Growing Algorithmic Thinking Through Interactive Problems to Encourage Learning Programming

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Context

- Attracting pupils to informatics
- Teaching pupils programming
- Offering teachers support to teach algorithmic thinking

Online platforms

- Existing online platforms are focused on direct teaching of programming
- Pupils and even teachers do not know what is programming nor algorithm design

✔ **Self-contained activities help teachers to support taught courses**

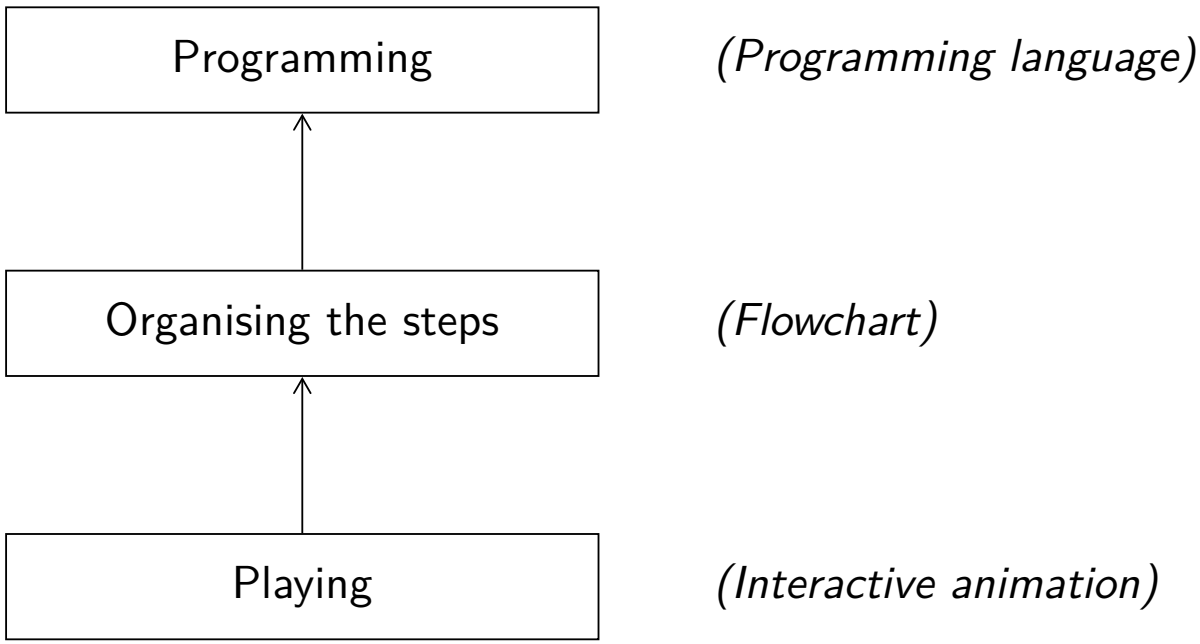
ILPADS

Interactive **L**earning of **P**rogramming and **A**lgorithm **D**esign **S**kills

- A website to support the learning of algorithm design and programming skills through interactive problems
- Proposes a set of activities related to an algorithmic problem

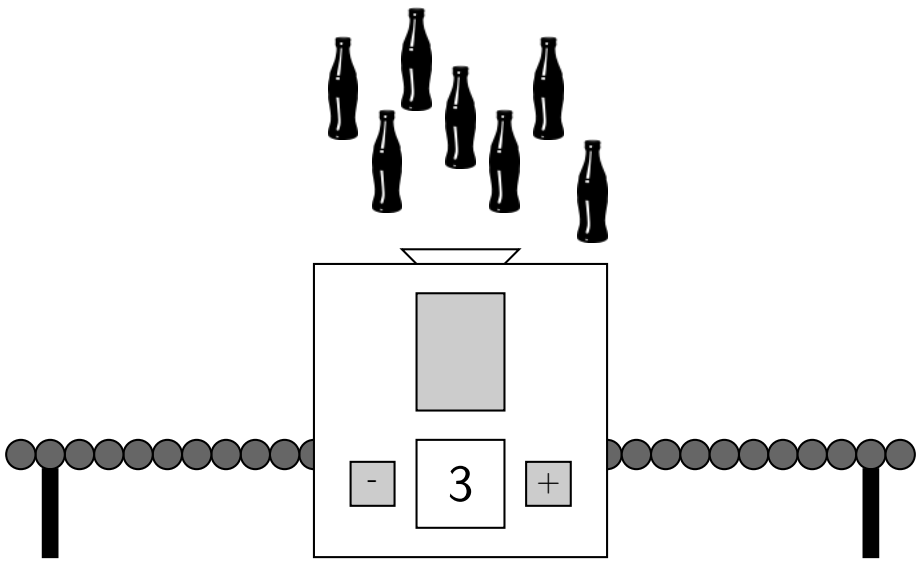
Activities

- Activities are split into three stages



Interactive animation

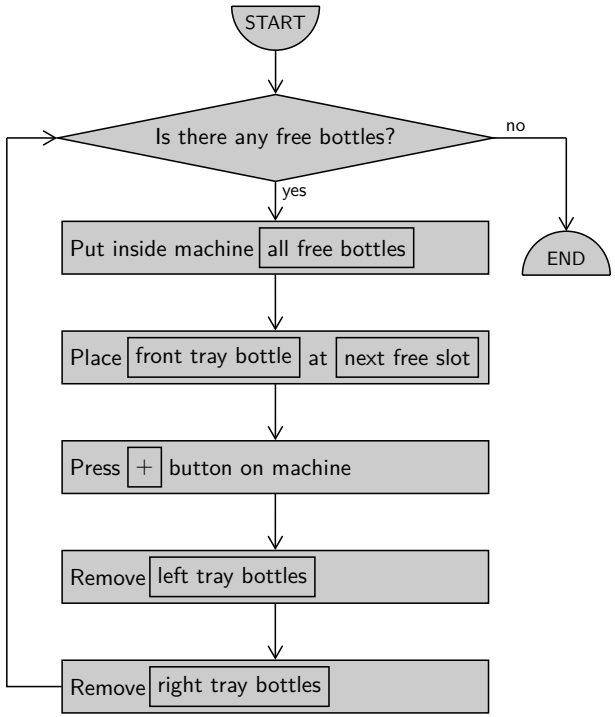
- Play with an instance of the problem



✔ **Discover the algorithm and build it in their mind**

Executable flowchart

- Execute and run a flowchart on an instance of the problem



✔ **Concretise and take the algorithm out of their mind**

Program

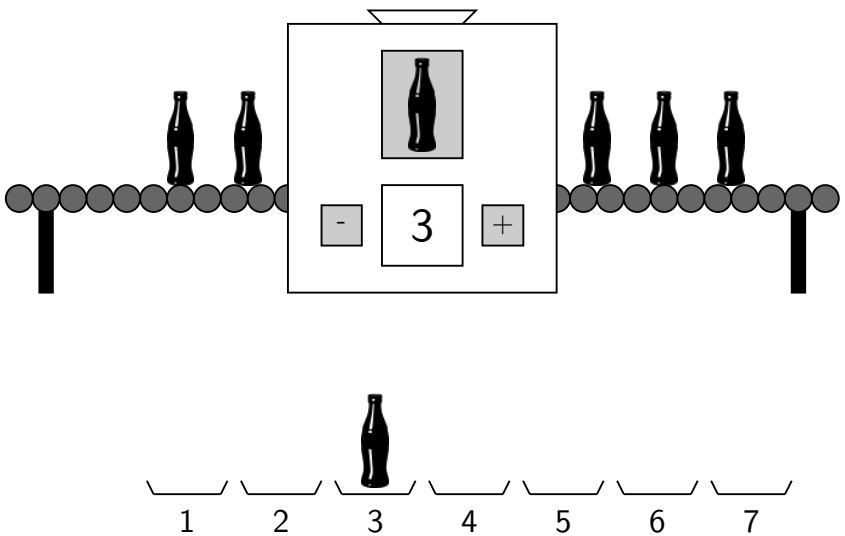
- Write a Python program corresponding to the flowchart

```
while isAnyBottlesFree():
    putInMachine (ALL_FREE_BOTTLES)
    place (FRONT_TRAY_BOTTLE, NEXT_FREE_SLOT)
    press (PLUS_BUTTON)
    remove (LEFT_TRAY_BOTTLES)
    remove (RIGHT_TRAY_BOTTLES)
```

✔ **Communicate the algorithm to the computer**

Interactive aspect and feedback

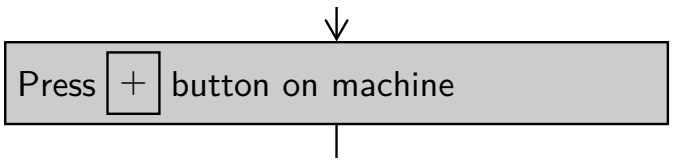
- Interactive animation working like a comic strip
- Feedback textual messages to help the learner



You placed a bottle weighing 3 ounce on position 2 but there are two lighter bottles. Are you sure it is a correct position?

Coherence between stages

- Elements of flowcharts correspond to action by the learner
- Python functions correspond to flowchart elements




```
press (PLUS_BUTTON)
```

Conclusion

- Helping pupils learn new skills with active learning and feedbacks
- From algorithmic thinking to programming
- Need to be tested and evaluated for quality