



What is Computational Thinking?

- It is a thought process for finding ways to solve problems.
- Computational thinking is often associated with computers and coding, but it is a useful approach to problem solving in general.
- Why is it important?
 - The future is likely to be very technologically rich and it is useful for understanding how these technologies will work.



The four corner stones of Computational Thinking

Problems exist in the real world .

For example, How to play this game of Snakes and Ladders?



We can think about this by

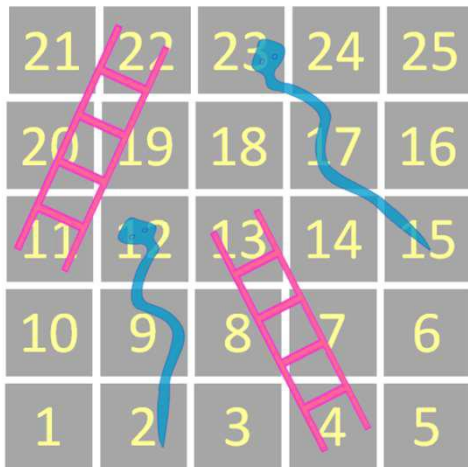
- Abstracting.
- Decomposing
- Finding patterns
- Thinking Algorithmically



Abstraction.

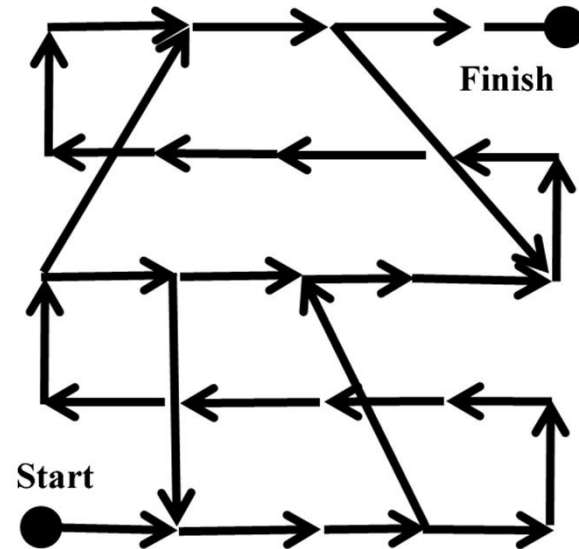
Definition.

- Simplifying a solution by filtering out unnecessary detail which is not needed
- A clearer representation, (or idea), of what we are trying to think about is provided
- Sometimes described as separating the “signal from the noise” in order to make thinking more efficient and effective



Example

- This is an abstract representation of movement in a snakes and ladders game





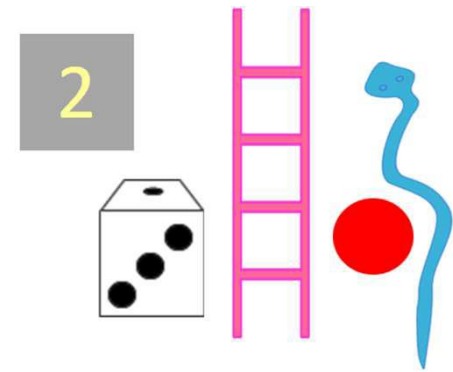
Decomposition

Definition

- Breaking down a complex problem or system into smaller parts that are more manageable and easier to understand
- Smaller parts can then be examined and solved, or designed individually, as they are simpler to work with.

Example

- A game of Snakes and ladders had different parts that be worked on by different people. The
 - Squares on the board
 - dice
 - ladder
 - Counter
 - Snake





Pattern Matching

Definition

- Recognising sequences that repeat can help formulate a general solution.
- Playing snakes and ladders follows a clear repeated pattern
 - Roll the dice
 - then move the counter that number of places.
 - Repeat this pattern until there is a winner.

Example

There is a clear pattern in this sequence of play:

- Blue rolls a dice and gets a 4 and moves to square 2.
- In square 10, green rolls a dice and gets a 5 and moves to square 16.
- In square 16, green rolls a dice and gets a 2 and moves to square 18.
- In square 2, red rolls a dice and gets a 2 and moves to square 13.
- In square 22, yellow rolls a dice and gets a 5 and moves to square 25.



Algorithmic thinking

- The use of algorithms, or step-by-step sets of instructions, to think about how the problem can be solved.
- There are different methods to do this
 - Drawing flowcharts
 - Writing
 - structured English
 - pseudo code
 - Hierarchical Structure charts

