Computational Thinking Skills in Dutch Secondary Education

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Some CT aspects can be recognized in current CS teaching practice. How can we ensure systematic teaching of CT in the CS curriculum?

We shall study the following issues:

1. What is an operational definition of Computational Thinking, tailored to the specific situation and needs of secondary education in the Netherlands?
2. How can students' CT problem solving skills be assessed?
3. What is a suitable pedagogical approach to teach students and stimulate their learning of CT problem solving skills?

Computational thinking - a new concept

"Computational thinking is a problem-solving process that includes (but is not limited to) the following characteristics:
- Formulating problems in a way that enables us to use a computer and other tools to help solve them.
- Logical reasoning and analyzing data.
- Representing data through abstractions, such as models and simulations.
- Automating solutions through algorithmic thinking (a series of ordered steps).
- Identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources.
- Generalizing and transferring this problem-solving process to a wide variety of problems."

A typical CS assignment in secondary education

Make a model / simulation / program for:
Traffic lights for a busy traffic crossing
Elevator in an apartment building

With this draft definition we shall establish CS teachers' PCK on CT through structured interviews (CoRe).

Result of the first phase: final operational definition of CT tailored to the needs of CS course in Dutch secondary education.

An instrument to assess students' CT will be developed in the second phase. A pedagogical approach will be developed in the third phase. The effects of the curriculum intervention will be assessed in the fourth phase.