

Software

IGCSE Computer Science ■ Topic 4

IGCSE Computer Science

applications

operating system

hardware

What we will cover

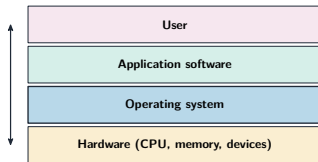
- 1 Hardware & software
- 2 System vs application
- 3 The operating system
- 4 Interrupts
- 5 Languages & translators
- 6 Recap



Hardware and software

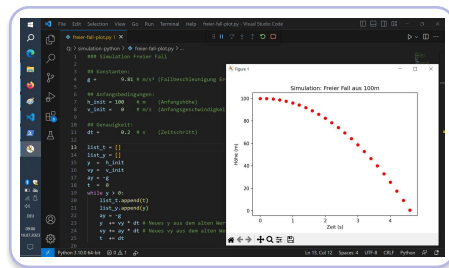
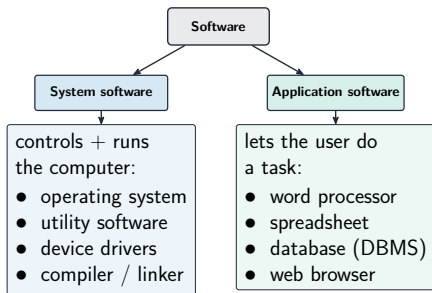
- **hardware** 硬件: the **physical** parts you can touch
- **software** 软件: the **programs** that tell the hardware what to do

Hardware alone does nothing useful;
software needs hardware to run on.
Both are needed.



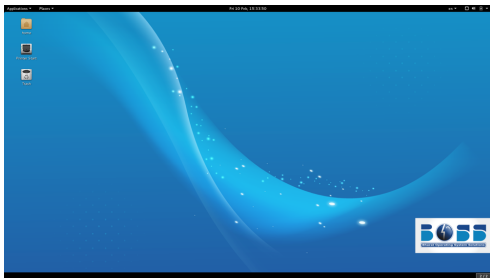
the OS lets the hardware, software and user work together

System vs application software



ide code

The operating system



The **operating system** 操作系统 runs the whole computer:

- manages files, memory, **peripherals** 外围设备
- handles interrupts & **multitasking** 多任务处理
- provides a **user interface** 用户界面 and a platform
- manages security – accounts, passwords

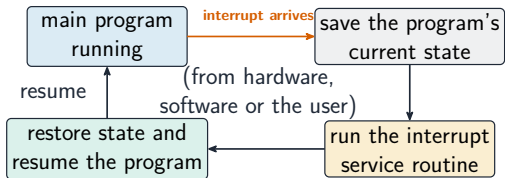
It is the **layer between** the hardware and your programs – neither talks to the other directly.

Interrupts

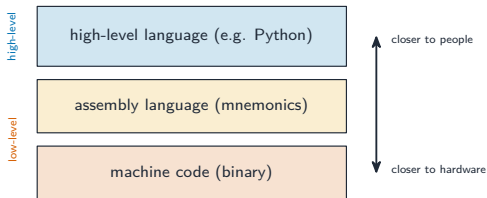
An **interrupt** 中断 is a signal that something needs attention **now**. It can come from:

- **hardware** – a key pressed, printer out of paper
- **software** – a divide-by-zero
- **the user** – a cancel key

The processor **saves its place**, services the interrupt, then **resumes** exactly where it stopped.



High- and low-level languages



- **high-level** 高级语言: English-like (Python); easy to read; runs on **any** computer
- **low-level** 低级语言: close to the machine; **fast**, but tied to one CPU

High-level is portable and readable; low-level trades that away for speed and direct hardware control.

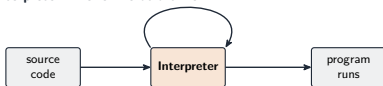
Compiler vs interpreter

Compiler — translate the whole program once



translated once; the machine code then runs many times

Interpreter — one line at a time



reads, translates and runs one line at a time (every run); stops at the first error

Both are **translators** 翻译程序 turning high-level code into machine code:

- **compiler** 编译器: translates **all at once** into a file you keep and re-run
- **interpreter** 解释器: translates & runs **line by line**, stopping at the first error

An **IDE** 集成开发环境 bundles the editor, translator and debugger in one tool.

Topic 4 – key takeaways

1 Two types

system runs the computer; application serves the user

2 OS

the layer between hardware and applications

3 Interrupt

save place, service, resume

4 Translate

compiler all at once; interpreter line by line

Check yourself

- 1 Is a web browser system or application software?
- 2 What does the processor do first on an interrupt?
- 3 Which translator stops at the first error?
- 4 Which language type runs on any computer?

apps

OS

hardware

Answers 1. application 2. saves its place 3. the interpreter 4. high-level