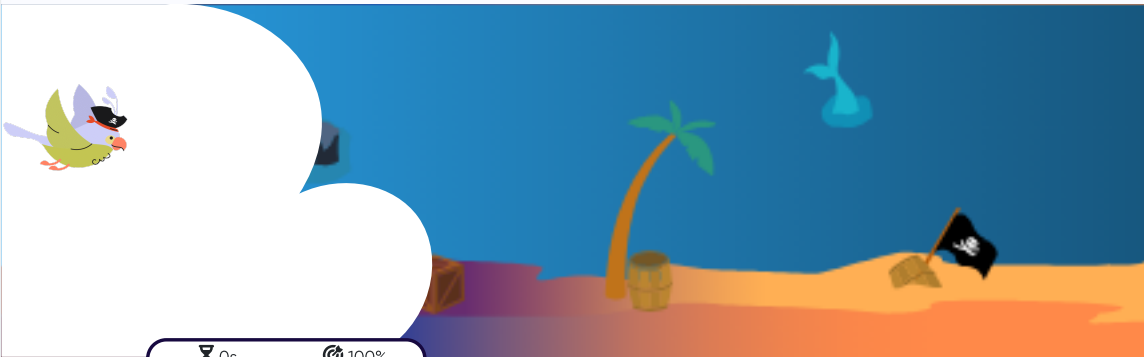
Choose the correct answer:

- A. It gets thrown away
- B. It turns into sound
- C. It is split into packets
- D. It becomes a picture

## Games (2)

### 1. Computer Devices and Computer Systems Typing

Full Screen Audio Instructions Restart Pause



0s 100%

A computer network is v

2. Computer Devices and Computer Systems Category

Full Screen

Audio

Instructions

Answer Key

Pause

Clear All

Check Order

Attempts: 0

A basket

A toaster

A smart watch

A piano

A swing




A phone

A tablet

A desktop computer

Computer Devices

Not Computer Devices





# Robotics Challenges (2)

## 1. Pressing Buttons

Challenge

Textbook

### Pressing Buttons

The micro:bit acts as a computer device with inputs and outputs. Computers can respond to input from the person using the computer.

For this challenge, create a program that does the following:

- When Button A is pressed, show a smiley face icon.
- When Button B is pressed, show a sad face icon.
- When Buttons A and B are pressed, show an angry face icon.

#### Requirements

- When Button A is pressed, show a happy face icon.
- When Button B is pressed, show a sad face icon.
- When Buttons A and B are pressed, show an angry face icon.

### Step 1

Code the micro:bit to show a happy face icon when you press button A.

Pressing Buttons Step 1 of 3



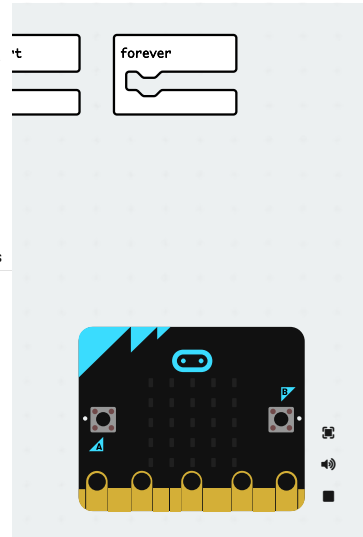
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Next

#### Toolbox

Search...

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



Download

## 2. Buttons and Numbers

Challenge

Textbook

### Buttons and Numbers

Code the micro:bit to do the following:

- When pressing button A, show the number 1.
- When pressing button B, show the number 2.
- When pressing buttons A + B together, show the number 3.

#### Requirements

- Show the number 1 when Button A is pressed.
- Show the number 2 when Button B is pressed.
- Show the number 3 when Buttons A and B are pressed.

### Step 1

Using the **show number** block, code the micro:bit to show the number 1 when you press button A.

Buttons and Numbers Step 1 of 3



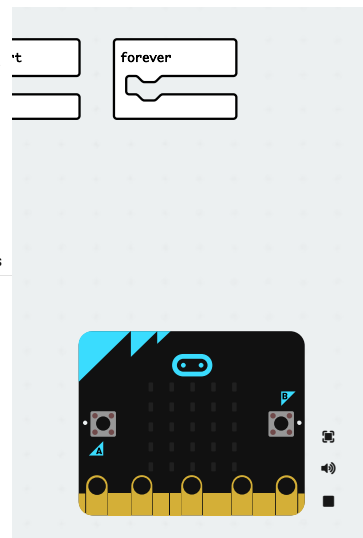
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Next

#### Toolbox

Search...

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



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## Answer Keys & Solutions

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### Questions

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#### 1. What is a computer network?

MULTIPLE CHOICE

**Correct Answer:**

- A. A type of phone ✗ Incorrect
- B. A machine that prints papers ✗ Incorrect
- C. A group of connected computers and devices ✓ Correct
- D. A storage space for pictures ✗ Incorrect

**Explanation:**

Networks let devices talk to each other and share information.

#### 2. What are nodes in a computer network?

MULTIPLE CHOICE

**Correct Answer:**

- A. Video game characters ✗ Incorrect
- B. Packets of data ✗ Incorrect
- C. Devices or connection points in a network ✓ Correct
- D. Passwords used to connect to Wi-Fi ✗ Incorrect

**Explanation:**

Nodes send and receive information across the network.

#### 3. What are packets?

MULTIPLE CHOICE

**Correct Answer:**

- A. Full copies of websites ✗ Incorrect

B. Pieces of a computer keyboard

✗ Incorrect

C. Small parts of information sent across a network

✓ Correct

D. Boxes used to ship laptops

✗ Incorrect

#### Explanation:

Data is broken down into little pieces to travel to their destination and reassemble.

### 4. Why do routers and switches matter in a network?

MULTIPLE CHOICE

#### Correct Answer:

A. They make your screen brighter

✗ Incorrect

B. They help send data packets to the right places

✓ Correct

C. They play music

✗ Incorrect

D. They store your passwords

✗ Incorrect

#### Explanation:

Routers and switches guide the information on its path.

### 5. What happens to information before it travels across a network?

MULTIPLE CHOICE

#### Correct Answer:

A. It gets thrown away

✗ Incorrect

B. It turns into sound

✗ Incorrect

C. It is split into packets

✓ Correct

D. It becomes a picture

✗ Incorrect

#### Explanation:

Each packet takes its own path to the destination.

### 1. Computer Devices and Computer Systems Typing

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

### 2. Computer Devices and Computer Systems Category

**Category Solutions:**

#### **Category 1: Computer Devices**

- A desktop computer
- A tablet
- A phone
- A smart watch

#### **Category 2: Not Computer Devices**

- A toaster
- A swing
- A piano
- A basket

*Students must sort items into their correct categories.*