SOME ADVICES TO GRADUATE STUDENTS

by Arthur Buchsbaum

I will point out some vital objectives for those which intend to study with me in the Graduate Course in Computer Science, offered by Federal University of Santa Catarina.

1. Study of Grammar and Composition in Portuguese

Every graduate student should know how to read and write correctly the official language (Portuguese) used in Brazil, country in which this university (UFSC – Federal University of Santa Catarina) is located. The graduate or doctoral thesis must be written, according to law, in Portuguese, even if the student has another nationality. This requirement may look strange for Brazilians, but they should be able to express themselves in their own language, specially if they are graduate or doctoral students, being then in a condition in which a good knowledge of their own language should be inherent to their life. Unfortunately many times this is not what happens. Many of my pupils have found many difficulties in the use of Portuguese language, even if they are able to show their intelligence in other areas. These students often make mistakes in orthography, punctuation, concord, etc., and reveal a lack of ability to express themselves clearly – they mix different ideas in a very confused way, showing no sense of organization, so the final result is something of a mess. Therefore my work gets more difficult because I have to assume the task of teaching my pupils many things that they should have learnt at high school before entering university. It is one byproduct of the present educational system in Brazil. I am consequently demanding for graduate students that are under my responsibility that they should have a complete fluency in Portuguese, in order to write correctly well-structured compositions.

I give some suggestions for those which don't know how to use Portuguese language correctly in order to help them to improve their weak points.

Some recommended books:

- "Manual de Gramática – Guia Prático da Língua Portuguesa", by Luiz Fernando Mazzarotto, Difusão Cultural do Livro. It is a pocketbook and has for this reason a fairly cheap price. It covers in a concise way but with many details the different topics related to Portuguese grammar, such as orthography, structure and processes of word formation. Exercises in the book make it possible to evaluate your knowledge in the above-mentioned topics.
- "Manual de Redação – Guia Prático da Língua Portuguesa", by Luiz Fernando Mazzarotto, Davi Dias de Camargo and Ana Maria Herrera Soares, Difusão Cultural do Livro. It is also a pocketbook and it covers the theory of composition (description, narration, dissertation) and text interpretation. It explains many problems found by beginners in text composition.
- "Dicionário da Língua Portuguesa", Larousse and Ática. It is a minidictionary, but its contents are enough to most necessities of my students. It also contains etymology of words. The big dictionaries Aurélio and Houaiss, although almost complete, are very heavy for constant use, so I don't recommend their printed version; instead it is better to have one of these dictionaries in CD format.
- "Caldas Aulete – Minidicionário Contemporâneo da Língua Portuguesa", Nova Fronteira. It is complete enough and includes a mini-encyclopedia with 2000 words.

- "Gramática Metódica da Língua Portuguesa", by Napoleão Mendes de Almeida, Saraiva. It is perhaps the most complete and best treatise on Portuguese language ever done.

Some Portuguese language courses:

- Curso de português por correspondência – founded by Napoleão Mendes de Almeida. Contains 104 lessons, covering phonetics, morphology, etymology, syntax and one literary appendix (prose and poetry). Each chapter has at its end a quiz about the subject written about, that must be answered by the student and sent for correction.
- Kumon Method – it has presential courses in Portuguese language (besides elementary mathematics and Japanese), in several cities in Brazil, with a very personalized approach adapted to the needs of each student. In their site they say: "Kumon is an individualized teaching method that develops the student independently from age or school grade. So there is not an age limit and it may be applied for adults and children. The didactic contents of Kumon range from pre-school till university level."
- SENAC of Santa Catarina State – offers frequently courses in Portuguese language and composition.

2. Study of English Language

Almost all important technical literature concerning sciences, such as Logic, Mathematics and Computer Science, are written in English, which is by all means the international language, serving as an important communication tool for the entire world, as it was the case of Latin until one and a half century ago. So it is essential that all graduate students, specially my pupils, have a reasonable knowledge of English, in the first instance at least for reading books and articles and afterwards for composition in English, language which is mandatory for almost all scientific events and publications abroad, and even in many events realized here in Brazil.

Presential courses are often very expensive and take a long time, for this reason they are not my first recommendation for English learning. A good self-taught student is able to acquire a reasonable proficiency in English, good enough to read scientific and technical texts, if he/she has the material to study with. A good choice is Telecurso 2000, which includes printed material containing English of high school level (in Brazil). A good online English course, from basic to advanced level, is Englishtown.

3. Complementary Study of Mathematics

At graduate level I have offered the trimestrial courses Formal Logic I, Formal Logic II and Formal Logic III, from March to December of every year, all belonging to Graduate Program of Computer Science, briefly PPGCC. Their aim is to transmit a basic knowledge in Symbolic Logic, and to give to my pupils the foundations for working on their dissertations or theses. For those students that intend to improve their knowledge on Formal Logic, it is necessary a minimum knowledge of mathematics, especially Set Theory. As PPGCC is still not offering this course, I advise my pupils that they study this topic by themselves.

Some recommended books:

- "Elements of Set Theory", by Herbert B. Enderton, Academic Press. An axiomatic approach of the Set Theory ZF, considered the standard one.
- "Axiomatic Set Theory", by Patrick Suppes, Dover Publications. Another book, very didactic, on the Set Theory ZF.

Besides Set Theory, it is desirable, but not mandatory[1], some knowledge on Algebra, Infinitesimal Calculus, Analysis and Topology. There is bellow a list of books on these topics:

- "Elementos de Álgebra", by L. H. Jacy Monteiro, Livros Técnicos e Científicos.
- "A Survey of Modern Algebra", by Garret Birkhoff and Saunders Mac Lane, A K Peters.
- "Linear Algebra", by Georgi E. Shilov, Dover Publications.
- "The Calculus with Analytic Geometry", by Louis Leithold, HarperCollins.
- "Elementary Real and Complex Analysis", by Georgi E. Shilov, Dover Publications.[2]
- "Introduction to Topology", by Bert Mendelson, Dover Publications.

4. Study of LaTeX

My last advice to my pupils is studying LaTeX. It is nearly essential for editing a dissertation, thesis, technical report or article for scientific events or journals. LaTeX is a programming language aiming composition of documents such as articles, books, dissertations, theses or technical reports, especially in the fields of science and technology (computer science, logic, physics, chemistry, biology, mathematics, statistics, geology, engineering, etc.). It has become standard in many scientific congresses. Through any text editor is composed a source text file which includes the text itself of the document as well as commands for generating special signs and descriptions of the structure of the final layout of the document. This source file (a text file whose name is suffixed by "tex") is compiled and generates another file in dvi format (**de**vice-**i**ndependent file), which contains the final layout, and can be visualized through an appropriate system. There are converters from dvi format to any of the formats pdf (**p**ortable **d**ocument **f**ormat) or ps (Adobe **P**ost**S**critpt), which are also very popular, for submitting papers or any documents, and/or for storage in Web servers.

Some good bibliographical references:

- "LaTeX Line by Line", by Antoni Diller, Wiley. It's very didactic. The author has some interest in Logic, and gives many examples in this subject matter.
- "A Guide to LaTeX", by Helmut Kopka and Patrick W. Daly, Addison–Wesley. It's an introductory approach to this theme, being much more detailed than a beginner's book. It contains many examples and exercises.
- "Math into LaTeX", by George Gratzer, Birkhäuser and Springer. It's another introduction to LaTeX, dedicated specially to the creation of texts containing Mathematics.
- "The LaTeX Companion (2nd Edition)", by Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle and Chris Rowley, Addison-Wesley. It's the better and more comprehensive book on the theme, but I wouldn't advise it for beginners.

For obtaining a working station with LaTeX, complete for PC's, the following systems are recommended:

- MiKTeX – a LaTeX implementation for PC's; it's freeware;
- WinEdt – a shell with a special interface for generating source files in LaTeX; it's a shareware. INE – Department of Informatics and Statistics of UFSC – has acquired a license;
- Adobe Reader – for visualizing documents in pdf, which is one of the formats used for submitting articles; it is a freeware;

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[1] This is not necessary for all my pupils, but only for those (especially doctoral students) that want to work on specific themes. Any supplementary knowledge of pure mathematics contributes, of course, to a greater intellectual maturity.

[2] There is another book by the same author, published by the same house, which is a continuation of his "Real and Complex Analysis", entitled "Elementary Functional Analysis".

- Ghostscript and GSview – for visualizing documents in ps, another format used for submitting articles, the first one is the basis and the second one the visual interface; both can be obtained freely in the mentioned site;
- PERL – necessary for some resources of MiKTeX; it is free.

It is advisable to install Adobe Reader, Ghostscript, GSview, PERL, MiKTeX, and WinEdt (don't confuse it up with WinEdit, which is another system).

WinEdt is really excellent. It makes it much easier the generation of files in tex format.

There's an active discussion list about TeX and LaTeX, comp.text.tex.

About LaTeX there are some online references:

- "Word Processors: Stupid and Inefficient", by Allin Cottrell;
- "LaTeX: From Quick and Dirty to Style and Finesse", by Tony Roberts;
- "LaTeX2e Reference", by Tony Roberts
- "The Not So Short Introduction to LaTeX2e", by Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl; a Portuguese version is also available;
- "A Beginner's Introduction to Typesetting with LaTeX", by Peter Flynn;
- "A Simplified Introduction to LaTeX", by Harvey J. Greenberg;
- "An Introduction to TeX and Friends", by Gavin Maltby;
- "Essential LaTeX", by Jon Warbrick;
- "LaTeX Tutorials – A Primer", by Indian TeX Users Group;
- "Online Tutorials on LaTeX", maintained by Indian TeX Users Group;
- "LaTeX for Word Processor Users", by Guido Gonzato;
- "Text Processing Using LaTeX", Department of Engineering of University of Cambridge;
- "Word Processing Using LaTeX", by Tim Love and Richard Prager;
- "Advanced LaTeX", by Tim Love;
- "LaTeX Maths and Graphics", by Tim Love;
- "Short Math Guide to LaTeX", by Michael Downes;
- "Essential Mathematical LaTeX2e", by D. P. Carlisle;
- "The Comprehensive LaTeX Symbol List", by Scott Pakin.