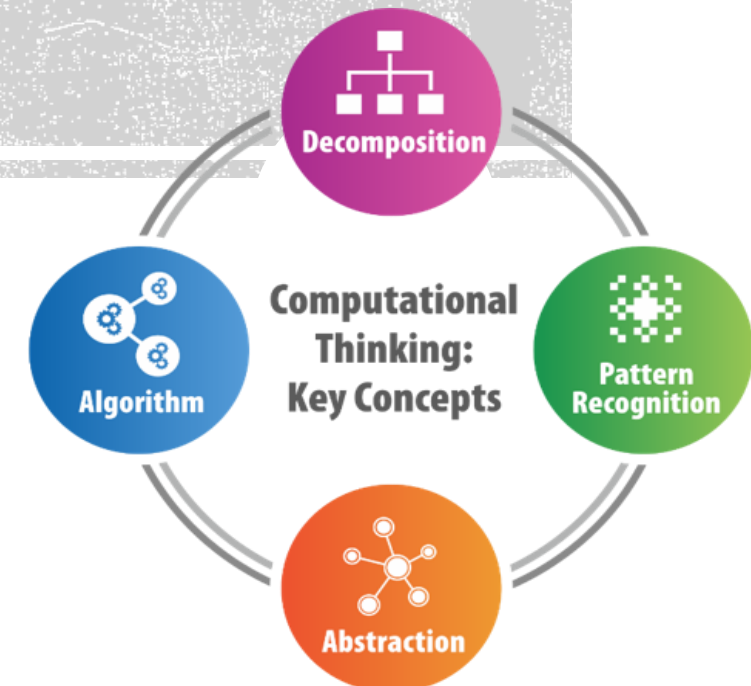# CS6102 – COMPUTATIONAL THINKING LABORATORY
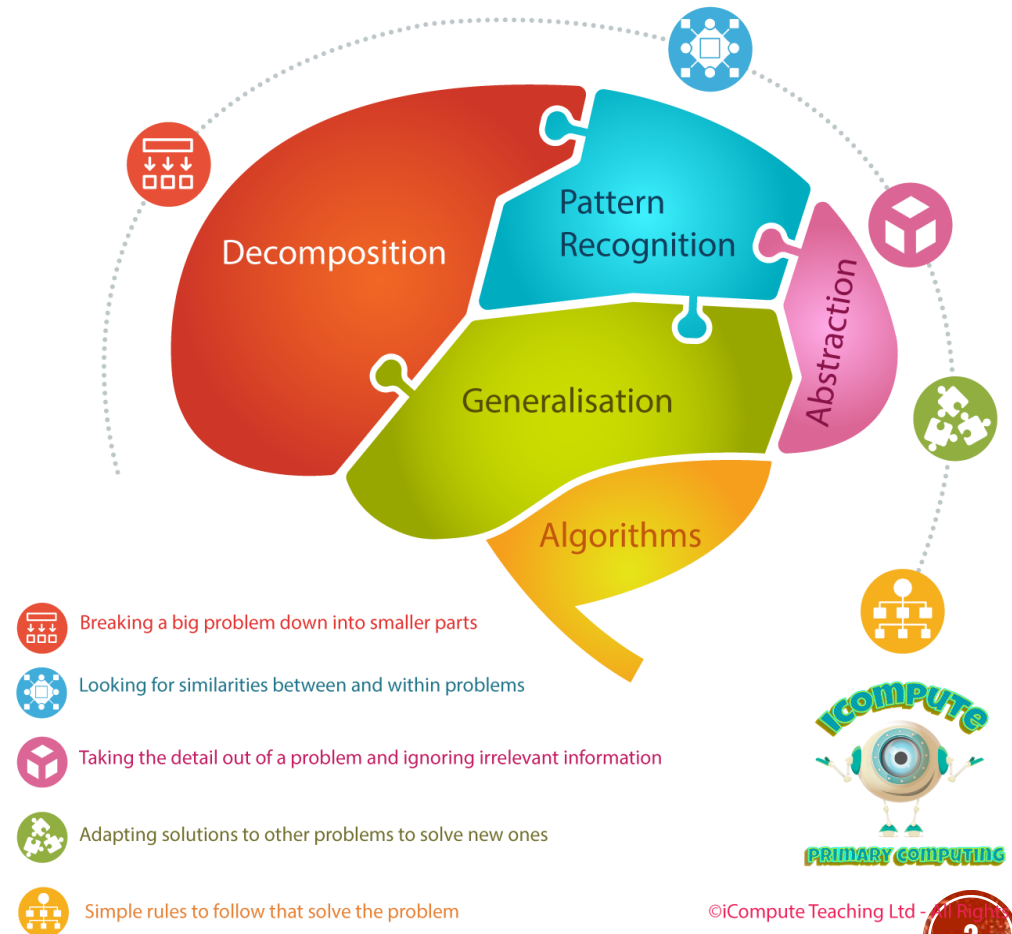
WHAT IS COMPUTATIONAL THINKING?

Computational thinking allows us to take a complex problem, understand what the problem is and develop possible solutions. We can then present these solutions in a way that a computer, a human, or both, can understand.

Computational Thinking

- Decomposition
- Pattern Recognition
- Abstraction
- Generalisation
- Algorithms

Breaking a big problem down into smaller parts

Looking for similarities between and within problems

Taking the detail out of a problem and ignoring irrelevant information

Adapting solutions to other problems to solve new ones
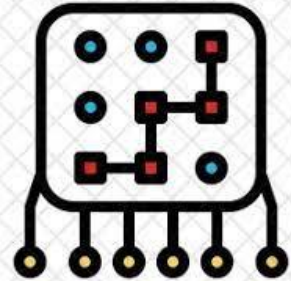
Simple rules to follow that solve the problem

WHY??

❖ Computers can be used to help us solve problems. However, before a problem can be tackled, the problem itself and the ways in which it could be solved need to be understood.
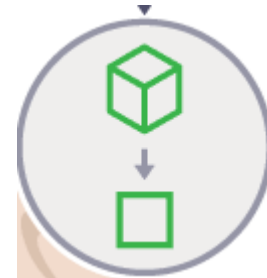
Children must be taught how to think not what to think - Margaret Mead

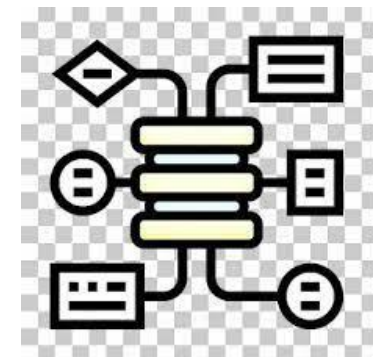# KEY SKILLS FOR COMPUTATIONAL THINKING

Decomposition

Pattern Recognition

Pattern Abstraction

Algorithm Design

4

KEY SKILLS FOR COMPUTATIONAL THINKING

Decomposition - breaking down a complex problem or system into smaller, more manageable parts

Pattern Recognition - looking for similarities among and within problems

Pattern Abstraction – focusing on the important information only, ignoring irrelevant detail

Algorithms - developing a step-by-step solution to the problem, or the rules to follow to solve the problem
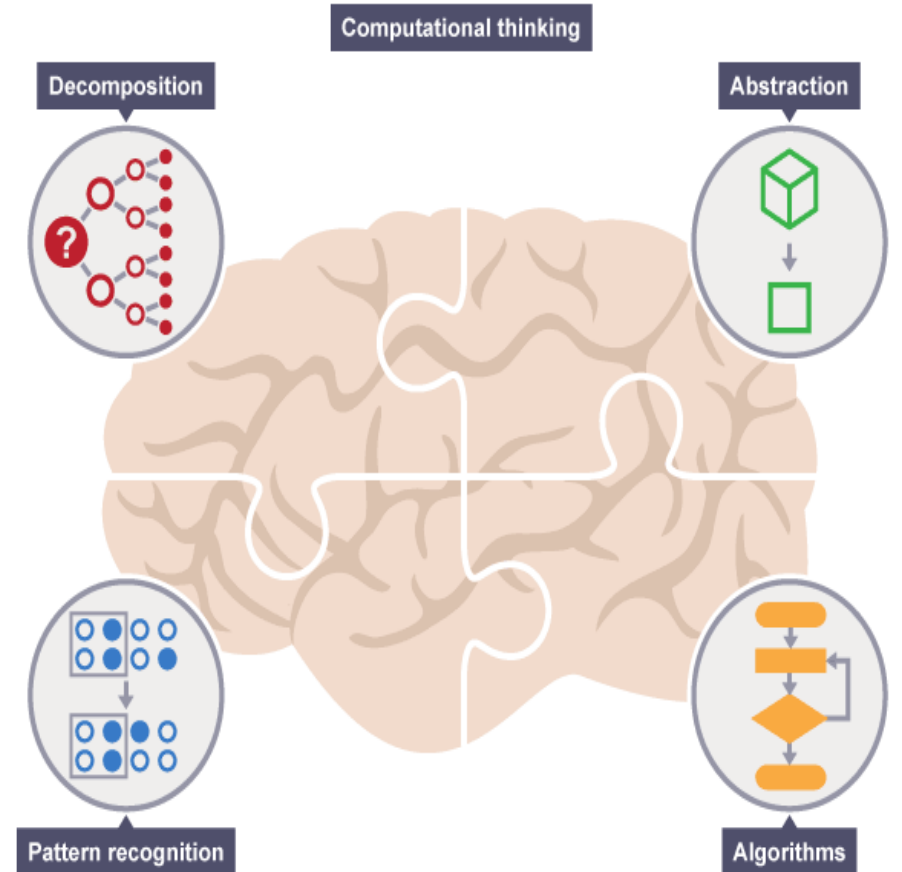
PATTERN RECOGNITION

Number Sequences-

2, 4, 6, 8, 10…..

or 1, 3, 5, 7, 9…

- Carroll Diagram- look at a series of shapes and order them according to a series of criteria.

	Has curved lines	Has straight lines
Has more than three sides		
Has three sides or fewer than three sides		

REAL WORLD EXAMPLES

✓ Using an algorithm to **find the best route** between two places based on traffic and other factors like construction or road blocks

✓ Students use computational thinking skills when deciding whether to plan an activity based on weather predictions on an app

✓ Following a **recipe** to bake a cake and an example of an algorithm.

✓ **Planning a budget involves pattern recognition and decomposition** when you determine your spending habits in each category