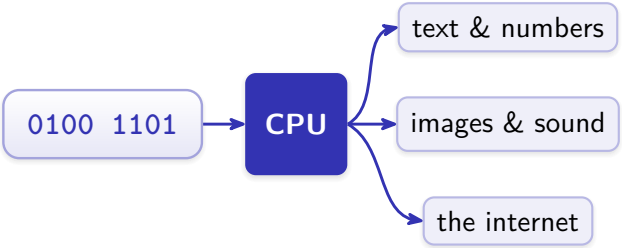
Computer Science

An Introduction ▪ Cambridge IGCSE 0478

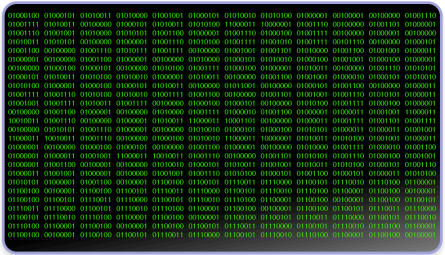
Course Overview



a first look at how the digital world really works

1 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

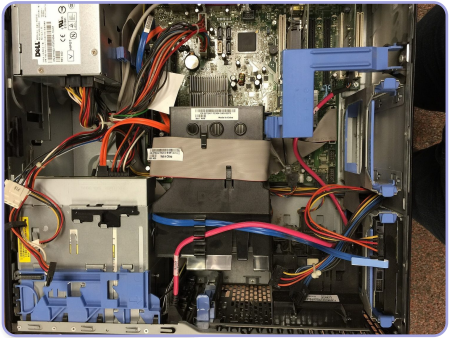
phones ▪ watches ▪ cars ▪ planes ▪ hospitals ▪ games

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

So what is Computer Science?

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

computer science



2 The big ideas

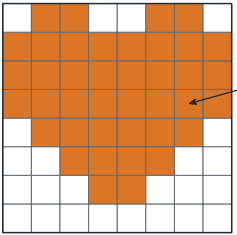
The big ideas

from 1s and 0s to robots and AI

Everything is just numbers

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

`0100 1101` → letter `'M'`



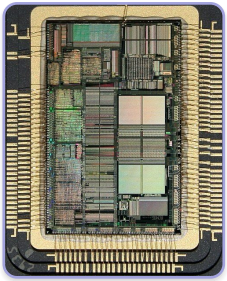
resolution $= 8 \times 8$ pixels

a picture is made of dots

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

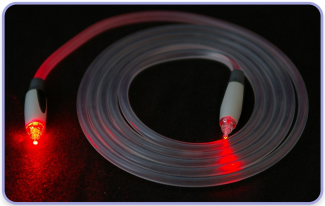
- your music fits on a chip
- the internet fills buildings

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

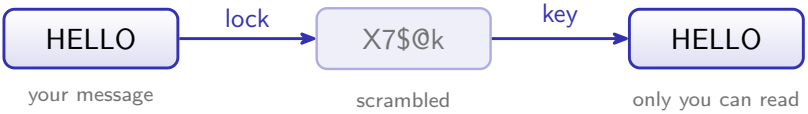


fibre, carrying light

a router at home

Keeping your secrets safe

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

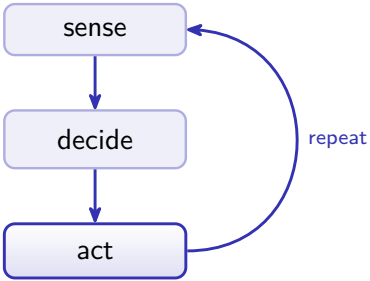


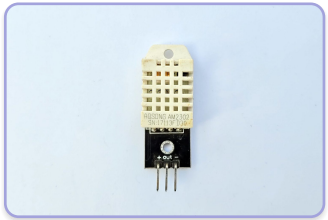
encryption

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

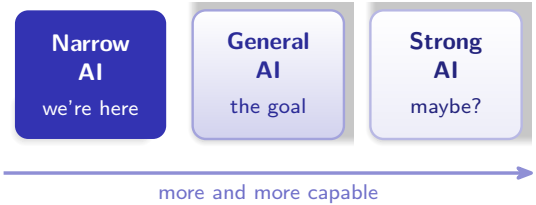
- cameras and sensors
- clever software
- no driver needed

a self-driving car

Artificial intelligence

Artificial intelligence :

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



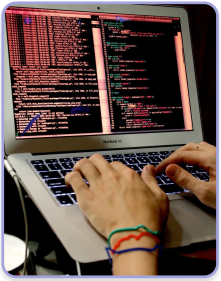
And you will make computers do things

- code is just clear instructions

Your first program

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

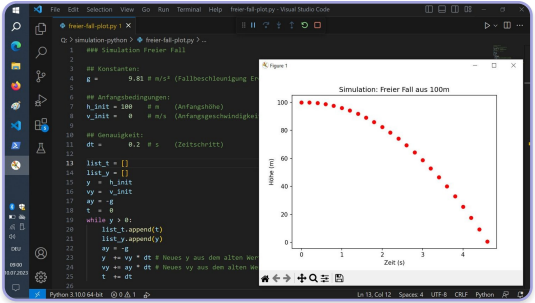
two lines ▪ the computer replies



you'll write code

You will build real things

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

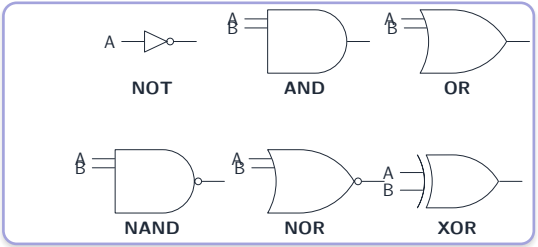


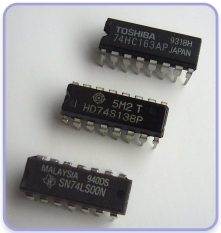
real code, running

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

1. **Numbers & data**
2. **Inside the machine**
3. **The internet**
4. **Programming**
5. **Databases**
6. **Logic**
7. **AI & the future**

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

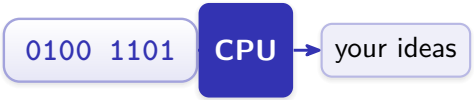
Five ways to explore every topic

Read	Try	Code	Practice	Words
clear notes	interactive	in your browser	real questions	key terms

read it ▪ try it ▪ code it ▪ test yourself

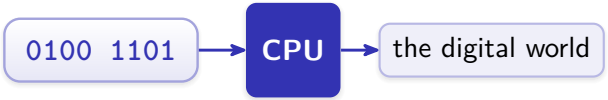
Why it's worth it

- 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.