Learning Computer Programming around a CAFÉ
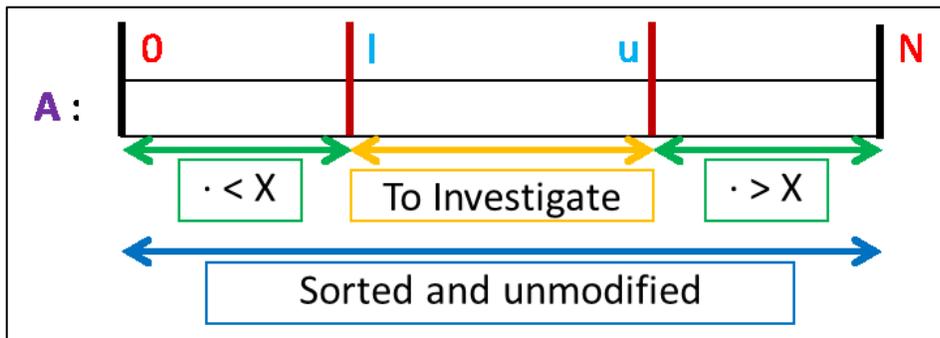
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## Programming methodology using *Graphical Loop Invariant*

Example of Graphical Loop Invariant for Binary Search of the value X in the array A

- Graphical approach → easier to understand
- Enable to derive the code of a program just by graphical transformations (See https://gli.montefiore.ulg.ac.be/icer/readme.html)
- Need practice to be mastered → tools to help teaching

Tool 1: GLI (web app to draw Graphical Loop Invariants)
url: https://gli.montefiore.ulg.ac.be/icer
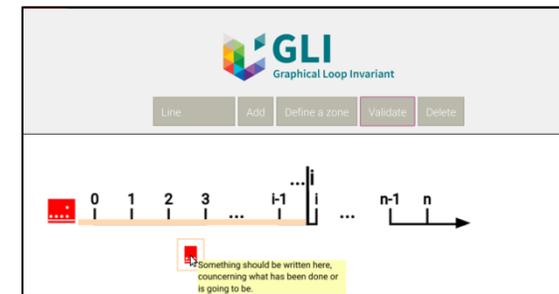
Screenshot of the App. It detects some missing items and provides basic feedback
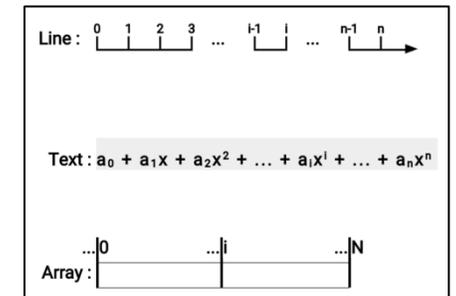
Patterns available in the App

Tool 2: CAFÉ*

- Automatic assessment of students' programs
- Take their Graphical Loop Invariant into account
- Provide feedback and feedforward information
- More info: https://orbi.uliege.be/handle/2268/242587?locale=en

* "Automatic Correction and Feedback for Students", but in French