

Diogo Miguel Gaspar de Sousa

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EDUCATION



Escola Profissional de Leiria (Professional School of Leiria), Leiria, Portugal

Gestão de Equipamentos Informáticos (Computer Equipments Management) (2005–2008)

- Two months internship in Alidata.
 - * *GNU/Linux* systems configuration.
 - * Developed an installer for database management system *firebird*. The low-level installer was written in *Perl*. There were interfaces developed in *shell script* (command line), *C* (text user interface) using the *newt* library and a graphical user interface, also in *C*, using *GTK+* and *glade* libraries.
 - * Developed a process monitoring application in *C++*. The application has a text user interface, using the *newt* library. It monitors the memory, processor usage, and the *TCP* traffic of a given port.

Internship Grade: 20.

- Final Project: *freeircd*, an *IRC* server (see “Software Projects”). Grade: 17
- Final grade: 14.6.



FCT **Faculdade de Ciências e Tecnologia** (Faculty of Sciences and Technology) of **Universidade Nova de Lisboa** (New University of Lisbon), Caparica, Portugal

Licenciatura em Engenharia Informática (Computer Science Bachelor’s Degree) (2008–2011)

- Obtained Bachelor’s degree with a final grade of 17.
- 186 ECTS obtained (one extra course taken).
- Received an excellence scholarship for the third year average grade of 17,78.
- Courses: Algorithms and Data Structures, Artificial Intelligence, Compilation and Interpretation of Programming Languages, Computational Logic, Computer Architecture, Computer Graphics and Interfaces, Computer Networks, Databases, Design and Analysis of Algorithms, Discrete Mathematics, Distributed Systems, Fundamentals of Operating Systems, Information Codification, Integrated Project, Introduction to Computer Systems and Networks, Introduction to Programming, Linear Algebra and Analytic Geometry, Logic Programming and Constraint, Logic Systems, Mathematical Analysis I, Mathematical Analysis II, Object-Oriented Programming, Physics, Probability and Statistics, Programming Languages and Environments, Software Development Methodologies, Theory of Computation.

Mestrado em Engenharia Informática (Computer Science Master’s Degree) (2011–2013)

- Obtained Master’s degree with a final grade of 17.
- Master’s thesis grade of 19. In this thesis we developed a static analysis to detect potential atomicity violations when using an library. The thesis is [publicly available](#) as well as the [prototype](#). The article “Prevenção de Violações de Atomicidade usando Contratos” covering the main contributions of the thesis (see “Publications”).
- 123 ECTS obtained (one extra course taken).
- Courses: Algorithms for Distributed Systems, Automata Algebraic Theory, Computability and Complexity, Computer Systems and Communications Security, Criptography, Design and Analysis of Software Systems, Domain Specific Languages, Introduction to Operations Research, Knowledge Representation and Reasoning, Logics for Programs Specification and Verification, Multi-paradigm Programming, Operating Systems.



Universiteit Utrecht (Utrecht University), Utrecht, Netherlands

Applied Functional Programming — A two-week summer course on functional programming featuring *Haskell* (2010)

- Developed `regex2dot`, a regular expression to finite state automaton compiler. The program can output the image of the non-deterministic, deterministic or optimum finite state automaton.



CS191x: Quantum Mechanics and Quantum Computation — A ten-week online course on quantum computing (2013)

- Completed with a final grade of 94%.

PROGRAMMING CONTESTS

National Olympiads in Informatics — Portugal

- 3rd place in 2007’s finals.
- 6th place in 2008’s finals.

Selected to the 2008 International Olympiads in Informatics, by two more contests in the University of Porto, which select the contesters with the four best scores.

Correspondence Iberoamerican Informatics Competition

- Bronze medal in the 2008 Correspondence Iberoamerican Informatics Competition.

International Olympiads in Informatics

- Obtained 45 points (out of 600) in the 2008 International Olympiads in Informatics.

Inter-University Programming Contest

- Participation in the 2009 Inter-University Programming Contest, with 16 points scored.
- Participation in the 2010 Inter-University Programming Contest, with 28 points scored.
- Participation in the 2011 Inter-University Programming Contest, with 33 points scored.
- Participation in the 2012 Inter-University Programming Contest, with 30 points scored.

- Participation in the 2013 Inter-University Programming Contest, with 16 points scored.

Inter-University Programming Marathon

- Participation in the 2009 Inter-University Programming Contest, ending in 8th place (of 14).
- Participation in the 2010 Inter-University Programming Contest, ending in 14th place (of 18).
- Participation in the 2011 Inter-University Programming Contest, ending in 3rd place (of 25). Selected for the 2011 Southwestern Europe Regional Contest.
- Participation in the 2012 Inter-University Programming Contest, ending in 5th place (of 16). Selected for the 2012 Southwestern Europe Regional Contest.
- Participation in the 2013 Inter-University Programming Contest, ending in 8th place (of 13).

Southwestern Europe Regional Contest

- Participation in the 2011 Southwestern Europe Regional Contest, ending in 23th place (of 42).
- Participation in the 2012 Southwestern Europe Regional Contest, ending in 39th place (of 44).

ACADEMIC
EXPERIENCE



Faculdade de Ciências e Tecnologia (Faculty of Sciences and Technology) of *Universidade Nova de Lisboa* (New University of Lisbon), Caparica, Portugal

2008–2009

Participation as volunteer in 2009 Expo FCT.

Participation as volunteer in 2009 Clube Math.

Integration with a group of students of Prof. João Lourenço, in the transactional memory subject, where two main contributions were made, adapted *CTL* (*Consistent Transactional Layer*, a library for transactional memory) to the *GNU Autotools* build system, and adapted the file system benchmarker *IOZone* to the *Transactional File System* (developed by another member of the research group).

2009–2010

UROP scholarship (*Undergraduate Research Opportunities Program*), with one year duration. The subject is “*Applications for Software Transactional Memory*” under the supervision of Prof. João Lourenço. Various concurrent anomalous programs were analyzed (they can be classified as *no lock*, *monitor (wait/notify)* and *Two-Stage Access*) and solutions in transactional memory was proposed.

Participation as volunteer in 2010 Expo FCT.

2010-2011

Presentation of the paper “*A Static Approach for Detecting Concurrency Anomalies in Transactional Memory*” in INForum2010.

ROPES scholarship (*Research Opportunities Programme for Excelling Students*) with one semester duration, under the supervision of Prof. João Lourenço. The project was to continue the development of a tool, initially developed by Bruno Teixeira, in his master’s thesis. This tool statically analyzes *Java* programs and tries to infer correlations between variables (through its access patterns), warning about possible high-level dataraces.

Participation as volunteer in 2011 Expo FCT and creation of a new activity of *Haskell* programming.

2011–2012

Teacher of the practical classes of Introduction to Programming, a first semester course of the Computer Science Bachelor's Degree.

ROPES scholarship (*Research Opportunities Programme for Excelling Students*) with one semester duration, under the supervision of Prof. João Lourenço in a unified system for databases and memory transactions.

Participation as volunteer in 2012 Expo FCT with the *Haskell* programming activity.

Presentation of the paper “*Aplicação do Fecho de Programas na Detecção de Anomalias de Concorrência*” in INForum2012.

Presentation of the paper “*Paralelização de Código Puro numa Linguagem Imperativa*” in INForum2012.

2012–2013

Attended 2013 HTDC winter school on transactional memory.

Participation as volunteer in 2013 Expo FCT with the *Haskell* programming activity.

FCT Scholarship under the supervision of Prof. João Lourenço improving an atomicity violation detection tool. This tool is described in “A Static Approach for Detecting Concurrency Anomalies in Transactional Memory” and the analysis implemented is presented in “Using program closures to make an API implementation thread safe” (see “Publications”).

Presentation of the paper “*Prevenção de Violações de Atomicidade usando Contratos*” in INForum2013.

2014

Participation as volunteer in 2014 Expo FCT with the *Haskell* programming activity.

FCT Scholarship under the supervision of Prof. João Lourenço improving an atomicity violation detection tool. This tool is described in “Prevenção de Violações de Atomicidade usando Contratos” (see “Publications”).

PUBLICATIONS

Bruno Teixeira, João Lourenço and Diogo Sousa. A Static Approach for Detecting Concurrency Anomalies in Transactional Memory. *Proceedings of INForum2010*, September 10, 2010.

João Lourenço, Diogo Sousa, Bruno Teixeira and Ricardo Dias. Detecting Concurrency Anomalies in Transactional Memory Programs. *Computer Science and Information Systems*. Vol. 8, No. 2, 533-548. (2011). doi:10.2298/CSIS110110007L.

Vasco Pessanha, Ricardo J. Dias, João Lourenço, Eitan Farchi, Diogo Sousa. Practical verification of high-level dataraces in transactional memory programs. *PADTAD 2011*: 26-34.

Eitan Farchi, Itai Segall, João Lourenço and Diogo Sousa. Using program closures to make an application programming interface (API) implementation thread safe. *PADTAD 2012*: 18-24.

Diogo G. Sousa, João C. Martins and João Costa Seco. Paralelização de Código Puro numa Linguagem Imperativa. *Proceedings of INForum 2012*, September 2012.

Diogo G. Sousa, Carla Ferreira, João Lourenço. Prevenção de Violações de Atomicidade usando Contratos. *Proceedings of INForum 2013*, September 2013.

SOFTWARE PROJECTS

List of projects created or contributed to. Apart for the [Hexchat](#) contributions these projects were mostly of a didactic nature, and are not maintained. All projects are under some version of the *GNU General Public License*.

[Potatochess](#) (2008), a *P2P* chess game (*IPv4* and *IPv6*). The application was written in *C++*, and uses the *GTKmm* and *glademm* libraries to do the graphical interface.

[Freeircd](#) (2007), an irc server written in *C*. The server supports *IPv6* and uses a *MySQL* database.

[Brute](#) (2008), a multithreaded brute force hash cracker written in *C*. The application is easily extensible to support new cryptographic hashing algorithms since the cryptographic modules are loaded in *run-time*.

[DBFI](#) (2008), a *brainfuck* interpreter and compiler written in *C*. In compiler mode generates *assembly x86* with *GNU* syntax.

[HTFS](#) (2008), a userspace file system under *FUSE* which only lives in RAM. The file system was written in *C* and uses *hashtables* to index all the data structures.

[CDSC](#) (2011), a data structures library written in *C* that provides interfaces and implementation of several data structures in an object-oriented manner. Contains interfaces for map, ordered map, queue, stack, priority queue and disjoint sets.

Several [contributions](#) to the [Hexchat](#) irc client. In particular the support for the irc extension *server-time* and improvements in the *urls* recognition.

TECHNICAL SKILLS

Programming languages: *C*, *Java*, *Rust*, *C++*, *Python*, *Haskell*, *Scala*, *Assembly x86*, *Perl*, *Shell scripting*, *Ocaml*, *Prolog*.

Other languages: *SQL*, *L^AT_EX* (and *BIB_TE_X*, *Beamer*), *UML*, *XML*.

Unix-like systems usage and administration.

Tools: *GNU Autotools*, *GNU Make*, *ant*, *GNU Gdb*, *git*, *svn*, *GNU Emacs*.

CURIOSITIES

Member 2773058 of the *Association for Computing Machinery*.

Member 6837 of the *Free Software Foundation*.

About 300 problems solved in *UVa Online Judge*.

Github: <https://github.com/orium>

More about me in my personal website.