INSIDE STORY

HOW THE INTERNET WORKS

COVER NOT FINAL

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PROGRAMMING LANGUAGES FOR THE WEB

If you want to really understand how the web works, you need to explore the computer code behind each page. When you peek, you'll see that web developers use a combination of programming languages to create amazing websites. Different languages are used for specific jobs, helping all the parts of a website work together smoothly.

Speaking the right language

Programming languages are divided into two types:

FRONT-END LANGUAGES are used to write the code that creates the parts of websites you see and interact with in your web browser. This includes the layout, design, buttons and menus.

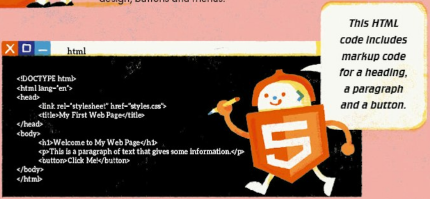
BACK-END LANGUAGES are used to write the code that runs behind the scenes on the server. They handle important tasks like data storage, user logins and processing orders.

HTML and CSS

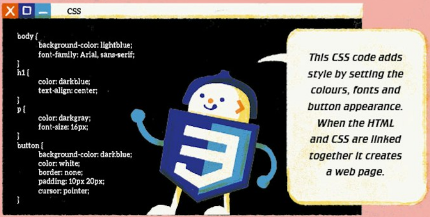
Every web page uses two important front-end languages: **HTML** (HyperText Markup Language) and **CSS** (Cascading Style Sheets). They are known as markup languages as they set out (or mark up) instructions for how a web page should look.

HTML is like the skeleton of a webpage – it's used to make the structure of the page and the things that go on it, including headings, images, paragraphs of text, and buttons.

CSS lists the instructions for how those different parts of the page should look, such as what fonts and colours should be used and where they should be used on the page.


html
This HTML code includes markup code for a heading, a paragraph and a button.

```
<!DOCTYPE html>
<html lang-"en">
<head>
        <link rel-"stylesheet" href-"styles.css">
        <title>My First Web Page</title>
</head>
<body>
        <h1>Welcome to My Web Page</h1>
        <p>This is a paragraph of text that gives some information.</p>
        <button>Click Me!</button>
</body>
</html>
```


CSS
This CSS code adds style by setting the colours, fonts and button appearance. When the HTML and CSS are linked together it creates a web page.

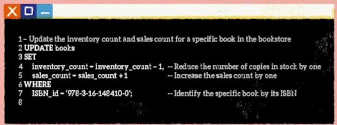
```
body {
        background-color: lightblue;
        font-family: Arial, sans-serif;
}
h1 {
        color: darkblue;
        text-align: center;
}
p {
        color: darkgray;
        font-size: 16px;
}
button {
        background-color: darkblue;
        color: white;
        border: none;
        padding: 10px 20px;
        cursor: pointer;
}
```

Making websites interactive

JavaScript is the most popular front-end programming language. It brings web pages to life by making them interactive (reacting to users' actions). It can check if a form is filled out correctly, create menus that open and close, and upload photos or videos to posts. Anytime you interact with a web page – whether you swipe, press a button or type something in – that's JavaScript at work!

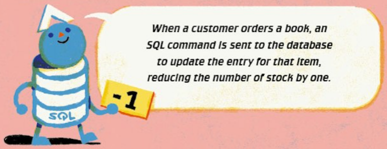
Connecting to databases

Databases on servers store information that websites need, like users' account details and lists of products. Web developers use a back-end language called SQL (Structured Query Language) to request information from the database or to add, remove or update entries.



```
– Update the inventory count and sales count for a specific book in the bookstore
UPDATE books
SET
   inventory_count - inventory_count - 1,  -- Reduce the number of copies in stock by one
   sales_count - sales_count +1            -- Increase the sales count by one
WHERE
   ISBN_id - '978-3-16-148410-0';          -- Identify the specific book by its ISBN

```


When a customer orders a book, an SQL command is sent to the database to update the entry for that item, reducing the number of stock by one.
-1
SQL

Coding dynamic websites

PHP is another back-end programming language used on servers. Web developers love using PHP because it can automatically create web pages for them. Imagine an online bookshop with thousands of books to sell. Instead of making a separate webpage for each book, developers create a template page with spaces for the title, price and description. When a user clicks on a book, the PHP code runs alongside SQL commands to grab the correct details from the database, fill in the template and send the finished page back to the user.

ON ASSIGNMENT

CHECK OUT SOME FRONT-END CODE

Did you know you can peek behind any website to see its HTML and CSS code? Here's how to do it:

1. Open a website that you trust in your browser. Always browse safely and with an adult's permission.
2. Right-click on the page and select "Inspect" or "View Page Source" from the menu.
3. A panel will open, showing you the HTML and CSS code used to build that page!
4. Explore the code to see how different elements are styled and structured.

USER GENERATED CONTENT

It used to be the norm to get all our information and entertainment from big media companies. They were the ones with the tools needed to create books, newspapers, music and movies, and had the know-how to share it with huge audiences. But now, thanks to the internet, anyone with a phone or computer can create something and share it with the world! We call this user-generated content because it's made by the users of the internet.

Everyone can be a creator

In the early days, if you wanted to share something online, you had to know how to build a web page. Then new websites like GeoCities and Piczo made it easy for anyone to create web pages of their own. Social media sites like MySpace, Facebook and YouTube simplified uploading photos, music and videos, and suddenly everyone had the tools to create and share something on the web.

INTERNET ALERT!

BEING A RESPONSIBLE CREATOR

Just because you can post something, doesn't always mean you should. What you say or do online can have real world consequences such as causing people harm, so it's important to think about how your posts might affect others.

We make the web

Nowadays, the biggest websites rely on us people making content! Many social media sites don't actually make their own content – they need us to upload ours. Social media sites would be totally empty without our posts. Even meme pages wouldn't exist without people creating and sharing funny content.

INTERNET ALERT!

WEB 2.0

When user-generated content started to take off, this was such a big change in the way people used the internet that people began calling it "Web 2.0".

Helping people be heard

One benefit of user-generated content is that it gives a voice to people who usually might not be heard. Traditional media is hard to break into, but user-generated content doesn't have the same barriers. A poet could post themselves performing their latest work, or a teenager might vlog about life in their small town. A refugee can even tell their story, giving us a glimpse into worlds we don't otherwise see.

Breaking the news

User-generated content also has a role to play in our news cycle: social media sites buzz with the latest news as soon as it happens. When there's a big event, users post photos and updates straight to social media for others to read and share. Sometimes they even break stories too! Being able to post instantly means important stories can reach people around the world long before traditional news outlets.

Can you rely on it?

Anyone can post anything online, which means there's a wide range in the quality and accuracy of what you'll see. Some user-generated content is well made and researched, but other content might be full of misinformation or be completely fake. Before you take something as fact, check the sources (where the information came from), see if it's backed up by evidence and consider whether the creator might have a bias or agenda for posting it.

Who made this!?

Do you find it annoying when people copy you? I bet you do, and copying is a problem online too. Content creators need to respect copyright laws, which are laws which say you can't use someone else's work without permission.

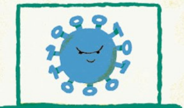
Sometimes well-known companies get caught red-handed stealing ideas too. There have been cases where companies have seen a a design for a t-shirt or a piece of jewellery and copied it without asking. They then sell these items, making money off someone else's hard work. How would you feel if someone else became rich or famous from your idea?

CYBER CRIME ON THE INTERNET

How safe is the internet? Most of our experiences using it are positive, but there is a darker – and sometimes dangerous – side to being online. As more people use the internet for shopping and banking, criminals find more chances to steal money and personal information. But there are ways we can protect ourselves and stay safe online.

Malware most wanted

One way to protect ourselves from cyber crime is to understand what it looks like. Malware, short for malicious software, is used to attack computer systems, destroy data or steal personal information. It can come in a few forms:



VIRUS

A virus is a computer programme which spreads by infecting other files or sending copies of itself through emails and chats between contacts. Viruses can be used to steal sensitive information or delete important files.

TROJAN HORSE

Sometimes malware hides inside an innocent-looking app or game. When you try to use it, the virus is activated. It's named after the famous Greek myth where soldiers snuck into Troy inside a wooden horse.

RANSOMWARE

Ransomware locks you out of a computer system and blocks you from accessing your files. Criminals then demand money (a ransom) to let you back in.

Hacking the human

It's much easier to trick a human than it is to break into a computer, so sometimes if a criminal wants certain information, they'll try to trick a person into making their computer less secure. This is called phishing, and here's how it might happen:

Imagine a cyber criminal wanted access to an email account, they might set a trap that allows them to obtain the password. This is done by creating convincing emails pretending to be from someone's family or friends, or by posing as a trustworthy company and creating a realistic-looking website. Criminals use trust to reel you in and gain your information, so keep an eye out for suspicious messages and friend requests or offers that are too good to be true.

The dark web

The internet is also used by criminals who want to buy and sell illegal goods or do harmful acts. Weapons and dangerous materials are traded in underground markets on a part of the internet called the dark web. These illegal websites are hidden from search engines, and can only be visited using special software. The traders use tools to try and make themselves untraceable, to try and avoid being caught.

Who protects us from cyber crime?

Lucky for us, there are thousands of people whose job is to protect us from cyber criminals.

ETHICAL HACKERS

hack into computer systems, but they're not criminals! Companies ask them to find weak spots in their online systems, then they report their findings and security teams fix the problems to prevent cyber crime.

DIGITAL FORENSICS SPECIALISTS

work with the police to gather evidence and help solve cyber crimes. Rather than dusting for fingerprints, they pull information from computers' storage or analyse server logs for criminal activity.

CYBER THREAT RESEARCHERS

study how criminals attack computer systems and try to spot common patterns or weaknesses. This research helps security experts invent new techniques to tackle cyber crime.

ON ASSIGNMENT

PROTECT YOURSELF FROM CYBER CRIME

You can also protect yourself and your family from cyber criminals. Complete this checklist to strengthen your digital security, then help your family to follow the steps too. Supporting others to stay safe online makes you a good digital citizen.

✓ **1. USE STRONG PASSWORDS FOR ALL YOUR ACCOUNTS**
Make them long and use random words so they are hard to guess.

✓ **2. CHECK YOU HAVE ANTIVIRUS SOFTWARE INSTALLED ON YOUR COMPUTERS**
Most computers have antivirus software built in, you just need to make sure it's activated.

✓ **3. MAKE SURE YOUR APPS ARE UP TO DATE**
Updating your apps to the latest version helps patch any security problems.