

Computing unplugged - Algorithms

Do Now

| | |
|---|---|
| 1 | What could go wrong if instructions are unclear? |
| 2 | Which is easier to follow: a list of steps or a paragraph of text? |
| 3 | If a computer followed your instructions exactly, would it ever “guess” what you meant? |
| 4 | What everyday task do you do that follows the same steps every time? |

Engage

“How could you explain to a robot how to make a jam sandwich without it going wrong?”

“Why can Google Maps find the fastest route, but a human often can’t?”

Learn

Keyword

Algorithm - A step-by-step set of clear, precise instructions designed to solve a problem or complete a task.

Synonyms:

1. Procedure
2. Method
3. Process

Why do we use algorithms?

Algorithms are used because they provide a **clear, ordered set of instructions** that allow a computer to **solve problems accurately, consistently, and efficiently**.

Algorithms break complex problems into smaller, manageable steps, making them easier to understand and complete. (E.g: Following a recipe rather than guessing.)

An algorithm will do the same thing every time if given the same input.

This is essential for:

- Calculations
- Games
- Apps
- Safety-critical systems (e.g. traffic lights)

Algorithms can help people and computers to repeat tasks consistently, make decisions consistently and handle large amounts of data consistently.

Build

| | |
|----------|--|
| 4 | Step-by-step instructions for making a cup of tea <ol style="list-style-type: none">1. Start2. Fill the kettle with fresh water.3. Switch on the kettle to boil the water.4. Place a teabag (or loose tea in an infuser) into a cup or mug.5. Once the water has boiled, carefully pour it into the cup.6. Let the tea steep for the desired time (usually 2–5 minutes).7. Remove the teabag or infuser.8. (Optional) Add milk, sugar, honey, or lemon as preferred.9. Stir the tea well.10. Serve and enjoy.11. Stop |
| 5 | Draw a flowchart for the step-by-step instructions above. |

Apply

| | |
|----------|---|
| 6 | Create step-by-step instructions for logging on to a computer |
| 7 | Create a flowchart using the step-by-step instructions created above |

Review

| | |
|-----------|---|
| 8 | Describe why we use algorithms |
| 9 | Describe what an algorithm is |
| 10 | Give a benefit of using algorithms |
| 11 | Draw a flowchart for an algorithm of your choice |