# ROLE MODEL DESIGN AND IMPLEMENTATION
# USING A SET APPROACH

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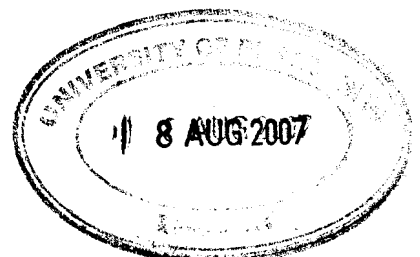
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# Role Model Design and Implementation Using a Set Approach

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The object-oriented paradigm enables a direct mapping from real world entities to analysis, design and implementation. However, the role concept is relatively new to the object-oriented paradigm. Existing object-oriented methodologies generally resort to graphical notations for role descriptions. This approach to role representation suffers two drawbacks. First, it is ambiguous. Second, the dynamic aspects of roles cannot be effectively captured. Moreover, existing object-oriented programming languages do not support the role concept.

In this work, we focus on role model design and implementation using a Set Approach to complete system development process. The set notation provides facilities to specify clearly and unambiguously all static and dynamic aspects of a system being modeled. In the design stage, we propose five design structures, including role binding and unbinding, roles of roles, role specialization, role composition, and role specification.

The proposed design structures have been applied successfully to implement a sample system called University System. The University System concerns a set of person intrinsic objects. Each person intrinsic object may take on one or several roles simultaneously from a set of roles. In addition, any of these roles may be acquired or discarded dynamically. In implementing the University System, The Microsoft Visual C++ is used as the programming language because of its standardization. The Class/Role Structure model is used to specify formally data structure of classes and roles involved in the system. The Object-Z** model is used to specify all the class/role methods and instance methods of the classes/ roles involved in the system.