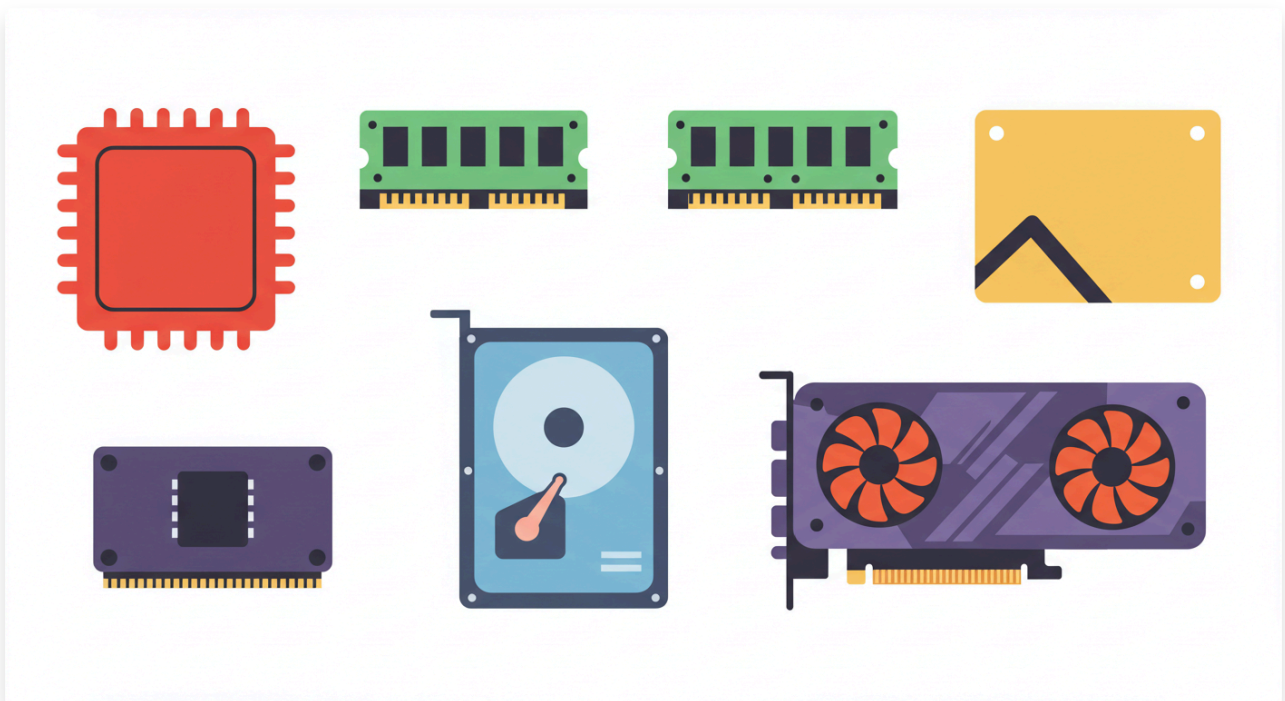


Hardware and Software

Textbook

Hardware and Software



Hardware is the part of the computer you can see and touch. Software is the set of instructions that tells the computer what to do. Both are needed for the computer to work the right way.

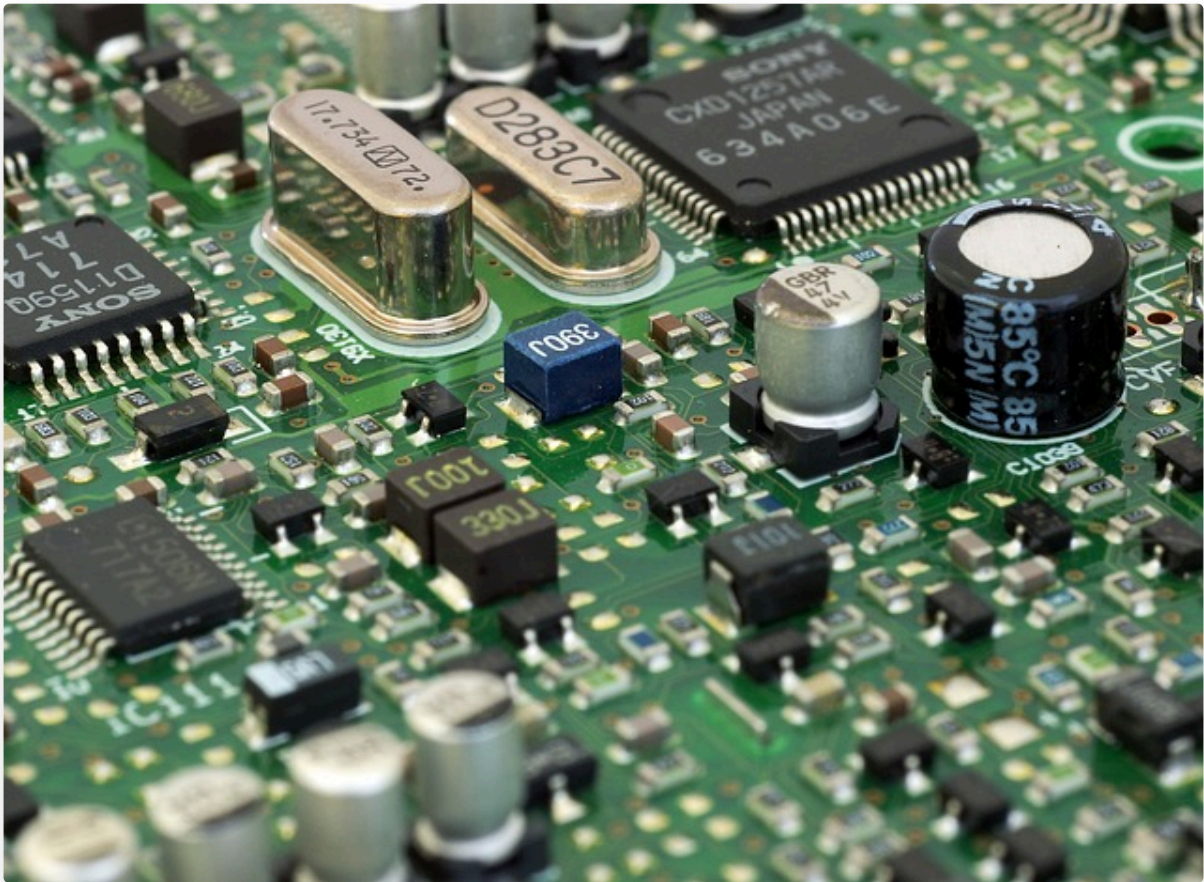
When you use a computer, all its parts need to work together to make it run right. We call these physical pieces "hardware."

Hardware comes in two types: internal parts and external parts.

Internal Parts

[Internal parts](#) are the pieces inside the computer. Common internal parts include:

- **Motherboard** - The motherboard is where all the computer parts connect to each other to work together and make the computer go. It's usually green, but it can be other colors too.



- [Hard Drive](#) - The hard drive is where the computer's memory is.
- [Fan](#) - Computers can get very hot when they're working hard to do what we ask them to do! That's why we have a fan to help keep the working parts cool.

External Parts

External parts are the pieces that plug into or connect to the computer. Examples of external parts include:

- [Mouse](#) - The mouse lets you click things on your computer screen.
- [Printer](#) - The printer allows you to print out your documents or pictures.
- [WiFi Router](#) - The WiFi router helps you connect to the internet.

The Computer's Job Cycle: Input, Processing, Output, and Storage

Computers are amazing because they can take information, do something with it, show you the results, and even remember it for later! We call this the **computation cycle**. It has four main steps:

- **Input:** Giving information to the computer.
- **Processing:** The computer's "brain" thinks about the information.
- **Output:** The computer shows you the results.
- **Storage:** The computer remembers information for later.

Both hardware and software work together in this cycle!

Hardware in the Computation Cycle

- **Input Devices:** These send information to the computer.
 - Examples: **Keyboard, Mouse, Microphone, Remote Control** (like for a game).
- **Processing Devices:** This is the computer's "brain."
 - Example: The **Processor (CPU)** inside your computer.
- **Output Devices:** These show you what the computer did.
 - Examples: **Monitor/Screen, Printer, Speakers, Vibration Motor** (in a game controller).
- **Storage Devices:** These remember information.
 - Examples: **Hard Drive, USB Drive**.

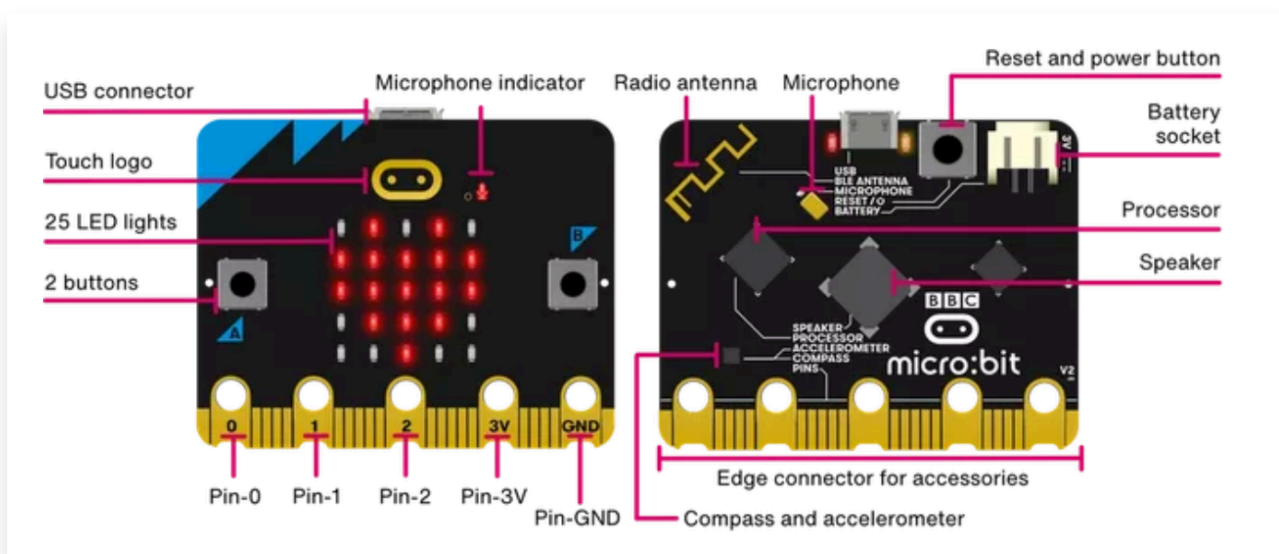
Software in the Computation Cycle

Software programs tell the hardware what to do at each step!

- **Input (Software):** When you type into a document or click a button in a game, the software takes that as input.
- **Processing (Software):** A game's software processes your moves; a math program processes numbers.
- **Output (Software):** Image software shows a picture on the screen; music software plays sounds through speakers.
- **Storage (Software):** When you click "Save," the software tells the computer to store your file.

The micro:bit

The [micro:bit](#) is considered a small computer because of the hardware and software it has. Let's talk about the internal (inside) and external (outside) parts of the micro:bit to learn how it works.



Internal Parts of the micro:bit

Internal Part	Description
Processor	The micro:bit has a small processor inside that follows code and instructions. It helps the micro:bit know what to do.
LED Matrix	The micro:bit has a special light display made of tiny lights. We can make it show pictures, words, and cool patterns!
Accelerometer	The micro:bit can feel when it moves. We can make things happen by shaking or tilting it.
Magnetometer	The micro:bit knows which way is North. It's like a mini compass that helps us find directions.
Bluetooth	The micro:bit can talk to other devices without any wires. It's like sending secret messages!

External Parts of the micro:bit

External Part	Description
Edge Connector	The micro:bit has spots on the sides where we can connect other things like sensors and gadgets.
Push Buttons	The micro:bit has buttons we can press. We can create code and tell it what to do with these buttons.
USB Connector	The micro:bit has a special plug that helps it talk to computers. It's like giving the micro:bit a way to charge and share information.

Software

Software refers to programs on the computer that you use.



Notice how each of these examples of software are programs that you use on the computer. Hardware are physical parts of the computer while software are programs on the computer.

The programs you build for the micro:bit are also examples of software. The algorithms you code are like a story that you tell and the micro:bit acts out with its lights, movements, and sound.

Critical Thinking Questions

1. How do the internal parts of a computer, like the processor and hard drive, work together to make the computer run? What do you think would happen if one of these parts didn't work.
2. How do external parts of a computer, like the mouse or printer, help you use the computer? Can you think of a time when you used a computer and one of these parts helped you do something?

Questions (5)

1. If your computer gets too hot, what part helps cool it down?

MULTIPLE CHOICE

Choose the correct answer:

- A. Hard Drive
- B. Fan
- C. Mouse
- D. Processor

2. You want to make your micro:bit show a picture using its tiny lights. Which part does this?

MULTIPLE CHOICE

Choose the correct answer:

- A. Processor
- B. Bluetooth
- C. LED Matrix
- D. USB Connector

3. If you want your micro:bit to know which way is North, which part helps it?

MULTIPLE CHOICE

Choose the correct answer:

- A. Accelerometer
- B. Magnetometer
- C. Processor
- D. Fan

4. You want to connect your micro:bit to another device without wires. What can you use?

MULTIPLE CHOICE

Choose the correct answer:

- A. USB Connector
- B. Fan
- C. Bluetooth
- D. Printer

5. How do the hardware and software work together in a computer?

MULTIPLE CHOICE

Choose the correct answer:

- A. Hardware gives instructions, software builds parts.
- B. Hardware is the physical parts, software tells them what to do.
- C. Software cools the computer, hardware prints pictures.
- D. Hardware and software don't need each other.

Games (1)

1. Hardware and Software Typing


Full Screen

Audio

Instructions

Restart

Pause



0s

100%

We call the physical parts

Robotics Challenges (4)

1. Check Mark

Challenge

Textbook

Check Mark

Create a software on the micro:bit that shows a check mark on the LED screen of the micro:bit.

Requirements

Use the 'on start' block and show a check mark.

Answer Key

Submit

Step 1

Use the **on start** block and show a check mark icon.

Check Mark Step 1 of 1

1 Done

Toolbox

Search...

Basic

Input

Music

Led

Radio

Loops

Logic

Variables

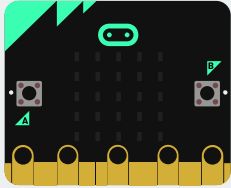
Math

Extensions

Advanced

Download

forever



2. Scissors

Challenge

Textbook

Scissors

Create a software on the micro:bit that shows the scissors icon on the LED screen of the micro:bit when you press play.

Requirements

Use the 'on start' block and show scissors

Answer Key

Submit

Step 1

Begin with the **on start** block.

Scissors Step 1 of 4

1 Next

Toolbox

Search...

Basic

Input

Music

Led

Radio

Loops

Logic

Variables

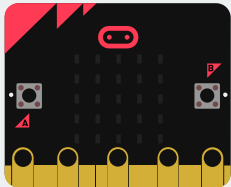
Math

Extensions

Advanced

Download

forever



3. It's Raining It's Pouring

Challenge
Textbook

It's Raining It's Pouring

Create a software on the micro:bit that shows an umbrella. This icon should appear on the LED screen of the micro:bit when you press play.

Requirements

Use the 'on start' block and show an umbrella icon.

[Answer Key](#)

Submit

4. Spooky

Challenge
Textbook

Spooky

Halloween is a holiday often celebrated in October. There are lots of spooky, scary things that come out around Halloween – like ghosts, goblins, skulls, and monsters.

Create a software on the micro:bit that shows two icons that could pass as “spooky” Halloween items. These icons should appear on the LED screen of the micro:bit.

Requirements

Show two spooky icons.

[Answer Key](#)

Submit

Download

Answer Keys & Solutions

Questions

1. If your computer gets too hot, what part helps cool it down?

MULTIPLE CHOICE

Correct Answer:

- | | |
|---------------|-------------|
| A. Hard Drive | ✗ Incorrect |
| B. Fan | ✓ Correct |
| C. Mouse | ✗ Incorrect |
| D. Processor | ✗ Incorrect |

Explanation:

Moving air helps cool down machinery.

2. You want to make your micro:bit show a picture using its tiny lights. Which part does this?

MULTIPLE CHOICE

Correct Answer:

- | | |
|------------------|-------------|
| A. Processor | ✗ Incorrect |
| B. Bluetooth | ✗ Incorrect |
| C. LED Matrix | ✓ Correct |
| D. USB Connector | ✗ Incorrect |

Explanation:

Which part is made up of many tiny lights?

3. If you want your micro:bit to know which way is North, which part helps it?

MULTIPLE CHOICE

Correct Answer:

A. Accelerometer

✗ Incorrect

B. Magnetometer

✓ Correct

C. Processor

✗ Incorrect

D. Fan

✗ Incorrect

Explanation:

This part is like a mini compass that finds directions.

4. You want to connect your micro:bit to another device without wires. What can you use?

MULTIPLE CHOICE

Correct Answer:

A. USB Connector

✗ Incorrect

B. Fan

✗ Incorrect

C. Bluetooth

✓ Correct

D. Printer

✗ Incorrect

Explanation:

This part lets devices talk to each other without cables.

5. How do the hardware and software work together in a computer?

MULTIPLE CHOICE

Correct Answer:

A. Hardware gives instructions, software builds parts.

✗ Incorrect

B. Hardware is the physical parts, software tells them what to do.

✓ Correct

C. Software cools the computer, hardware prints pictures.

✗ Incorrect

D. Hardware and software don't need each other.

✗ Incorrect

Explanation:

Hardware are the parts you can touch, software are the instructions they follow.

Games

1. Hardware and Software Typing

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