Informatics *versus* Information Technology

How Much Informatics is Needed to Use Information Technology

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Part I

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Informatics (CS) *versus* IT (ICT)

Informatics (CS) is concerned with designing and producing informatics 'tools', such as: algorithms, programs, systems, methods, theorems, …

IT (ICT) concentrates on how to use and apply informatics and other information technology tools in working with information

Informatics (CS) *versus* IT (ICT)

In learning and teaching

Informatics – practical demonstration of a process of designing and producing informatics solutions and 'tools'; consists of:

- specification of a problem
- designing an algorithm and solution
- computer implementation of the solution
- testing and evaluation of the solution

Informatics (CS) *versus* IT (ICT)

In learning and teaching

Informatics – practical demonstration of a process of designing and producing informatics solutions and 'tools' can be applied to different 'objects':

- text
- graphics
- calculations
- algorithms
- data base
- web pages

- specification of a problem
- designing an algorithm and solution
- computer implementation of the solution
- testing and evaluation of the solution

Informatics (CS) *versus* IT (ICT)

In learning and teaching

IT (ICT) – use and apply informatics and other information technology tools in working with information.

Approach: Observe the rules of style while working with computer on:

- text editing
- graphics
- calculations
- constructing a data base
- publishing a web page

depend on:
- type of objects
- ICT tools used

History B.PC.

1965: First regular classes in two high schools in Wrocław

Subject: Numerical methods and programming

Content: polynomials, root finding, integration, interpolation, errors

Programming: assembler, autocode Mark III, Algol

Computer: Elliott 803 (UK)

CS

History: 1985 – 1995

1985 … The time of Logo

In fact, it was misunderstanding of Papert's idea: Logo was used as a programming language instead of a learning environment

1988 … Pascal era in schools …

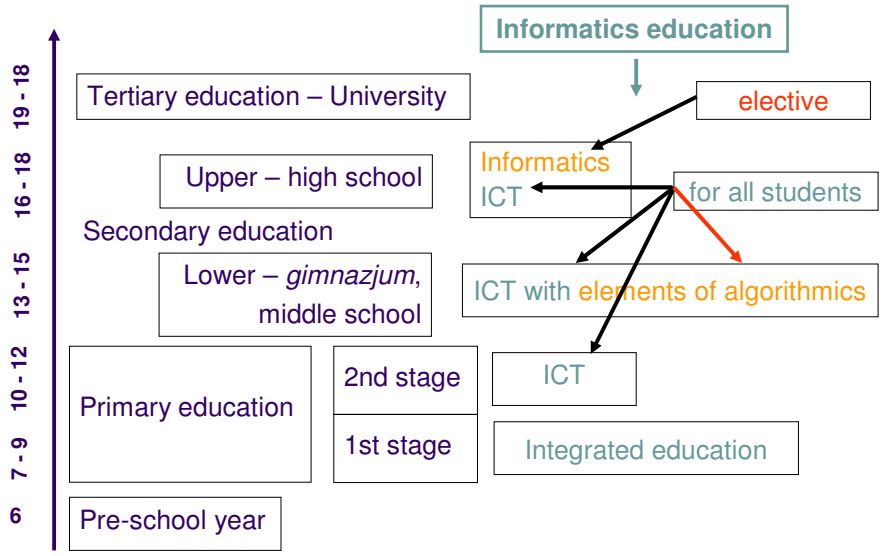
Content: numerical calculations + combinatorics, complexity, data base, text editing, spreadsheet calculations

Programming: Pascal, Turbo Pascal, …, Delphi

Computers: 8-bit micro, PC, …

CS

The Education System in Poland, 1999 …



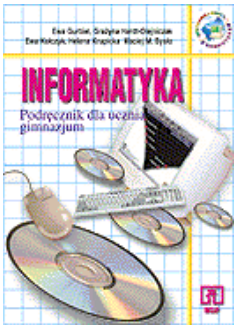
Algorithmics in *gimnazjum*: NC: Problem solving with algorithms

- examples of algorithms for solving practical and school problems
- precise formulation of problem situations
- description of algorithms
- presentation of algorithms in a ‘computer form’
- examples of recursive algorithms
- testing and evaluation of algorithms
- computer modeling and simulation

Algorithmics in *gimnazjum*: NC: Problem solving with algorithms

Sample topics:

- algorithms in mathematics
- manuals, cooking books, …
- calculations in spreadsheet
- 'algorithmic' moves of the Turtle – Logo
- finding smallest or biggest elements
- finding elements in ordered sets
- organization of sport tournaments
- sorting (selection, bubble)
- greedy approach – the change problem



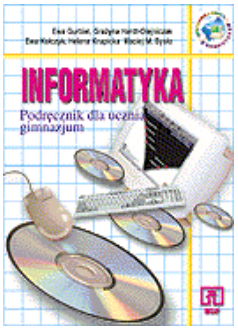
Algorithmics in *gimnazjum*: NC: Problem solving with algorithms

Informatics and ICT tools:

- calculators
- spreadsheet
- Logo
- demonstration software
- package ELI – algorithmics with computer but with no programming

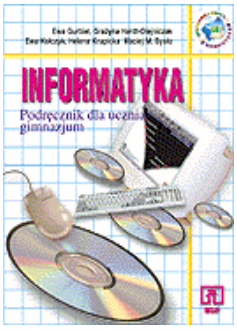
Other tools:

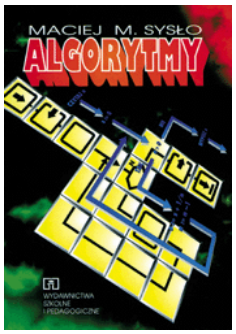
- Hanoi Towers, cones, books, coins, tournaments, etc.



Algorithmics in *gimnazjum*: NC: Problem solving with algorithms

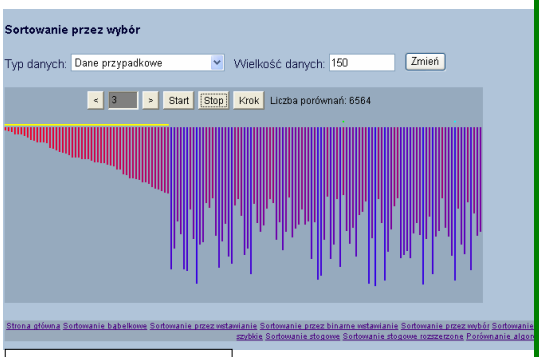
Books:



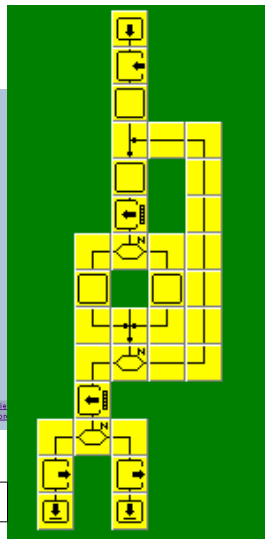


Algorithmics in *gimnazjum*: NC: Problem solving with algorithms

Software:



Sorting package



Flow Chart Builder

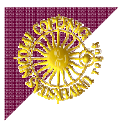
Informatics (CS) *versus* IT (ICT)

ICT in schools guarantees: computer literacy – basic knowledge and skills related to computer use

Fluency with IT (NSF) is needed: the ability to use IT effectively today and tomorrow and to learn more IT in the future (LLL)

Algorithmic thinking, programming, modeling and simulation, principles of computer and network operations … are among the concepts required by fluency with IT

Informatics (CS) *versus* IT (ICT)



ACM, 2003: *A Model Curriculum for K-12 Computer Science*:

… to integrate CS fluency and competency throughout primary and secondary schools …

Four-level framework for CS – the first two levels … ought to be mastered by all students, while the second two … can be elected by students with special interests in CS

Informatics and ICT curriculum in Poland coincides with the ACM recommendations