First International Congress on Tools for Teaching Logic On-line Dictionary of Logic: System Description

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Abstract

In this paper we describe in detail the architecture of a multilingual dictionary of logic that is publicly accessible via the Internet. This dictionary was designed and implemented in the framework of the project ALFA Tools for Teaching Logic (consult the URL http://aracne.usal.es for further details about the project and for a link to the dictionary). The functional requirements of the application are: (i) the creation of a database of logical terms, (ii) the translation of logical terms into different languages, (iii) the remote access to the application via the Internet using a web browser and (iv) the software uniqueness and an easy system administration. The application was designed in such a way that both the number of logical terms and the number of languages could be dynamically incremented. Nowadays, the dictionary contains more than 500 terms and offers translations into Basque, Catalan, Dutch, English, German, Italian, Portuguese and Spanish. For building the database, we started from a list of English words provided by the English partners of the project. The rest of partners performed the translation into their own languages. Finally, it is worth mentioning that the software tool is domain-independent. Therefore, it could be used to create multilingual dictionaries for disciplines other than logic.

1 Architecture of the dictionary

The application was developed using the WWW (World Wide Web) technology [1], which is currently one of the most used models in distributed systems. In the WWW technology, applications are formed by (i) a part that contains the data, which is stored and managed in the server; (ii) a part of local processing or client application; and (iii) a part of graphical user interface, which is locally executed using a browser. In our case, the database stores the logical terms

of the multilingual dictionary. The access to the data is performed through the connection to a relational database management system that is located in a server that is permanently connected to the Internet and that acts as server of the application. The data model of the application was de…ned following the entity-relationship model [2]. This model is usually used as conceptual model in the design of information systems [5, 8]based on relational database management systems which are queried with the standard SQL (Structured Query Language) [3]. In particular, every logical concept was represented by a unique identi…er and a concept descriptor; every language was represented as a set of logical terms; every logical concept is related to one or more terms of a same language, and every term has a unique meaning in order to allow the translation into di¤erent languages. The client application is in charge of modifying and consulting the contents of the dictionary of logical terms through the direct access to the database. The communication between the client application and the server is performed, through the Internet, using the application programming interface JDBC (Java Database Connectivity) [4, 6]. JDBC is the standard for accessing relational databases in development environments based on the Java programming language. The only information about the server that the client application knows is its IP (Internet Protocol) address and the service port. This way, the access to the database of logical terms is totally transparent to the user. Therefore, the WWW architecture allows to share a same database of logical terms among several users and allows to create alternative dictionaries distributed in the network. This means that each dictionary is physically located in a di¤erent server in such a way that we can de…ne dictionaries that are specialized in di¤erent areas of logic and are maintained by di¤erent groups of users. The implementation of the client application is a Java applet [7] which is executed locally. Users download this applet from the server, when they are connected to the web page of the dictionary, with a browser able to execute Java applets. Users have to introduce their identi…er and their password before starting the connection between the applet and the database server. The kind of operations that users can perform on the dictionary database depends on the permissions they have. The server is in charge of managing permissions. Once a user is identi…ed, it communicates the operations that this user can perform. In particular, permissions are needed for modifying, inserting and eliminating logical terms. Consulting terms is allowed to all the users. The application o¤ers a di¤erent graphical user interface for every operation. Such an interface is uniform and was designed to give to the users a fast and user-friendly access to the dictionary of logical terms.

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References

[1] T. Berners-Lee. Information Management: A Proposal, 1989. Available at http://www.w3.org/history/1989/proposal.html.

[2] C. J. Date. An Introduction to Database Systems. Addison-Wesley, 7th edition, 1999.

[3] C. J. Date and H. Darwen. A Guide to the SQLStandard. Addison-Wesley, 1997.

[4] G. Hamilton, R. Cattell, and M. Fisher. JDBCDatabase Access with Java. Addison-Wesley, 1997.

[5] M. Page-Jones. The Practical Guide to Structured Systems Design. Prentice-Hall, 1988.

[6] G. Reese. Database Programming with JDBCand Java. O'Reilly, 1997.

[7] G. Steele, J. Gosling, and B. Joy. The Java Language Speci…cation. Mc Graw-Hill, 1997.

[8] E. Yourdon. Modern Structured Analysis. Yourdon Press Computing Series, 1991.