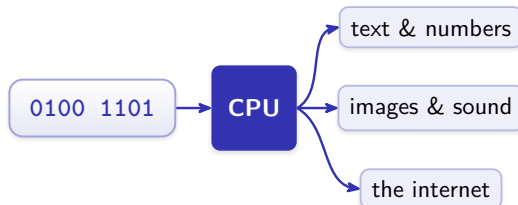


Computer Science

An Introduction ■ Cambridge IGCSE 0478

Course Overview



a first look at how the digital world really works

1

Computers are everywhere

Computer Science
└ Computers are everywhere

Behind everything you tap, watch and play...



photos ■ messages ■ games ■ video = 1s and 0s

Computers are everywhere



tablets



your home



the sky



cameras



shops



your desk

phones ■ watches ■ cars ■ planes ■ hospitals ■ games

So what is Computer Science?

- not just *using* computers
- understanding how they **work**
- making them do **new things**

computer science 计算机科学



2 The big ideas

The big ideas

from 1s and 0s to robots and AI

0100 1101

Computer Science

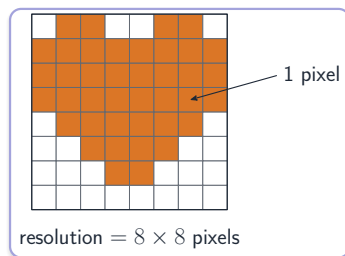
└ The big ideas

Everything is just numbers

- photos are grids of dots
- sounds are streams of numbers
- text and video too

0100 1101

letter 'M'



a picture is made of dots

Computer Science

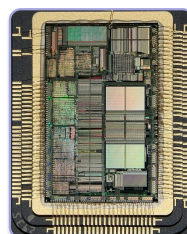
└ The big ideas

A chip that never sleeps

- smaller than your thumbnail
- billions of steps a second
- runs every program



the chip



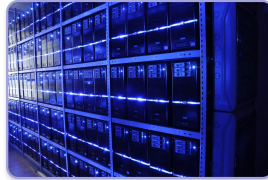
inside it

Storing the whole world

- your music fits on a chip
- the internet fills buildings



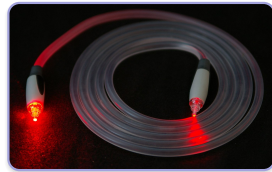
a hard disk



a data centre

A message around the world – in a second

- split into tiny packets
- racing through cables
- under whole oceans
- arriving in an instant



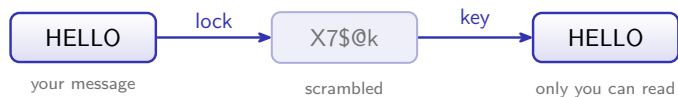
fibre, carrying light



a router at home

Keeping your secrets safe

your password, **scrambled** – only the right key opens it

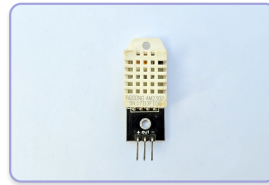
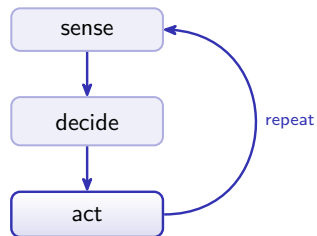


encryption 加密

Computers that act on their own

you already use them:

- thermostats
- automatic doors
- robot vacuums



a sensor

Robots

- build our cars
- perform surgery
- explore other planets



a factory robot arm



a 3D printer

Cars that drive themselves

- cameras and sensors
- clever software
- no driver needed

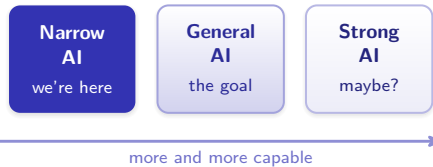


a self-driving car

Artificial intelligence

Artificial intelligence 人工智能:

- recognises faces
- answers questions
- creates art
- one task – for now



And you will make computers do things

- code is just clear instructions

Your first program

```
name = input("Your name? ")
print("Hello " + name + "!")
```

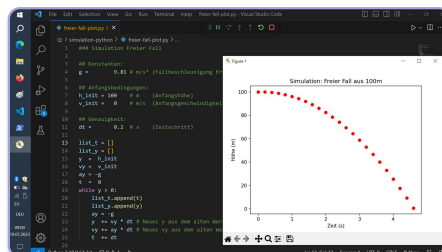
two lines ■ the computer replies



you'll write code

You will build real things

- games to play
- websites to share
- apps that solve real problems
- all built by **you**

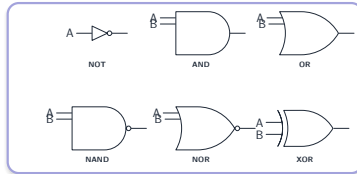


real code, running

It's all built on simple logic

- every decision, three rules
- billions make everything

AND ■ OR ■
NOT



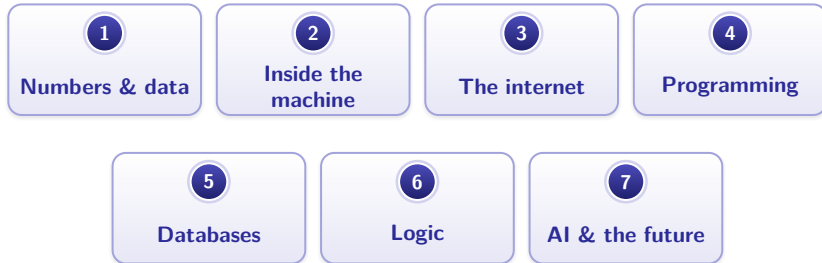
a logic chip

3 Your year ahead

Your year ahead
your course, your exams, your tools

Your journey this year

Seven worlds to explore



the whole subject – one world at a time

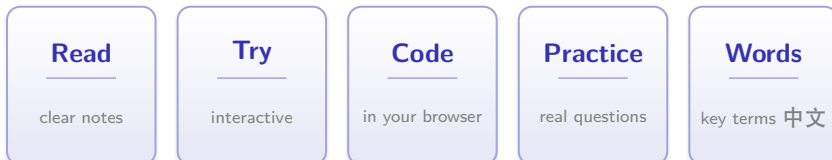
Two parts, two papers



two written exams ▪ equal weight ▪ we'll get you ready, step by step

How we'll learn together

Five ways to explore every topic



read it ▪ try it ▪ code it ▪ test yourself

Why it's worth it

- needed in **every** career
- teaches you to solve problems
- **build** the future, not just use it



Ready?

how the **digital world** really works –
and how to **build** a part of it



Welcome to Computer Science.