ViSCoS – online Computer Science study program

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Virtual Studies of Computer Science

- basic studies of Computer Science
  - 25 ECTS
  - eight courses
  - 3 semesters of study within 1.5 years

- ViSCoS curriculum
  - the preliminaries of Information and Communication Technology (ICT)
  - basics of programming with Java
  - introduction to Computer Science
  - ”special courses”
    - Research Fields of Computer Science
    - Introduction to the Ethics of Computing

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ViSCoS courses and schedule

Introduction to ICT and Computing	Semester 1
Programming I	Semester 1
Programming II	Semester 2
Hardware, Computer Architecture and Operating Systems	Semester 2
Programming Project	Semester 2 and 3
Introduction to the Ethics of Computing	All
Design of Algorithms	Semester 3
Research Fields of Computer Science	Semester 3

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Main development steps

2000	Implementation and running of the first courses. Offered to high school students in the North-Karelia province. No study fees.
2001	Expansion to the Etelä-Savo region. First students ”graduated” in December 2001.
2004	ViSCoS courses are offered via the Open University at the University of Joensuu.
2005	100th ”graduated” student. Implementation of English version and concept design of ViSCoS Mobile
2006	First English courses offered in Fall 2006?

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Reasons to start

- lack of advanced CS expertise in high schools
  - interests and needs both in school level and within students
- department wanted to attract more attention in the local area
  - to get new students
    - student position with grade 3 out of 5
  - tighten the collaboration between university and schools
- research perspective
  - research and development of online CS studies
  - opportunity to create and test new technological solutions to support learners

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Student numbers

	2000	2001	2002	2003	2004	2005
Student starting	89	184	156	94	101	72
Completed all courses	22 (24,7 %)	42 (22,8 %)	14 (8,9 %)	16 (17,0 %)	15 (14,8 %)	-
Continuing at department	10 (11,2 %)	3 (1,6 %)	6 (3,8 %)	-	-	-

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ViSCoS collaboration

- division of responsibilities
  - ViSCoS Team
    - 2 instructors + project management
    - tutoring, responsible for running the course, overall organization
    - technological development
  - Open University
    - one study secretary + supportive staff
    - administration, student support, marketing

- student fees
  - Persons holding a student position or serving in the army
    - 250 euros
  - Others
    - 350 euros for others
  - Fee includes
    - Mandatory course books
    - Student services/support materials
    - Study right for three semesters
    - Extra semesters 80 euros

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Design principles: Candle scheme

- to offer individual counseling and support to students
  - instructors provide feedback to assignments
  - tutors work in the local level

- to link the printed learning material with an activating learning environment on the web
  - digital learning tools, visual examples and exercises
    - WebCT 2000-2004
    - Moodle 2004-
- to utilize the principle of learning-by-doing
  - assignments, projects, essays, studies

- to keep the user interface simple
  - accessible with modem connection
  - synchronous communication methods not used
    - videoconferencing

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R&D focus in ViSCoS - 1

- “drop-out” research
  - reasons for quitting the studies
    - lack of time
    - difficult assignments
    - course did not full fill the expectations
  - ways to minimize the dropouts by enhancing supportive efforts => instructional intervention
  - Programming II and Programming project course seem to be most challenging for students

- development and improvement of applications to support ViSCoS students
  - Jeliot program visualization tool
  - Ethicsar ethical argumentation tool
  - LEAP digital learning portfolio

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R&D focus in ViSCoS - 2

- processing of student data
  - research and development of data mining and machine learning techniques for enhancing student support
    - background information
      - age, skills, ICT use background
    - assignment data, exam marks, activity logs
  - identified use scenarios
    - classifications of students to predict their success
    - a general overview of student population and their success inside a course
    - data from several courses

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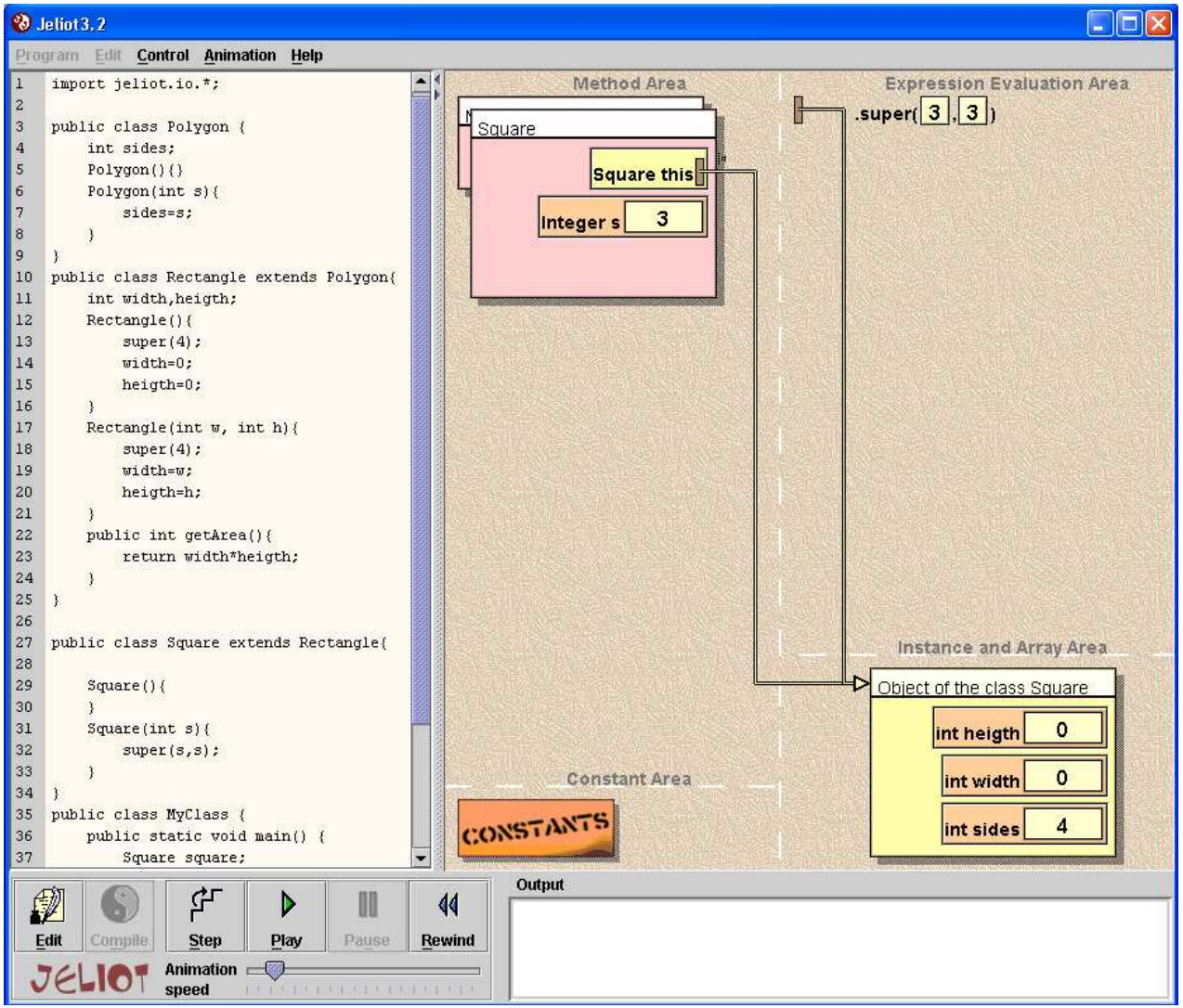
Jeliot3



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Ethicsar

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ViSCoS experiences - 1

- a formative development process in the creation of e-Learning program with limited resources
  - feedback collected from students concerning what **did not** work well
- preparedness for unexpected results
  - although the number of drop-outs in individual courses decreased during the development of the courses, the number of graduated students has remained at the same level
- readiness and flexibility to changes according to students needs and requirements
  - removal of face to face sessions in ViSCoS

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ViSCoS experiences - 2

- focus on creating an authentic learning community
  - supportive efforts are not sufficient for different learners
  - first years there was a feeling of working together in novel situation
  - are we doing our best?

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Future development

- ViSCoS Mobile
  - using mobile devices in studying
    - adaptation of course materials and tools
    - Programming with a mobile device
    - MobileBlog
    - Student support services
- ViSCoS in English
  - first courses in September 2006
  - developing country context
- new solutions to support students and instructors
  - semi-automatic assessment of assignments
  - learners are encouraged to pose more questions
  - ViSCoS memory
    - problems and solutions from earlier courses
  - ways to support meaningful collaboration

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More info

http://cs.joensuu.fi/viscos

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