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](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](https://gli.montefiore.ulg.ac.be/icer)*

**Screenshot of the App. It detects some missing items and provides basic feedback**

**Tool 2: CAFÉ**

- Automatic assessment of students’ programs
- Take their Graphical Loop Invariant into account
- Provide feedback and feedforward information

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