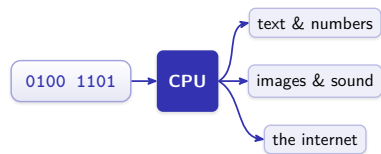


Computer Science

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**

Computer Science
Computers are everywhere

Computers are everywhere



phones • watches • cars • planes • hospitals • games

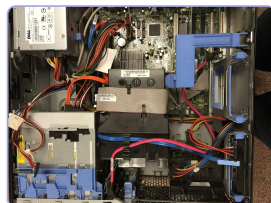
One set of ideas runs all of them: input, process, output – stored as **binary** 二进制.

Computer Science
Computers are everywhere

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

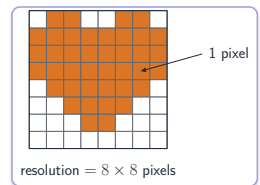
0100 1101

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

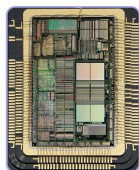
Computer Science
└ The big ideas

A chip that never sleeps

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



the chip



inside it

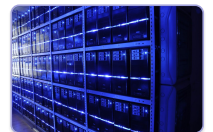
Computer Science
└ The big ideas

Storing the whole world

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



a hard disk



a data centre

Computer Science
└ The big ideas

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

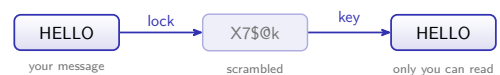


a router at home

Computer Science
└ The big ideas

Keeping your secrets safe

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

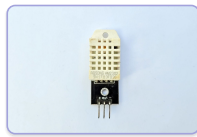
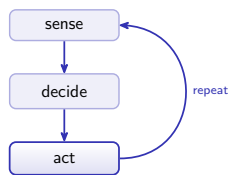


encryption 加密

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 + "!")
```

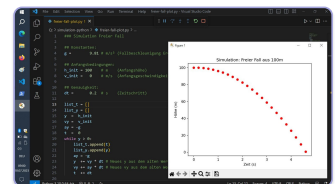
two lines the computer replies



you'll write code

You will build real things

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

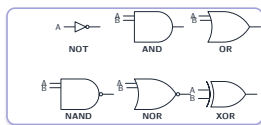


real code, running

It's all built on simple logic

- every decision, three rules
- billions make everything

AND ■ OR ■
NOT



a logic chip

3

Your year ahead

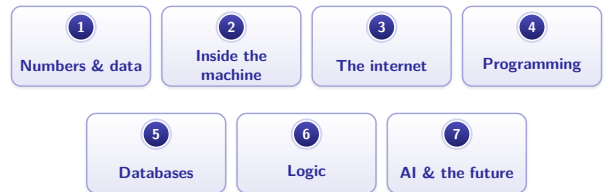
Your year ahead

your course, your exams, your tools

0100 1101

Your journey this year

Seven worlds to explore



the whole subject – one world at a time

Two parts, two papers

Paper 1

How computers work

data ■ hardware ■
the internet ■ AI

1h 45min ■ 75 marks ■ 50%

Paper 2

Solving problems with code

algorithms ■ programming ■ logic

1h 45min ■ 75 marks ■ 50%

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.