

Exercise walk-through

The internet and the world wide web ■ 5.1

eXercise

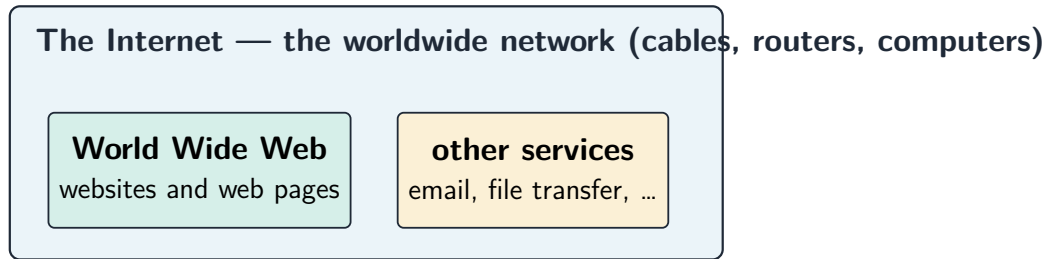
You must be able to

- distinguish the internet from the world wide web
- describe how a web page reaches the browser (DNS, web server)
- describe session and persistent cookies

Method — Internet, web and DNS

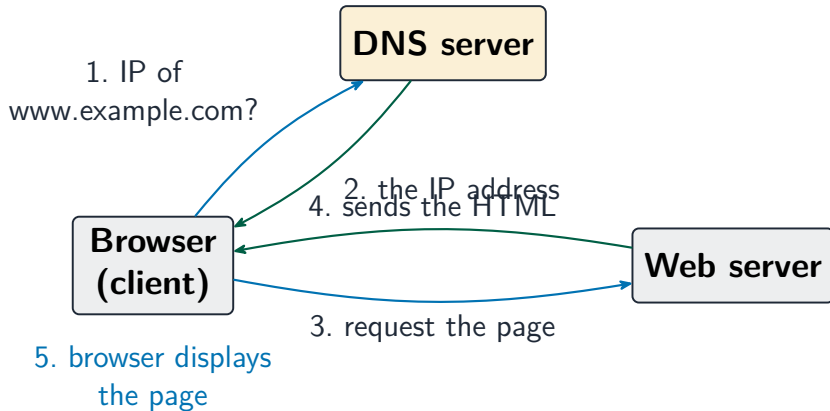
- **session cookie:** deleted on closing the browser; **persistent:** saved between visits.

Method — Internet, web and DNS



The internet (network) contains the web and other services

Method — Internet, web and DNS



Browser asks DNS for an IP, then requests the page from the web server

Method — The words the exam wants, in the right order

Internet or web? The **internet** 互联网 is the worldwide network of interconnected computer networks, the infrastructure itself. The **world wide web** 万维网 is the collection of web pages and other resources that is accessed using that infrastructure. The internet came first and carries email, file transfer and streaming as well as the web.

Reading a URL 统一资源定位符. In

`https://www.example.com/notes/topic5.html` the parts are: the **protocol** (`https`), the **domain name** (`www.example.com`) and the **file path or web page name** (`/notes/topic5.html`).

How a page reaches the browser, in the order the marks are given:

- 1 The user types the URL into the browser.
- 2 The browser sends the domain name to a **DNS** 域名系统 server.

Method — The words the exam wants, in the right order

- 3 The DNS server looks up the matching **IP address** and returns it (if it does not hold the name, it passes the request to another DNS server).
- 4 The browser sends a request to the **web server** at that IP address.
- 5 The web server returns the page's **HTML**.
- 6 The browser **renders** the HTML into the page you see.

Cookies 小型文本文件. A **session cookie** is stored only in memory and is deleted when the browser is closed; it is used for things like the contents of a shopping basket during one visit. A **persistent cookie** is stored on the hard disc and stays until it expires or is deleted; it is used to remember log-in details, language and site preferences, or items saved between visits.

Digital currency and blockchain. A digital currency exists only electronically. A **blockchain** 区块链 is a shared digital ledger: each transaction is stored in a block with

Method — The words the exam wants, in the right order

a **hash** of the previous block, so changing one block changes every hash after it and the tampering is obvious to everyone holding a copy.

Practice 2.1 ■ 2 marks

State the difference between the internet and the world wide web.

Solution 2.1

Method: The words the exam wants, in the right order

Worked steps

the internet is the worldwide network (infrastructure) **M1**; the web is the collection of websites you view on it **A1**.

Practice 2.2 ■ 1 mark

State the purpose of a DNS.

Solution 2.2

Worked steps

it stores the IP address for each web address (turns a URL into an IP address) **B1**.

Practice 2.3 ■ 3 marks

Identify the three parts of the URL `https://www.school.org/exams/paper1.html`.

Solution 2.3

Method: The words the exam wants, in the right order

Worked steps

Protocol: `https` **B1**; domain name: `www.school.org` **B1**; web page or file path: `/exams/paper1.html` **B1**.

Practice 2.4 ■ 2 marks

Give two uses of a persistent cookie.

Solution 2.4

Worked steps

Any two of: remembering log-in details; storing site preferences such as language; saving items in a basket between visits; targeted advertising **B2**.

Practice 2.5 ■ 2 marks

Explain how a blockchain makes it hard to change a past transaction.

Solution 2.5

Method: The words the exam wants, in the right order

Worked steps

Each block stores a hash of the previous block **B1**; changing one block changes its hash, so every later block no longer matches and the tampering is visible to everyone holding a copy **B1**.

Exam-style 3.1 ■ 1 mark

A cookie deleted when you close the browser is a:

A persistent cookie

B session cookie

C firewall

D proxy

Solution 3.1

A persistent cookie

B session cookie 

C firewall

D proxy

Worked steps

B. A session cookie is deleted when the browser closes.

Exam-style 3.2 ■ 3 marks

A user types a URL and presses enter.

- (a) Describe the steps that load the web page.
- (b) State one use of a persistent cookie.

Solution 3.2

Method: The words the exam wants, in the right order

Worked steps

- (a) the browser asks a DNS for the site's IP address **M1**; it then contacts the web server using that IP address **M1**; the server returns the HTML, which the browser renders **A1**.
- (b) remembering you / your details between visits **B1**.

Exam-style 3.3 ■ 3 marks

A student uses a browser to visit an online shop.

(a) Complete the table by identifying each part of the URL

`https://www.shop.co.uk/cart/checkout.html`.

Part	Value
protocol	
domain name	
web page or file path	

Exam-style 3.3 ■ 3 marks

- (b) Describe how the web page is retrieved and displayed, from the moment the student presses enter.
- (c) The shop stores the contents of the basket in a session cookie. Explain why a session cookie is suitable, and state one thing the shop should use a persistent cookie for instead.
- (d) The student notices the protocol is `https` and not `http`. Explain the benefit of `https` for this website.
- (e) Explain the difference between the internet and the world wide web.

Solution 3.3

Method: The words the exam wants, in the right order

Worked steps

- (a) Protocol: `https` (B1); domain name: `www.shop.co.uk` (B1); web page or file path: `/cart/checkout.html` (B1).
- (b) The browser sends the domain name to a DNS server (B1); the DNS server returns the matching IP address, passing the request on to another DNS server if it does not hold the name (B1); the browser sends a request to the web server at that IP address (B1); the web server sends back the HTML of the page (B1); the browser renders the HTML to display the page (B1).
- (c) A session cookie is deleted when the browser closes (B1), which suits a basket that

Solution 3.3

only needs to last for one visit **B1**; a persistent cookie should be used for the customer's log-in details or preferences, which must survive between visits **B1**.

(d) The data sent between the browser and the server is encrypted **B1**, so payment and log-in details cannot be understood if they are intercepted **B1**.

(e) The internet is the worldwide network of connected networks, the infrastructure **B1**; the world wide web is the collection of pages and resources accessed using it **B1**.