
The SINTEC Personalized, Knowledge-Based E-Learning Environment

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Knowledge-Based e-Learning

- Knowledge based systems
- Student modeling
- Reasoning for:
 - Student diagnosis
 - Explanations generation
 - Lesson planning
- Intelligent interfaces

Knowledge

Learning is a knowledge centered activity:

- One of the main goals of a learning process is the articulation in the learner's mind of a body of knowledge for the considered domain.
- The skeleton of this body is usually a semantic network of the main concepts involved in that domain - **ONTOLOGY**

Ontologies

"An ontology is a specification of a conceptualization....That is, an ontology is a description (like a formal specification of a program) of the concepts and relationships that can exist for an agent or a community of agents" (Gruber)

Ontologies used in e-Learning

- Domain
- Tutoring
- Human-computer interfacing
- Lexical
- Upper Level

Personalized texts for e-Learning

Are adapted to each users':

- ❑ knowledge - student model
- ❑ learning style
- ❑ psychological profile
- ❑ goals (e.g. lists of concepts to be learned)
- ❑ level (novice, expert)
- ❑ preferences (e.g. style of web pages)
- ❑ context of interaction

Student model

- Keeps track of the concepts known, unknown or wrongly known by the student (Dimitrova, Self, Brna, 2000)
- Inferred from results at tests or from interaction (visited web pages, topics searched etc.)
- Is usually defined in relation with the domain ontology (concept net, Bayesian net)

Intelligent e-Learning Projects at CS-Polytechnic University & ICIA

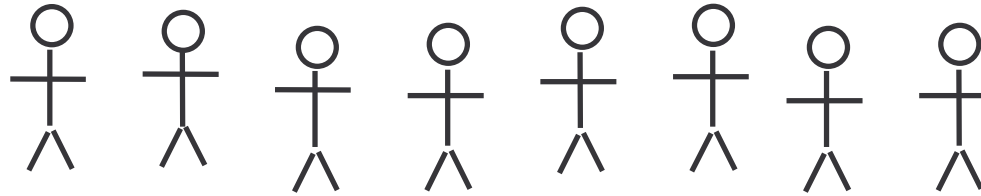
- MacPAIL
- ITS for programming
- WebGen
- LARFLAST
- SINTEC
- EU-NCIT
- COOPER

SINTEC (2002-2003)

- INFOSOC- Funded Project
- Includes experience from ITS and LARFLAST
- Partners :
 - CS Dept., “Polytechnica” Univ. Bucharest
 - Romanian Academy Institute for AI
 - Romanian Academy Psychology Institute
 - SIVECO S.A. Romania
- Continued in FP6 SSA EU-NCIT

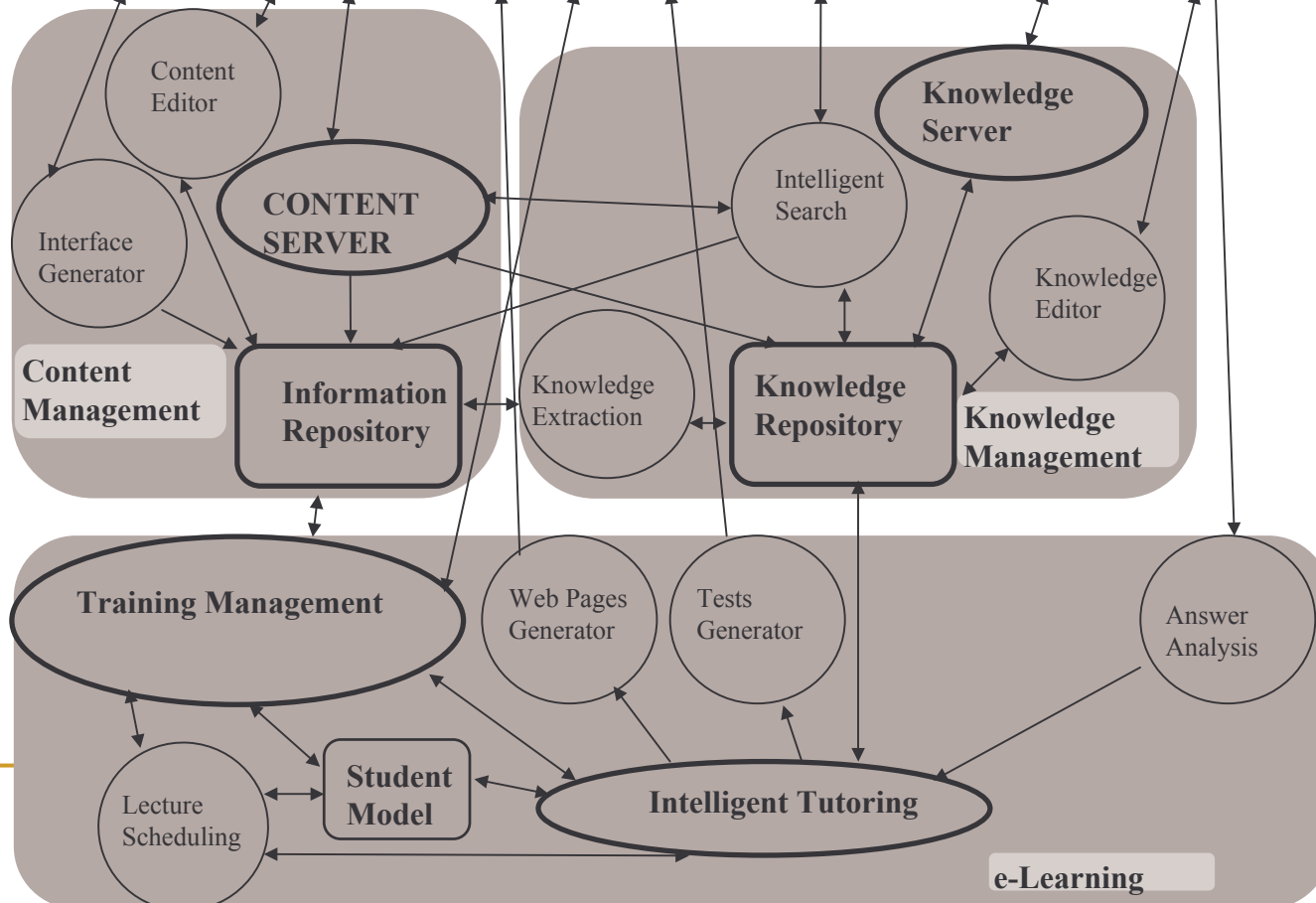
SINTEC

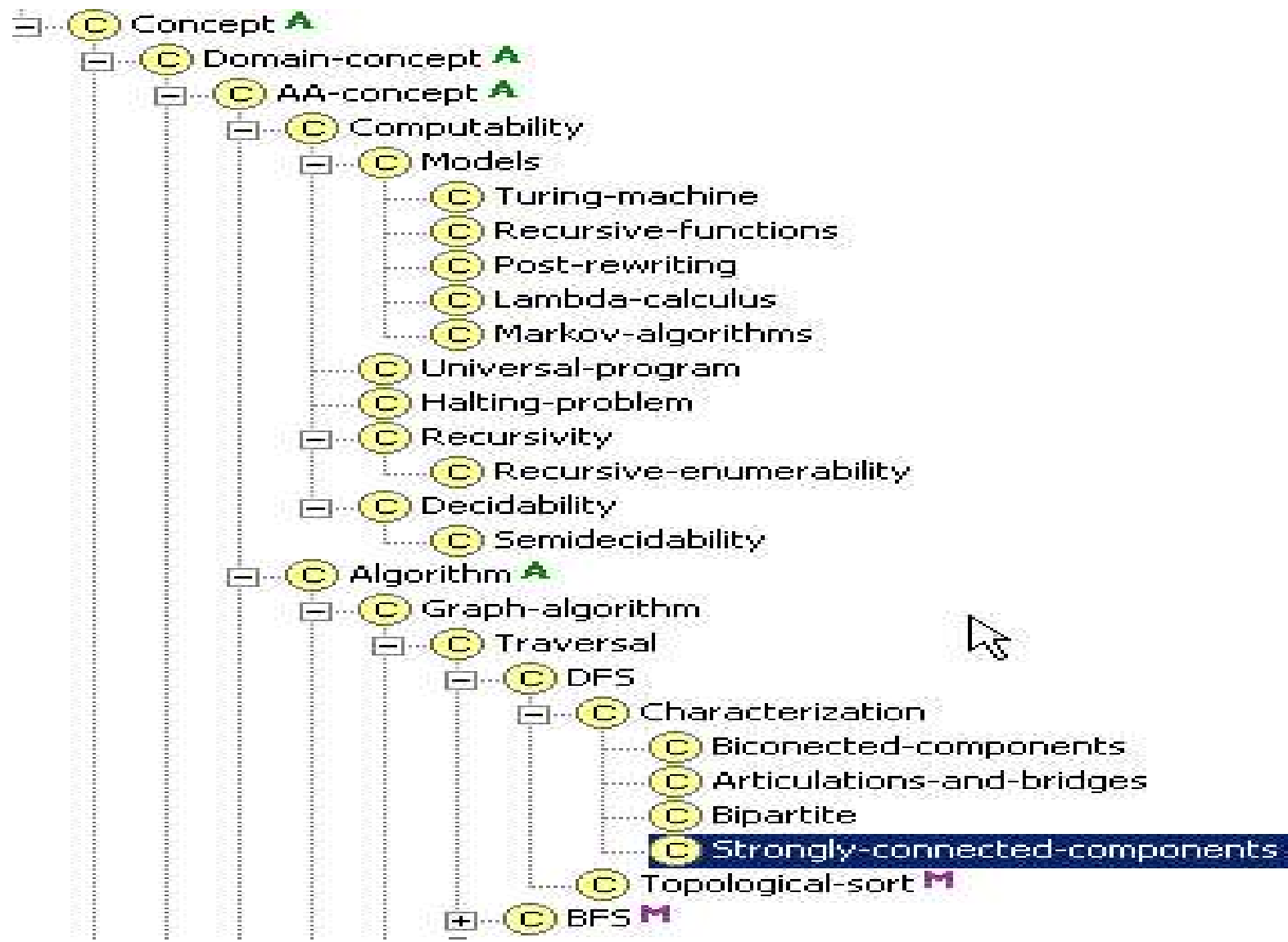
- Collaborative tools for distance and distributed e-Learning
- Web services technology for distributed processing knowledge (ontologies) from the (Semantic) Web
- Content creation and reuse from the web, according to metadata standards for e-Learning like IMS, ARIADNE, SCORM, AICC
- ITS technology (student modelling and inference)
- Text Mining:
 - intelligent search of learning materials on the web
 - knowledge extraction
 - categorization
 - summarization



INSTITUTIONAL PORTAL - WWW

Collaborative Services





S	represented-as	Instance	single	classes={Data-structure} default
S	corect_proof	Class	multiple	parents={}
S	data_structure	Class	multiple	parents={Data-structure} value
S	complexity	Instance	single	classes={Complexity}
S	apply_prerequisite	String	multiple	
S	pseudocode	String	single	
S	schema	Class	single	parents={Algorithm-schema}
S	similar-to	Any	multiple	
S	property	Class	multiple	parents={Property}
S	references	Instance	multiple	classes={Document-concept}
S	text	String	single	
S	needed	Class	multiple	parents={Learning-task}
S	requires	Any	multiple	
S	inverse_of_requires	Any	multiple	
S	identifier	String	single	
S	created_by	String	single	default={Stefan Trausan-Matu}
S	romanian_name	String	multiple	


User survey - Microsoft Internet Explorer

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User survey

Learning-style inventory

Our platform can adapt to your learning style and abilities. Please complete the test below to help us create of profile. Rank a 4 for the sentence that describes you the *best* down to 1 for the one that describes you the *least*.

1. When I learn:

I like to deal with my feelings I like to think about ideas I like to be doing things I like to watch and listen

2. I learn best when:

I listen and watch carefully I rely on logical thinking I trust my hunches and feelings I work hard to get things done

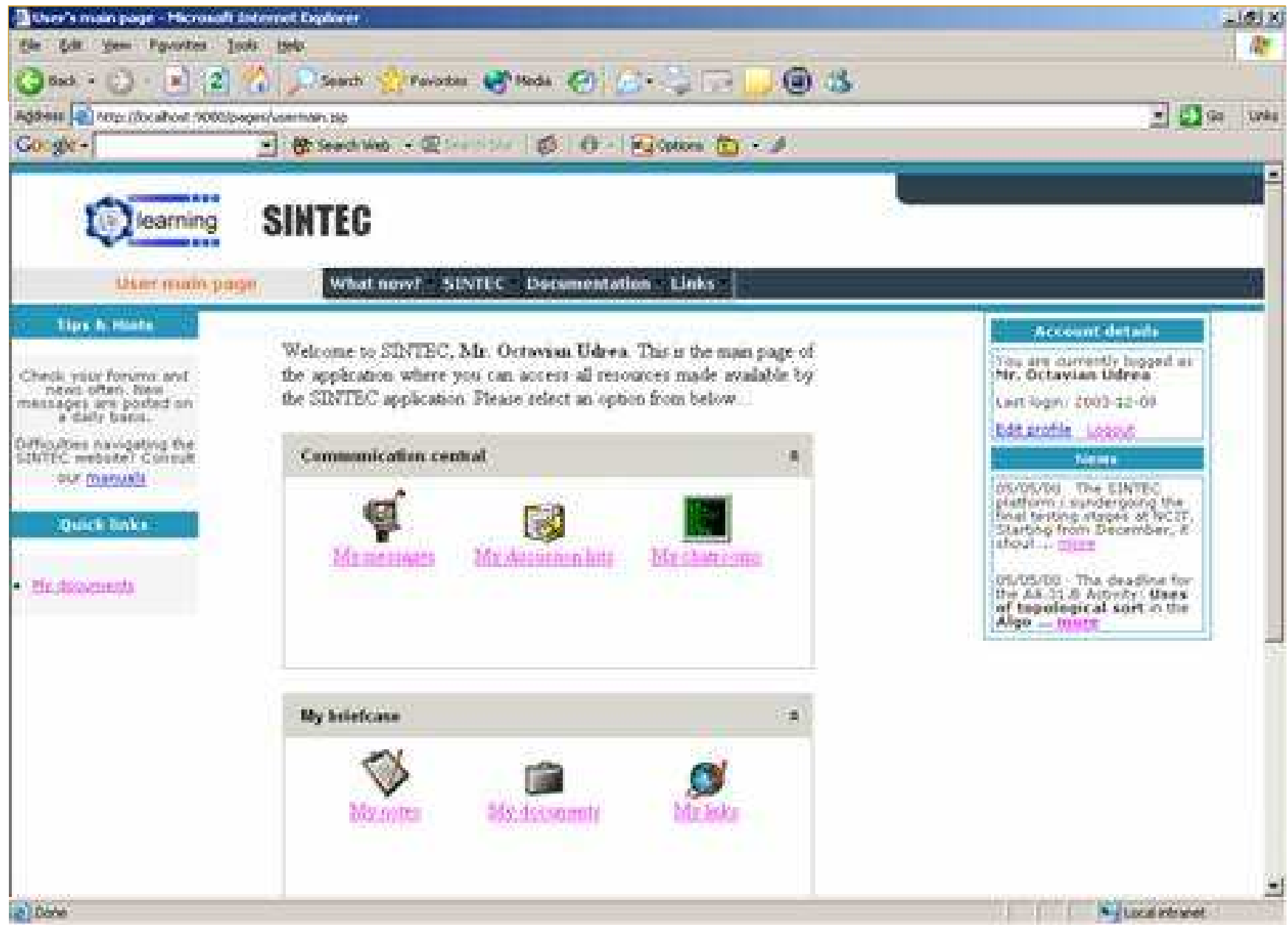
3. When I am learning:

I tend to reason things out I am responsible about things I am quiet and reserved I have strong feelings and reactions

4. I learn by:

feeling doing watching thinking

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Course: Algorithm Analysis (#31) - Microsoft Internet Explorer

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Tips & Hints

Check your forums and news often. New messages are posted on a daily basis.

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- [My documents](#)

You are enrolled in the **Algorithm Analysis (#31)** since *Sunday, November 2 2003*:

Course details

Descriptions: *Introduction to fundamental algorithms and computation issues; Direct application into graphs, trees, network flow algorithms.*

Instructor: [Prof. Stefan Trausan-Matu](#)

Teaching Assistants: [Ruxandrea Zăbescu](#)

Grading information: Maximum grade is 10. Minimum passing grade is 5. Maximum points available: 120.

Communication central

[Forum: AA discussion list](#)

[Chatroom: AA chat](#)

Discussion transcript available for [AA chat](#) for Thursday, December 4 2003: [click here](#).

Scheduled events

Recitation scheduled for **Thursday, December 10 2003 at 11:00 GMT+2**. This event repeats for the following period: every week.

My activity

You have currently completed **34%** of the activities. You have currently **58** points out of **60**.

Your discussion participation details: **2** messages posted.
[Work on activities - Notes for this course](#)

Account details

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Last login: 2003-12-09

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05/05/03 The deadline for the AA 31 B Activity: Uses of topological sort in the Algo ... [more](#)

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You have currently completed 34% of the activities. You have currently 58 points out of 60.

My activity

Legend: ■ Completed ■ Available ■ Not yet available

Activity AA.01.4.1: Graph traversal

- Activity AA.31.4.1.1: Breadth traversal
- Activity AA.31.4.1.2: Depth traversal
- Activity AA.31.4.1.3: Topological sort

Activity AA.31.4: Optimization of Dijkstra's algorithm

- Activity AA.31.4.2: Strongly connected components
- Activity AA.31.4.3: Articulation points and bridges

Activity AA.31.B: Uses of topological sort

- Activity AA.31.C: Quiz test 1

Activity AA.31.4.4: Minimal paths

- Activity AA.31.4.4.1: Greedy algorithms
- Activity AA.31.4.4.2: Floyd-Warshall
- Activity AA.31.4.4.3: Bellman-Ford

Activity AA.31.D: Final quiz

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Quick-links

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Transcript

Course: Database Fundamentals

Description: Familiarization of students with the basic principles of databases and some theoretical knowledge for better understanding DBMS systems. The course covers topics such as: basic database principles, data model planning (including E-R data model diagrams and the net data model), relations and operations for relations (joins, product, difference, projection, etc.), transactions and serializability, distributed databases issues.

Period: **Wednesday, September 17 2003 - Monday, October 6 2003**

Status: **Completed**

Final grade: **9.45**

Percentile: **92%**

Detailed grades:

- Activity #213.A: From E-R to relational models (homework): **8 (2.4 credits)**
- Activity #213.B: Queries and subqueries (homework): **10 (2 credits)**
- Activity #213.C: DDL Statements (homework): **10 (2 credits)**
- Activity #213.D: Constraints (homework): **6 (1.45 credits)**
- Activity #213.E: Implementing in DB2 (project): **8 (1.6 credits)**

Course: Algorithm analysis

Description: Introduction to fundamental algorithms and computation issues. Direct application into graphs, trees, network flow algorithms.

Period: **Sunday, November 2 2003 - ?**

Status: **In progress**

Detailed grades:

- Activity #31.A: Optimization of Dijkstra algorithm (homework): **10 (1.2 credits)**

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Conclusions

- The approach was used for CS students at PUB
- Algernon is not reliable – in future JESS
- A lot of psychology work to be done
- Difficult to develop the ontology