KTH ROYAL INSTITUTE
OF TECHNOLOGY

Why Computing Education and Computational Thinking Needs a Broader Perspective

UNIVERSITY OF
EASTERN FINLAND

FIE Conference 2021, 13-16 October, Lincoln, Nebraska, USA.
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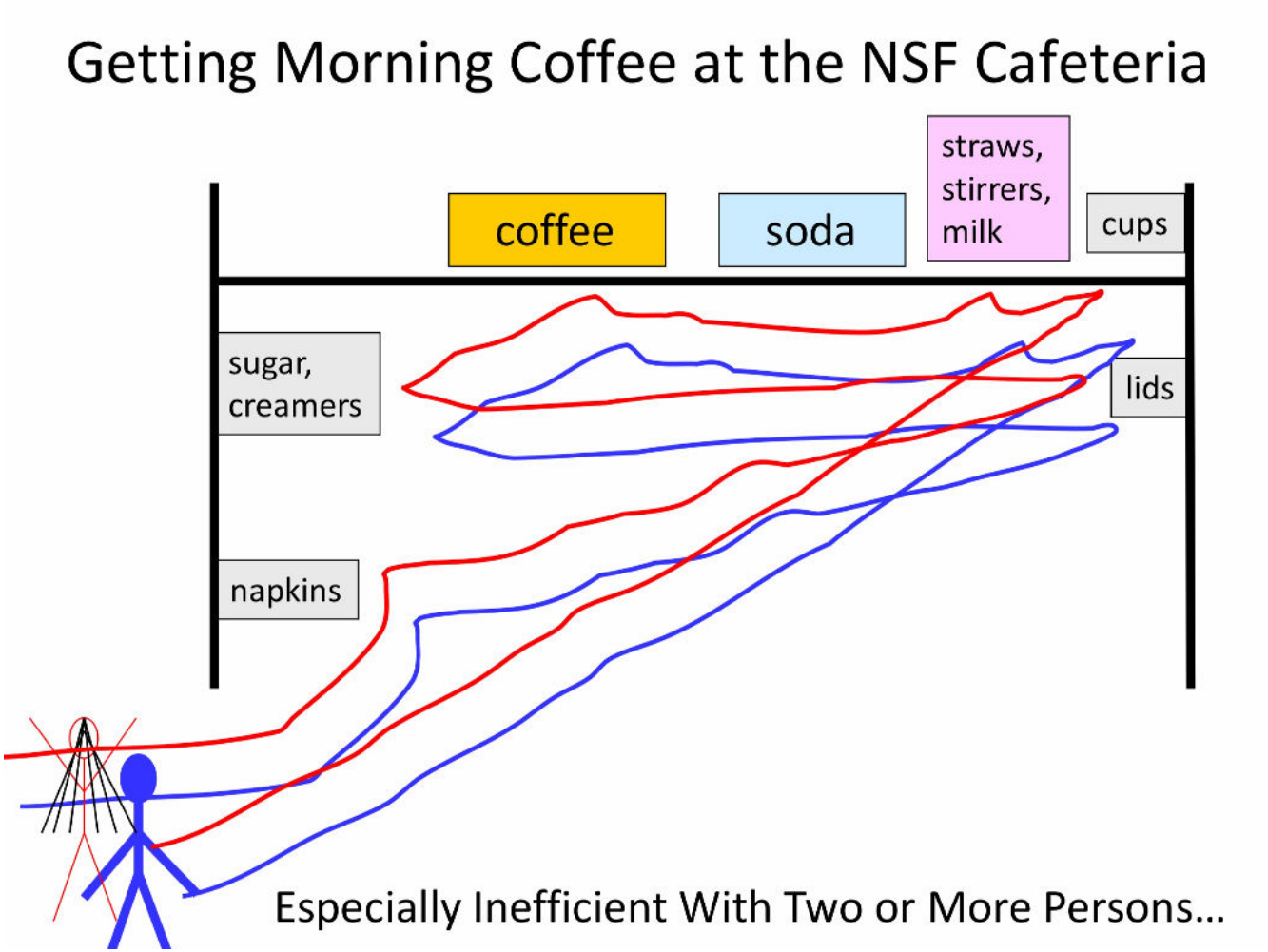
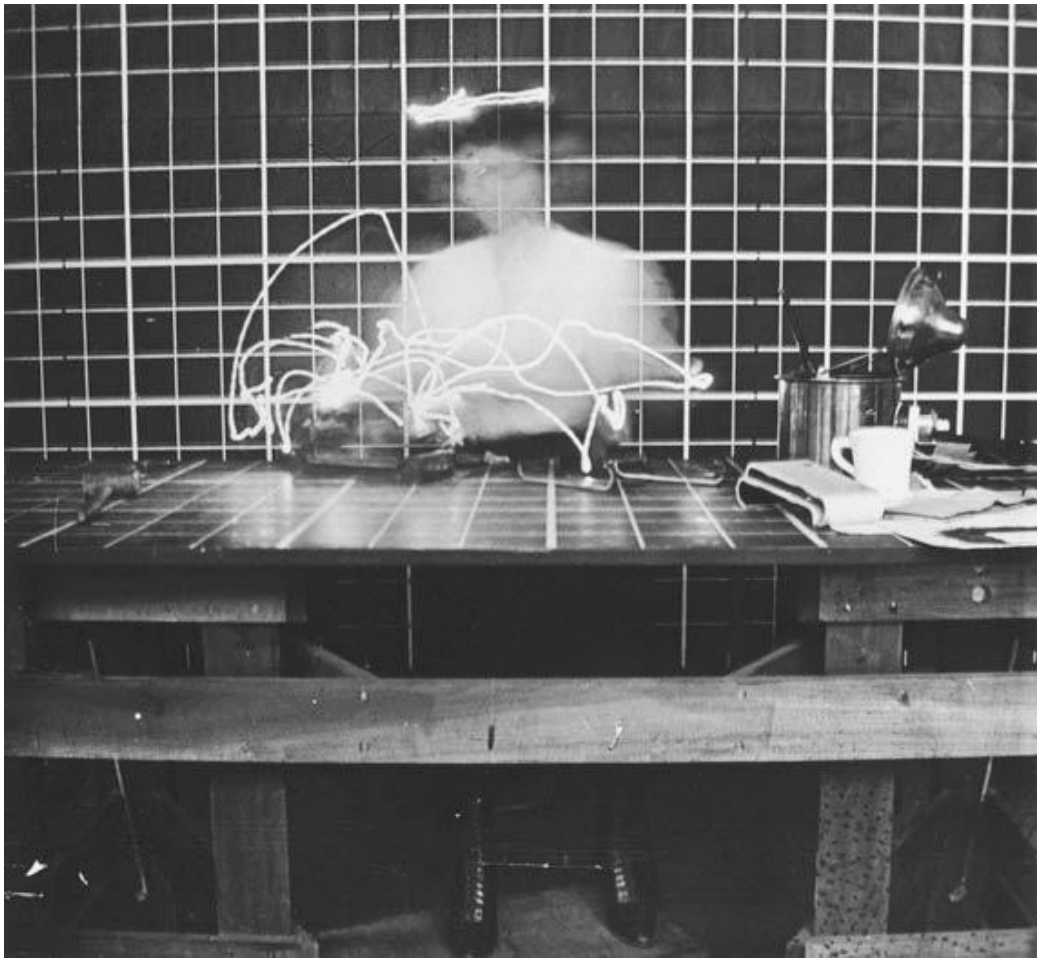
Not Computational Thinking: Wing 2006



Frank and Lillian Gilbreth 1868 - 1926

Time and motion study



Frank and Lillian Gilbreth

Why Coding?

CT at a basic level is about understanding how programmed technological solutions can help us.

Structure

Algorithmic formulation

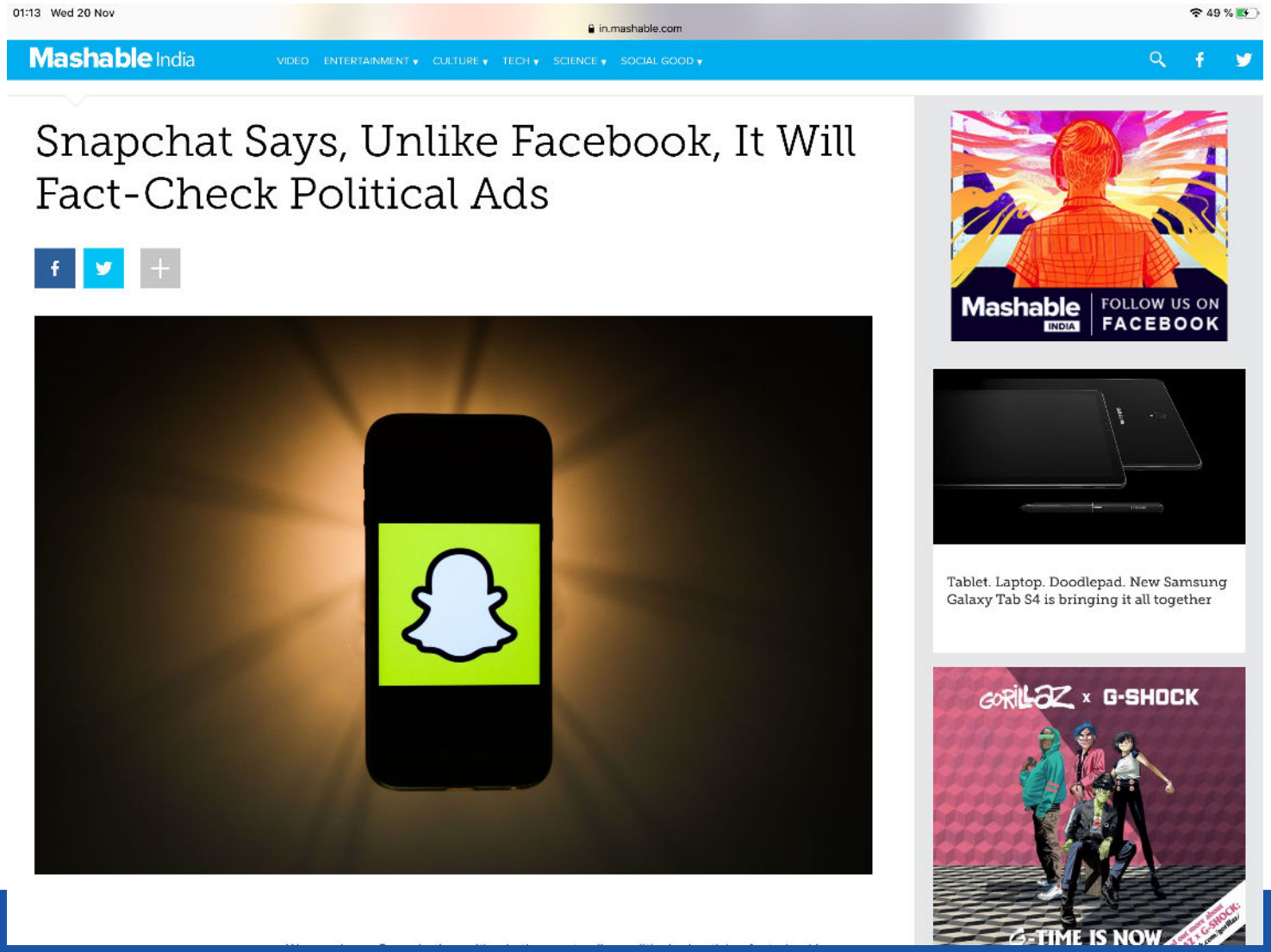
Realisation of a design as a hardware/software system

Reflection in relation to other observable artefacts in our personal experience.

The work must relate to pupil’s experiences.

Understanding the world around us?

And the media around us?

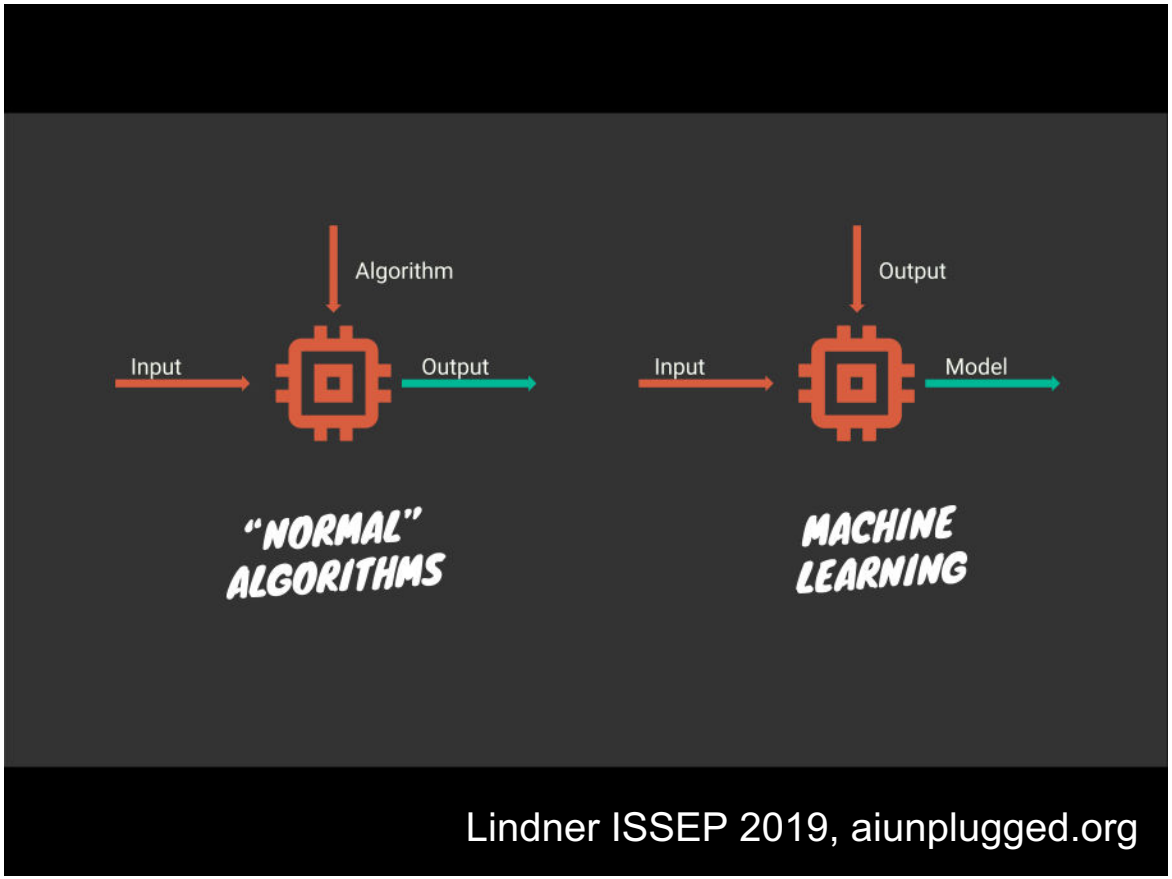


It all begins with Computation and Computability

Abstractional quagmire

Programming can focus on the wrong level of abstraction.

Determinism and reductionism no longer explain all behaviour



Conventional CT does not explain how programmed technological solutions in your world work.

What types of thinking are fundamental?

Mathematical?

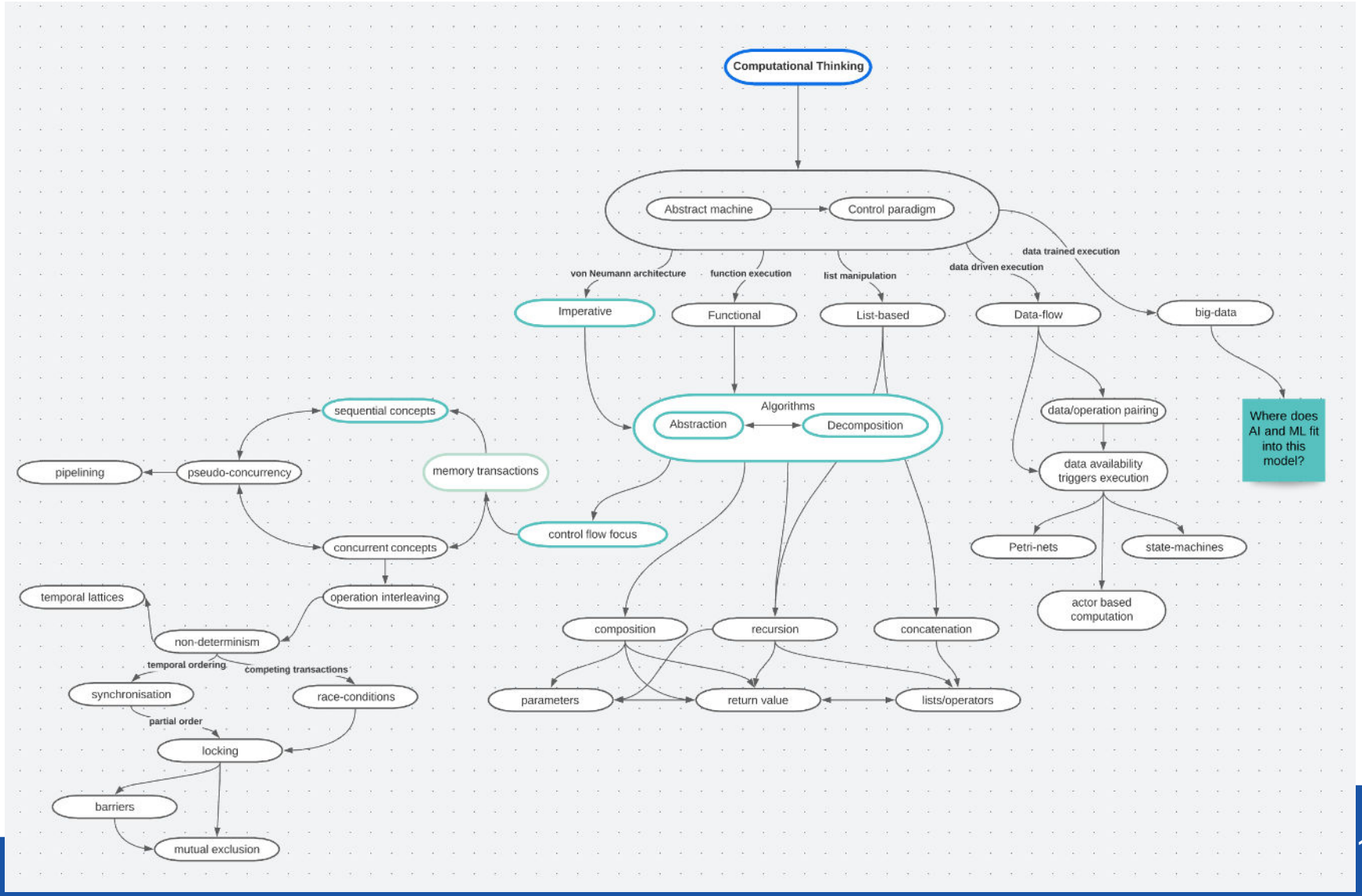
Critical?

Computational?

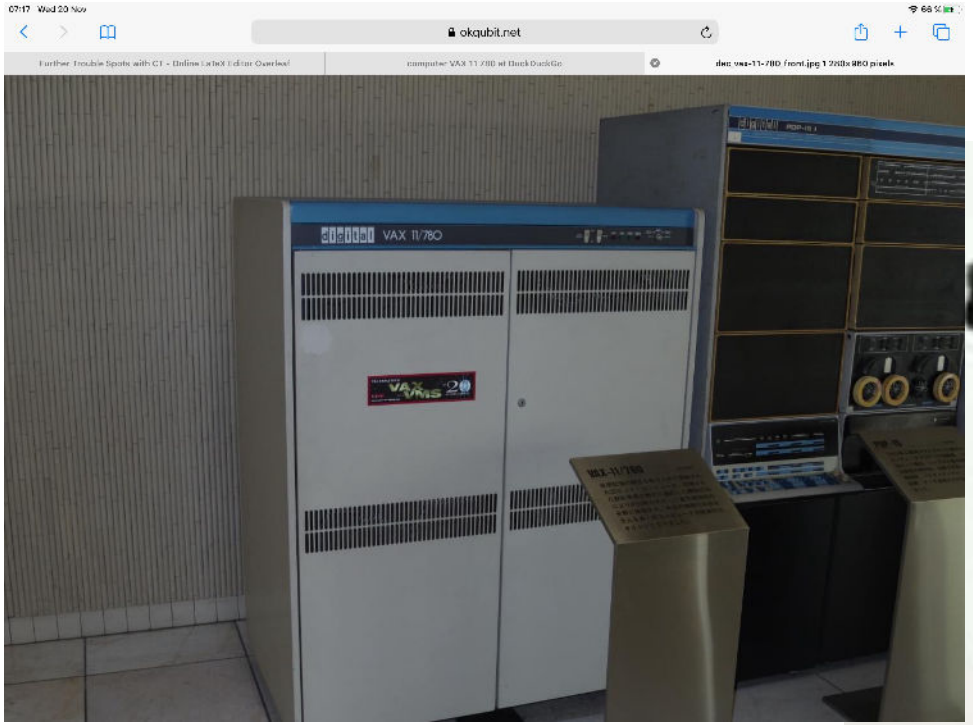
CT is fundamental only when

- We can define it
- Explain how it is useful
- Utilise its unique properties

Our Conception of CT must expand beyond imperative programming.



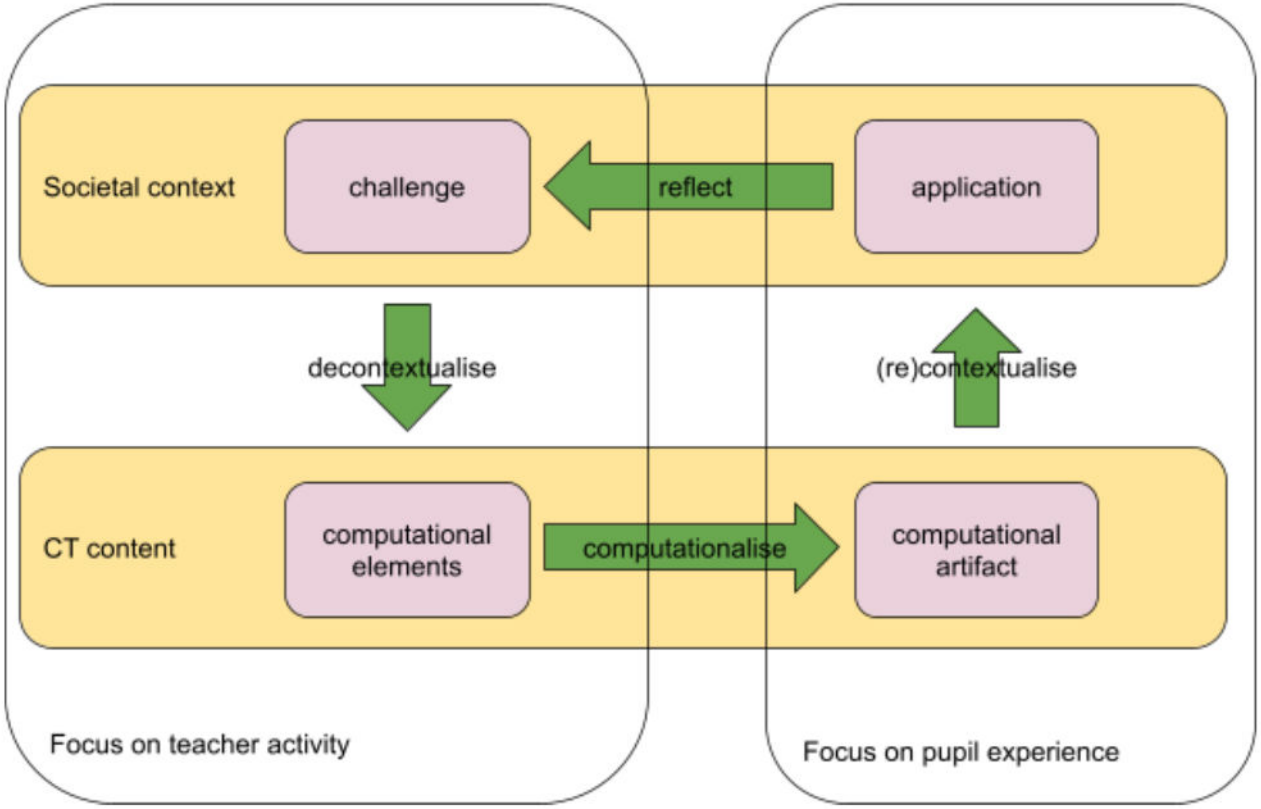
However, we still believe that CT equips citizens for the future, considering...



The Computer!

Computability

CT can be contextualised



Logic

Cat and mouse

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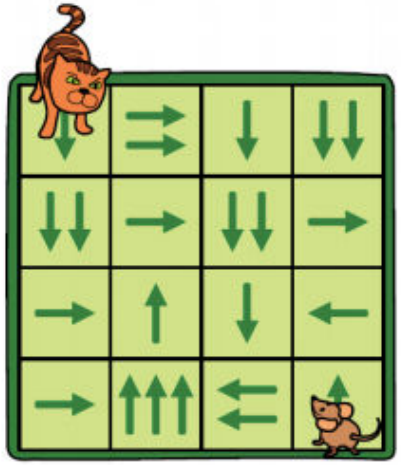
Beaver created two robots: cat and mouse. Both of them can move from one square to another following the arrows. Cat wants to hunt the mouse.

- Cat starts first.
- Moves are made alternately (cat, mouse, cat, mouse, etc.)
- The robots move in the direction indicated by the arrows as many squares as there are arrows (E.G. one square if there is one arrow, two squares if two arrows and etc.).
- When a robot is moving, it ignores the arrows on the squares it moves over.
- Mouse is eaten, when the cat is on the same square as the mouse.



Can the mouse avoid the cat?

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