Chapter IV
Practical Case Study of a Web-Based Tutor Payment System

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ABSTRACT
The emerging use of object-relational databases with Web technologies has only recently begun. This chapter discusses a practical realization of an application using this technology. The aim is to show readers how to construct a full application from a design using object-oriented features up to the implementation. In this chapter, we highlight important or difficult stages with an emphasis on the mapping of object design into Oracle 8i and the use of stored procedures with the extended features for objects manipulation of Oracle 8i. This enables developers to construct professional Web applications achieving a high modularity and evolution capacity with an accelerated development phase in comparison with the traditional approach.

INTRODUCTION
This chapter is dedicated to the study of a practical case. We will show a way of implementing a Web-based application using an object-relational database. To
justify the use of an object-relational database rather than an object-oriented
database or a relational database, it is important to take into account the constant need
of companies to produce faster applications. The object-oriented model with its
characteristics of modularity, reusability, and extendibility, and its ability to stay the
nearest as possible from the real world, is very suitable for these requirements.
However, object-oriented databases are still not widely deployed and most compa-
nies want to be able to use the object technology without having to change their
database systems. Moreover, because developers know relational systems very
well, applications may be developed faster. This is the reason that we chose a system
combining the advantages of relational and object-oriented features. We chose
Oracle 8i. Since version 8, Oracle has provided some object functionalities, such as
objects, ref types, collection types, nested objects, etc. This new era of DBMS
(Database Management Systems), where relational DBMS is enhanced with some
object-oriented features, is often known as Object-Relational DBMS (Stonebraker &
Moore, 1996). Consequently, database design using object-oriented modeling
needs to be transformed into an object-relational database schema for implementa-
tion (Rahayu and Chang, 1993).

In this case study, the Web part of the application is implemented using PHP
(McCarty, 2001). This allows us to demonstrate the use of a scripting language to
access a database and present the information to users. PHP has also been chosen
as much for its ease of use as for its ability to demonstrate how to use a language
combining presentation and logic facilities. The implementation of the database and
the way to construct queries are also explained and demonstrated using PL/SQL
(Urman, 1997).

The rest of this chapter is organized as follows. Firstly, we describe the case
study and the database design. This is then followed by the implementation
architecture. The database layer implementation using the transformation methodo-
logy is later described. The components of the two logic layers, the database and
the application logic respectively, are then detailed, as well as the presentation layer.
Finally, some discussions and conclusions are given.

**TUTOR PAYMENT SYSTEM: A CASE STUDY**

In this section, we briefly describe a tutor payment system, and the design
aspect of the system, using an object-oriented modeling.

**Problem Descriptions**

The case study is an online tutor claim system, which allows casual tutors to
submit claims of payment for their work. This payment claim is done fortnightly as
the payment in the Australian University system is carried out every fortnight. The
casual tutors are students, mostly postgraduates hired by a university department for
each subject in each semester. They will help lecturers in their work, doing marking,
labs, tutorials, and consultations.
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