06 Automated and Emerging Technologies

SrWL Learning · Complete Classroom Teaching Version · 2026–2028 target

Sensors, control and artificial intelligence

55 editable slides / Explanation · Visual · Practice · Teacher Check

By the end of this chapter

- Automated systems.
- Sensors and actuators.
- Robotics and AI.
- Benefits and risks.

Learning goals are organised into bite-sized lessons.

Our learning route

10 mini-lessons · each includes one guided check

- 01 Automated systems: A
- 02 Automated systems: B
- 03 Sensors, ADC and feedback: A
- 04 Sensors, ADC and feedback: B
- 05 Industrial and transport applications: A
- 06 Industrial and transport applications: B
- 07 Robotics and artificial intelligence: A
- 08 Robotics and artificial intelligence: B
- 09 Benefits, limitations and safety: A
- 10 Benefits, limitations and safety: B

01 Automated systems · Foundations

One clear idea to explain before moving to practice

An automated system combines hardware and software.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Automated systems — key points

- An automated system combines hardware and software.
- Sensors collect information about physical conditions.

Worked context: Example: automatic greenhouse ventilation.

Automated systems — connect the ideas

Follow the concept from left to right

01

An automated system combines hardware and software.

→

02

Sensors collect information about physical conditions.

Apply the principles to this example: Example: automatic greenhouse ventilation.

Try it · Automated systems

Think (30 s) · Pair discussion (1 min) · Share

Explain the meaning of this idea and give a relevant example:

Sensors collect information about physical conditions.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Automated systems

Model response · Correct misconceptions

Sensors collect information about physical conditions.

EXAM TIP / EXTENSION

Use this worked context to add detail: Example: automatic greenhouse ventilation.

02 Automated systems · Applications

One clear idea to explain before moving to practice

A processor compares readings with desired conditions.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Automated systems — key points

- A processor compares readings with desired conditions.
- Actuators respond to control signals.

Worked context: Example: automatic greenhouse ventilation.

Automated systems — connect the ideas

Follow the concept from left to right

01

A processor compares readings with desired conditions.

→

02

Actuators respond to control signals.

Apply the principles to this example: Example: automatic greenhouse ventilation.

Try it · Automated systems

Think (30 s) · Pair discussion (1 min) · Share

Describe when this principle applies:
Actuators respond to control signals.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Automated systems

Model response · Correct misconceptions

Actuators respond to control signals.

EXAM TIP / EXTENSION

Use this worked context to add detail: Example: automatic greenhouse ventilation.

03 Sensors, ADC and feedback · Foundations

One clear idea to explain before moving to practice

A sensor measures a physical quantity.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Sensors, ADC and feedback — key points

- A sensor measures a physical quantity.
- An analogue-to-digital converter digitises analogue signals.

Worked context: Temperature → sensor → ADC → controller → fan.

Sensors, ADC and feedback — connect the ideas

Follow the concept from left to right

01

A sensor measures a physical quantity.

→

02

An analogue-to-digital converter digitises analogue signals.

Apply the principles to this example: Temperature → sensor → ADC → controller → fan.

Try it · Sensors, ADC and feedback

Think (30 s) · Pair discussion (1 min) · Share

Identify the key technical terms and describe their roles:
An analogue-to-digital converter digitises analogue signals.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Sensors, ADC and feedback

Model response · Correct misconceptions

An analogue-to-digital converter digitises analogue signals.

EXAM TIP / EXTENSION

Use this worked context to add detail: Temperature → sensor → ADC → controller → fan.

04 Sensors, ADC and feedback · Applications

One clear idea to explain before moving to practice

A controller processes data and makes decisions.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Sensors, ADC and feedback — key points

- A controller processes data and makes decisions.
- Feedback provides new readings for continuous control.

Worked context: Temperature → sensor → ADC → controller → fan.

Sensors, ADC and feedback — connect the ideas

Follow the concept from left to right

01

A controller processes data and makes decisions.

→

02

Feedback provides new readings for continuous control.

Apply the principles to this example: Temperature → sensor → ADC → controller → fan.

Try it · Sensors, ADC and feedback

Think (30 s) · Pair discussion (1 min) · Share

Compare this concept with a related alternative:
Feedback provides new readings for continuous control.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Sensors, ADC and feedback

Model response · Correct misconceptions

Feedback provides new readings for continuous control.

EXAM TIP / EXTENSION

Use this worked context to add detail: Temperature → sensor → ADC → controller → fan.

05 Industrial and transport applications · Foundations

One clear idea to explain before moving to practice

Factory systems can control production processes.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Industrial and transport applications — key points

- Factory systems can control production processes.
- Automated vehicles use multiple sensors and control software.

Worked context: Discuss an automated parking system.

Industrial and transport applications — connect the ideas

Follow the concept from left to right

01

Factory systems can control production processes.

→

02

Automated vehicles use multiple sensors and control software.

Apply the principles to this example: Discuss an automated parking system.

Try it · Industrial and transport applications

Think (30 s) · Pair discussion (1 min) · Share

Apply this idea to a new computer science scenario:

Automated vehicles use multiple sensors and control software.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Industrial and transport applications

Model response · Correct misconceptions

Automated vehicles use multiple sensors and control software.

EXAM TIP / EXTENSION

Use this worked context to add detail: Discuss an automated parking system.

06 Industrial and transport applications · Applications

One clear idea to explain before moving to practice

Smart parking systems detect spaces and control movement.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Industrial and transport applications — key points

- Smart parking systems detect spaces and control movement.
- Different applications require appropriate safety checks.

Worked context: Discuss an automated parking system.

Industrial and transport applications — connect the ideas

Follow the concept from left to right

01

Smart parking systems detect spaces and control movement.

→

02

Different applications require appropriate safety checks.

Apply the principles to this example: Discuss an automated parking system.

Try it · Industrial and transport applications

Think (30 s) · Pair discussion (1 min) · Share

Explain the meaning of this idea and give a relevant example:

Different applications require appropriate safety checks.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Industrial and transport applications

Model response · Correct misconceptions

Different applications require appropriate safety checks.

EXAM TIP / EXTENSION

Use this worked context to add detail: Discuss an automated parking system.

07 Robotics and artificial intelligence · Foundations

One clear idea to explain before moving to practice

Robotics combines control, sensors and physical movement.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Robotics and artificial intelligence — key points

- Robotics combines control, sensors and physical movement.
- AI systems are designed for tasks requiring intelligent behaviour.

Worked context: Compare rule-based automation and learned predictions.

Robotics and artificial intelligence — connect the ideas

Follow the concept from left to right

01

Robotics combines control, sensors and physical movement.

→

02

AI systems are designed for tasks requiring intelligent behaviour.

Apply the principles to this example: Compare rule-based automation and learned predictions.

Try it · Robotics and artificial intelligence

Think (30 s) · Pair discussion (1 min) · Share

Describe when this principle applies:

AI systems are designed for tasks requiring intelligent behaviour.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Robotics and artificial intelligence

Model response · Correct misconceptions

AI systems are designed for tasks requiring intelligent behaviour.

EXAM TIP / EXTENSION

Use this worked context to add detail: Compare rule-based automation and learned predictions.

08 Robotics and artificial intelligence · Applications

One clear idea to explain before moving to practice

Machine learning uses data to learn patterns.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Robotics and artificial intelligence — key points

- Machine learning uses data to learn patterns.
- AI outputs need testing for accuracy and bias.

Worked context: Compare rule-based automation and learned predictions.

Robotics and artificial intelligence — connect the ideas

Follow the concept from left to right

01

Machine learning uses data to learn patterns.

→

02

AI outputs need testing for accuracy and bias.

Apply the principles to this example: Compare rule-based automation and learned predictions.

Try it · Robotics and artificial intelligence

Think (30 s) · Pair discussion (1 min) · Share

Identify the key technical terms and describe their roles: AI outputs need testing for accuracy and bias.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Robotics and artificial intelligence

Model response · Correct misconceptions

AI outputs need testing for accuracy and bias.

EXAM TIP / EXTENSION

Use this worked context to add detail: Compare rule-based automation and learned predictions.

09 Benefits, limitations and safety · Foundations

One clear idea to explain before moving to practice

Automation can improve speed, consistency and safety.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Benefits, limitations and safety — key points

- Automation can improve speed, consistency and safety.
- Set-up and maintenance can be expensive.

Worked context: Risk question: what happens if a sensor fails?

Benefits, limitations and safety — connect the ideas

Follow the concept from left to right

01

Automation can improve speed, consistency and safety.

→

02

Set-up and maintenance can be expensive.

Apply the principles to this example: Risk question: what happens if a sensor fails?

Try it · Benefits, limitations and safety

Think (30 s) · Pair discussion (1 min) · Share

Compare this concept with a related alternative:

Set-up and maintenance can be expensive.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Benefits, limitations and safety

Model response · Correct misconceptions

Set-up and maintenance can be expensive.

EXAM TIP / EXTENSION

Use this worked context to add detail: Risk question: what happens if a sensor fails?

10 Benefits, limitations and safety · Applications

One clear idea to explain before moving to practice

Faulty sensors and software may cause unsafe actions.

TEACHER EXPLANATION

Discuss why this principle matters in real computer systems.

Benefits, limitations and safety — key points

- Faulty sensors and software may cause unsafe actions.
- Human oversight, testing and security remain important.

Worked context: Risk question: what happens if a sensor fails?

Benefits, limitations and safety — connect the ideas

Follow the concept from left to right

01

Faulty sensors and software may cause unsafe actions.

→

02

Human oversight, testing and security remain important.

Apply the principles to this example: Risk question: what happens if a sensor fails?

Try it · Benefits, limitations and safety

Think (30 s) · Pair discussion (1 min) · Share

Apply this idea to a new computer science scenario: Human oversight, testing and security remain important.

YOUR TASK

Use accurate technical vocabulary. Add a second point or a specific example where possible.

Teacher check · Benefits, limitations and safety

Model response · Correct misconceptions

Human oversight, testing and security remain important.

EXAM TIP / EXTENSION

Use this worked context to add detail: Risk question: what happens if a sensor fails?

Five essential ideas

Recall these without looking at the teaching slides

01 Automated systems

02 Sensors, ADC and feedback

03 Industrial and transport applications

04 Robotics and artificial intelligence

05 Benefits, limitations and safety

End-of-chapter challenge

Answer in your notebook, then compare with a partner

Identify the input, processing and output in an automatic door.

TEACHER MODEL ANSWER

Motion sensor detects movement; controller decides; actuator opens door.