PDST
Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

pdst.ie

An Roinn Oideachais
Department of Education

National Workshop 7

Day 1 (of 2)

LEAVING CERTIFICATE
COMPUTER SCIENCE

Schedule

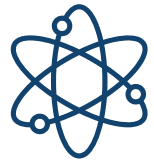
10:00am – 11:30am	***Session 1:*** **Computational Thinking**
11:30am – 12:00pm	**Break**
12:00pm – 1:30pm	***Session 2:*** **Formative Assessment for LCCS**
1:30pm – 2:30pm	**Lunch**
2:30pm – 4:30pm	***Session 3:*** **Python, Dictionaries, and APIs**

Key Messages

LCCS can be effectively mediated through the use of a constructivist pedagogical orientation which will incorporate participatory and inquiry-based learning activities (whole-class, group, pair or individual).

LCCS aims to develop and foster the learner's creativity and problem solving skills along with their ability to work both independently and collaboratively.

Digital technologies used in LCCS have the potential to enhance collaboration, learning and reflection, by enabling students to learn more efficiently and to facilitate work that might not otherwise be possible.



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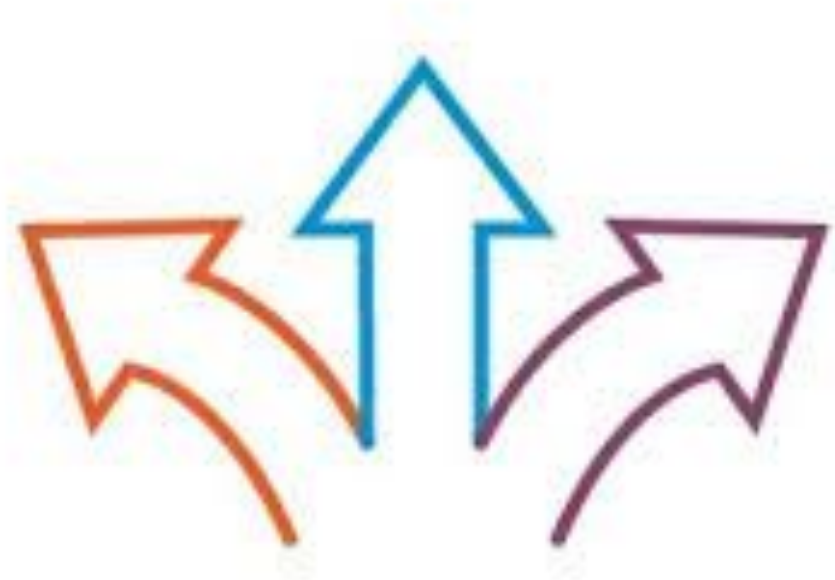
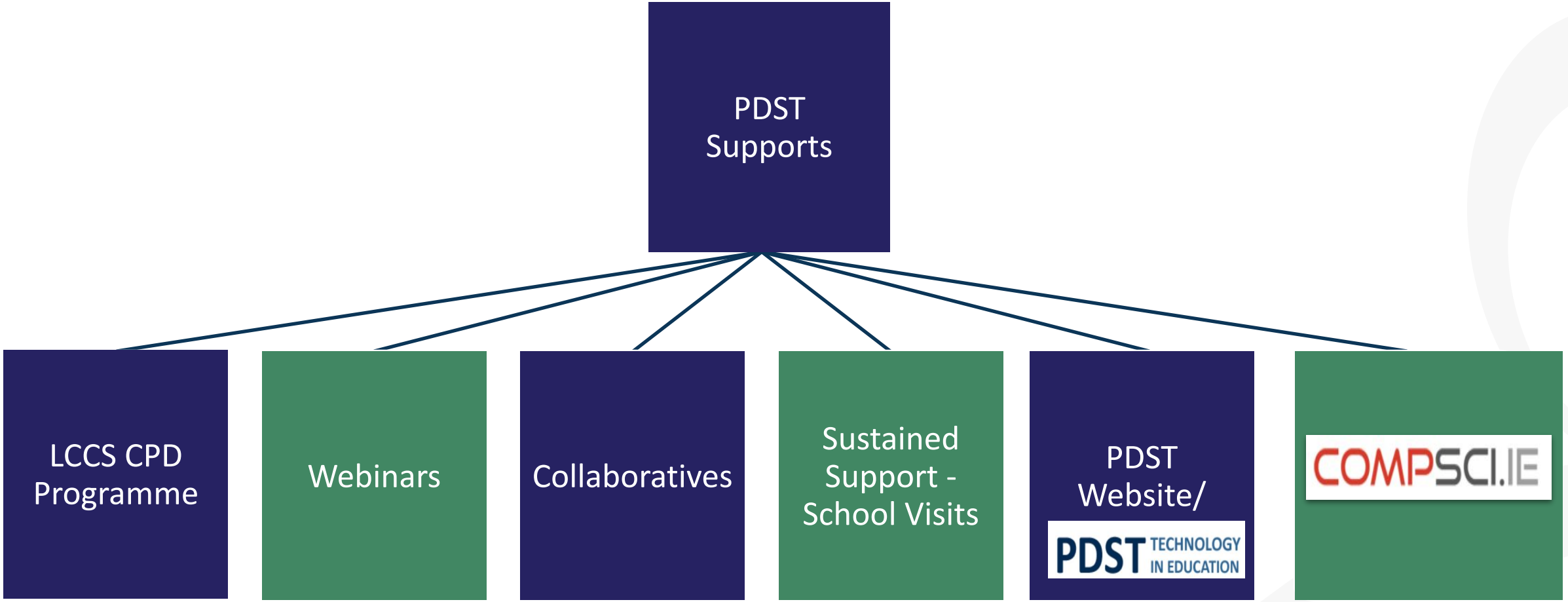
Post Phase 1 CPD



Phase 3 Leaving Certificate Computer Science

PDST Supports



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Computational Thinking

Schedule

Section 1	**Computational Thinking: Bongard Problems**
Section 2	**Computational Thinking: Bertrand's Box Problem**
Section 3	**Creative Coding with p5*JS**

Computational Thinking and Problem Solving

The **four pillars** model (algorithms, pattern recognition, decomposition, abstraction) is well suited to the constructivist ethos of Leaving Certificate Computer Science

György Pólya's **four principles** (understand, plan, carry out, look back) of problem solving is popular among maths educators

Wales/Woods model (define the situation, identify the goal, generate ideas, plan, act, review)

Bransford **IDEAL** process: Identify, Define, Explore, Anticipate and Act, Look.

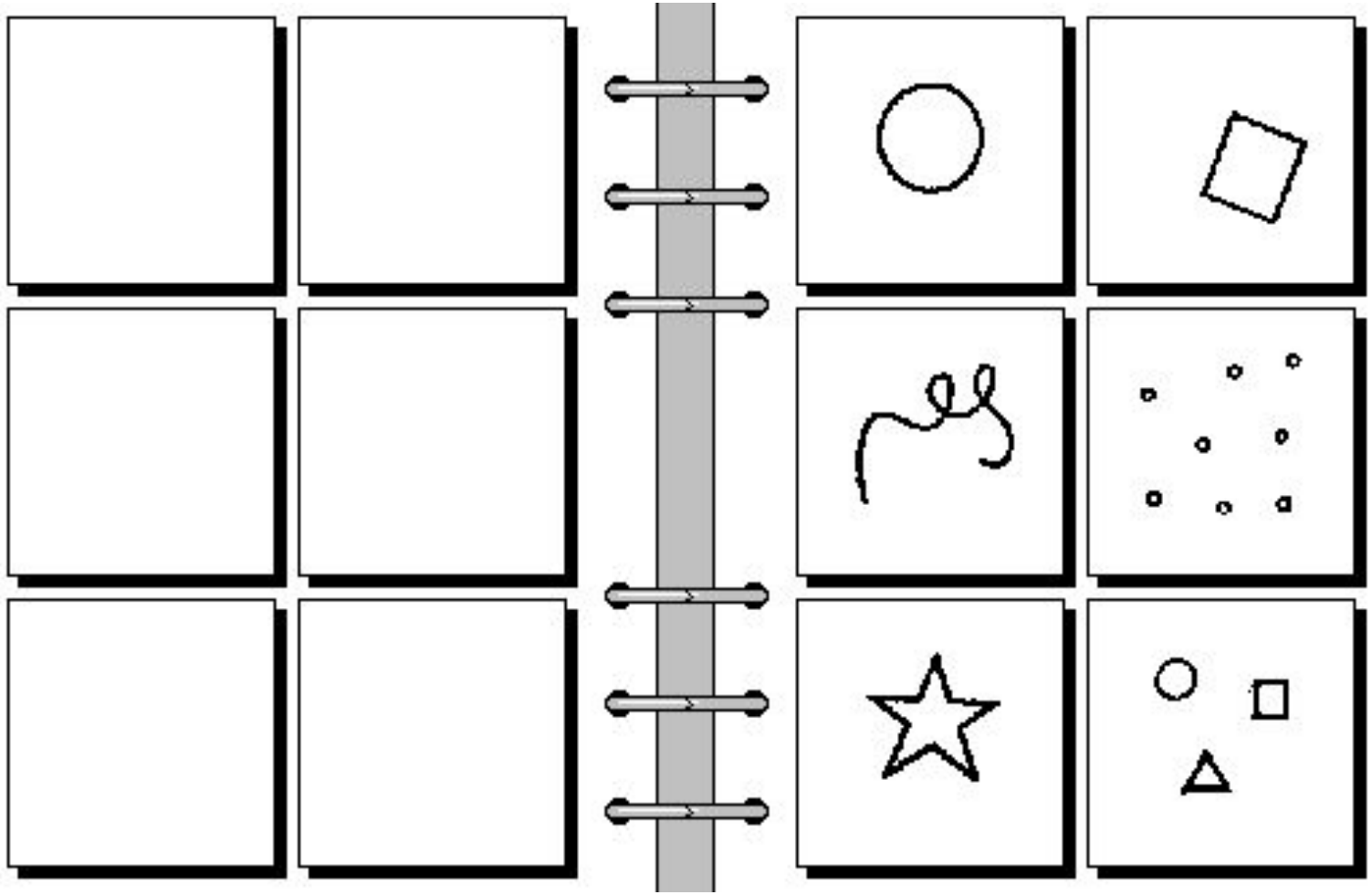
Bongard Problems

Created by Soviet computer scientist Mikhail Bongard.

A Bongard problem contains two pages, a left and right
Each page has six images
The six images on the left conform to a pattern (or, rule)
The six images on the right conform to a *different* pattern
Sometimes the rules relate to one another.

The task of the solver is to determine the rule.

Bongard Problems



Bertrand's Box Problem

We have three boxes:

One box contains two gold coins

One box contains two silver coins

One box contains one gold coin and one silver goin

Bertrand's Box Problem

The question:

Shuffle the boxes so you don't know which is which

Pick a box and take out a coin.

If it is a gold coin, **what is the probability that the other coin in that box is also gold**?

Bertrand's Box Problem

Work by yourself for about 5 minutes.

Work towards a solution, try to create a representation for your solution, get an answer and a reason for your answer.

After 5 minutes talk about your answer, your solution and your reasoning with the others on your table.

See if you can come to a consensus on the answer.

After each group has had time to discuss, we will discuss together and see if we can reach agreement on the answer.

processing.org

p5.js

p5js.org

A javascript library for creative coding

Aimed at beginners, artists, educators, and designers

p5js is one of a family of interpretations of the original processing.org

Fantastic examples, tutorials and references

p5js.org

The task:

Create an account in p5js.org

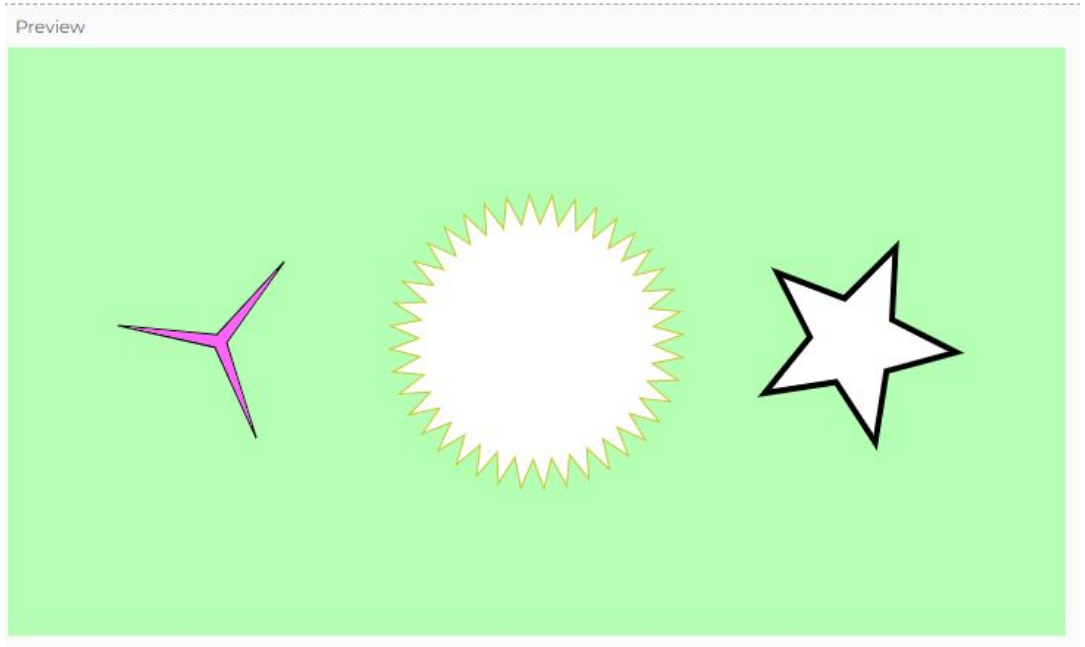
Save the sketch provided.

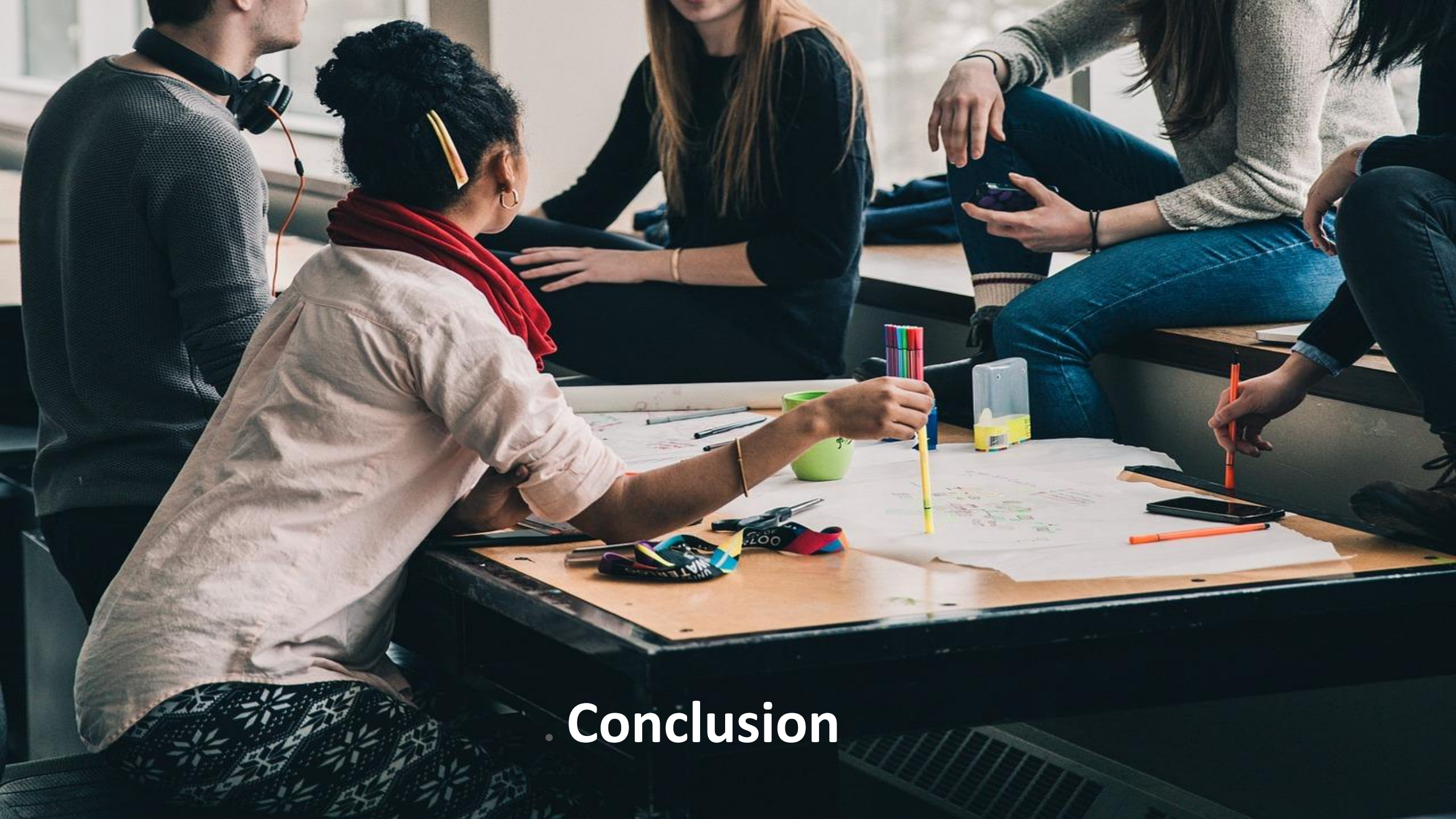
Look at the code and the preview.

Try to understand what the code does.

Change it, play with it and make something cool.

Share your creations on slack at the end of the session





Conclusion

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Computational Thinking tasks can be presented in a variety of ways

Classroom context is key to deciding how to engage with certain topics

There is no one way to think computationally (e.g. one's pattern recognition may be another's abstraction)

The process of problem solving is non-linear and progress can be slow

"Be less helpful"

Confusion can be a good thing

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