

Automated & Emerging Technologies

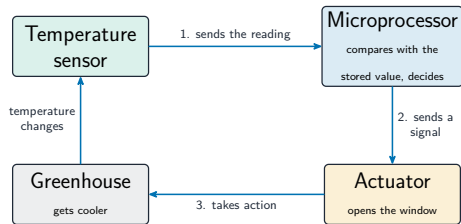
IGCSE Computer Science ■ Topic 6

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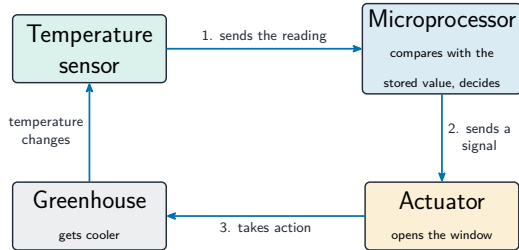


What we will cover

- 1 Automated systems
- 2 Sensor $\rightarrow$ micro $\rightarrow$ actuator
- 3 Pros & cons
- 4 Robotics
- 5 Artificial intelligence
- 6 Recap



The control loop



drone

Automated systems – pros and cons

Advantages

- work day and night without rest
- faster and more **consistent** 一致的
- safe in places people cannot go
- fewer human mistakes



robot arm

The deciding weakness is the last one: an automated system only handles what it was **built for**.

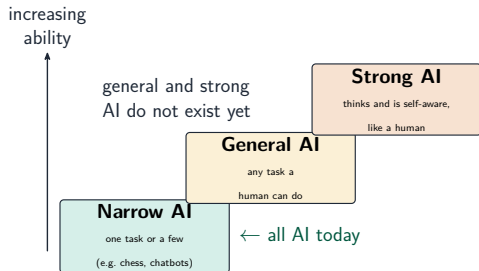
Robotics

A robot has a **physical structure** 物理结构 (arms), **electrical components** 电子元件 (motors, sensors) and **programmable instructions** 可编程指令. Used for factory work (welding, moving heavy parts) and home appliances (a robot vacuum).



robot vacuum

Artificial intelligence



self driving car

Topic 6 – key takeaways

1 Loop

sensor → microprocessor → actuator, repeated

2 Decide

the micro compares data with stored values

3 Robot

no independent decision-making

4 AI

data + rules; learns and adapts

Check yourself

- 1 Which part makes the decision?
- 2 Which part causes movement?
- 3 What is a robot's key limitation?
- 4 What can AI do that a fixed system cannot?



Answers 1. the microprocessor 2. the actuator 3. no independent decisions
4. learn and adapt