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## Research strategy of the Department of Computer Science, University of Helsinki, for 2007-9

This document is an extract of the strategy of the Department of Computer Science, University of Helsinki, for the planning period 2007-9. This document summarizes the major research related issues of the strategy.

### *Mission of the department*

The Department of Computer Science educates Masters and Doctors for advanced expert and research positions in the field of computer science at companies as well as research and education institutions. The research units and groups at the department develop new scientific knowledge, both for the application needs of society (companies, other disciplines, and teaching) and for renewing their own field of research and in anticipation of future application needs.

### *Present state of research*

The research at the department keeps a very high standard internationally; as testimony of this, it received the highest possible grade, 7/7, in the international evaluation of research arranged by the University of Helsinki in 2005. In the evaluation, the FDK Centre of Excellence was called 'the world leader in data analysis'. Naturally, the basic goal of the department is to retain this high standard in the focal areas of research, and to branch out into new focal research areas as far as resources will allow.

### *Focal areas of research*

During this strategy period, two focal research areas will continue at the department:

- The research in *data analysis* is centred in the FDK research unit and HIIT. One strong application area of this research is analysis of biological data, one of the focal research areas of the whole faculty. A new application area is the study of cultural data like place name corpora; there, data analysis is coupled with the language technology expertise at the department. Current trends in *computational science* emphasize data analysis, but also information management, operating systems, and software.
- During this strategic period, the research in *mobile computing* deals with issues of maintaining continuous connectivity to the Internet while on the move. Studies of issues in data security, spontaneous networking, and improvements in energy efficiency will be increased. These promote new focal research items in the research area.

The department branches out into three new focal areas of research during this strategic period. They will emphasize topics that answer to the computerized society's needs, will be built on the basis of current focal areas at the department, and will support both current and new research areas. At the same time, current focal areas will be developed further.

- The research into *interoperability* improves middleware services for e.g. collaboration between business networks. The research challenges include importing service-oriented software architectures into the collaboration management between business services and using modelling, verification and validation methods for ensuring the correctness and quality of the dynamic collaborations.

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- *Empirical software engineering* offers a good opportunity for new industrial cooperation. The new focal area of research into service interaction also promotes new cooperation opportunities for this new focal area.
- *Ubiquitous computing* amounts to a massive distribution of computing into our environment. Research questions include context-awareness, which focuses on automatically taking the user's environment into consideration, and personalization, where the user's special features and behaviour are automatically taken into consideration.

#### *Development of research activities*

The central development actions for the planning period 2007-9 include the following.

- One of the goals of the university strategy for 2007-2009 is the internationalization of research. Many of the department's research projects are international as it is, and the department supports this development.
- In its strategy, the University of Helsinki gives its research education an especially high profile. The department gives research education mainly within graduate schools. It coordinates two schools (Hecse, ComBi) and participates in two other (KIT, SoSE).
- The research evaluation of 2005 recommended that the collaboration with the Department of Mathematics and Statistics be increased immediately. The departments are currently negotiating a joint research position. A natural field of the new office would be data analysis or logics. The former would support one of our current focal areas, while the latter would support new focal areas and other fields (like research into programming languages).
- The research evaluation recommended that the department increase its number of professors. This is one of the principles entered into the 2007-2009 staff policy. However, the strained economy of the department does not allow for establishing many new professorships.