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Tangible and Beneficial Course Objective and Teaching Materials Proposed For Management- and Information Science-Oriented Students[1)]

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1. Introduction

We present innovative approaches in teaching software application development to the students who major management and information sciences in undergraduate schools, and the students who major information systems in graduate schools.

Conventional lectures and practices for those students are apt to have either “programming technique-biased”, “information technique-biased” or “management-biased” tendencies, depending on the lectures’ majors themselves. In other words the teaching methods in software development courses have been relied on neither on the proper characteristics of software development per se nor the socio-technical needs of software from clients and society. The students should be able to deal with both business model construction and management information system development equally well. What do the efficient and effective teaching methods look like to get the students to understand how to make a business model that meets a company’s strategy and requirement systematically, efficiently, fast and within a limited period of time and a limited budget?

To this end, we make full use of methodology both in business model construction and in management information system development. We have selected NetBeans IDE (Integrated Development Environment) in Java platform for software development and UML (Unified Modeling Language) for business modeling. The characteristic feature of NetBeans and UML are their visualizing capability of the model structure and the system architecture, and their operability based on their object-oriented programming concept and its methodology. As the objects on such a platform could we design screens and their sequences modularly and visually that deal with those data and procedures pertaining to and traversing to organizational sections in business models.

2. Basic Concepts

Software development is carried out with the knowledge of programming and business management. The former requires a lot of rigorous and logical thinking, whereas the latter deals with the complexity of the underlying business concerned. In order to facilitate those knowledge and skills, we need to vividly show the students the depth and rigor of abstract thinking and complex logic, and the importance of a lot of practices. The core of our innovative teaching is "design abstraction and complexity." Design is to visualize managing complexity and those works require a lot of practices.

In practical situations, however, such as in our class rooms and in our laboratories, it is extremely difficult for the students to deal with software development problems mentioned above. Still it should be possible with our proper and patient guidance that the students move to higher levels of abstraction by practicing and experiencing design problems as comprised of subdivided pieces, if necessary, yet visual and self-contained and concrete systems that they build by themselves.

In our courses we exploit our tools that deal with the basic components of our business model and our system architecture where we manipulate designing screens and their sequences modularly and visually as objects. Our visual works are carried out with NetBeans IDE (Integrated Development Environment) on Java platform. One of the good frameworks to facilitate the visual modeling is UML (Unified Modeling Language).

3. Course Objectives

We present the case studies of the courses of two schools that the present authors are in charge of: Graduate School of Engineering and Department of Management and Information.

✧Graduate Schools
Department of Information Systems, Graduate School of Engineering,
Northeastern University.

For the sake of discussion, the following course in particular relevant to our undergraduate courses is elaborated. The course covers how to leverage object-oriented techniques as well as user interface design principles to engineering multi-role business applications. Students learn how to incorporate such features as configuration management, user administration, and role-based-access control.

Course: **Application Engineering and Development (2008-2010)**
< Objective >
The students develop a complete application, no matter how small the scale is, useful for an end user. The activities include design and programming.

✧Undergraduate Schools
Department of Management and Information, School of Economics,
Hokusei Gakuen University.

Courses (2009-2013)
■ **Software Development I (Junior: 1st semester)**
■ **Software Development II (Junior: 2nd semester)**

< Objective >
Management Information System development on Java IDE with Unified Modeling Language (UML) plugged in
--- Business Model and Object-Oriented Programming ---

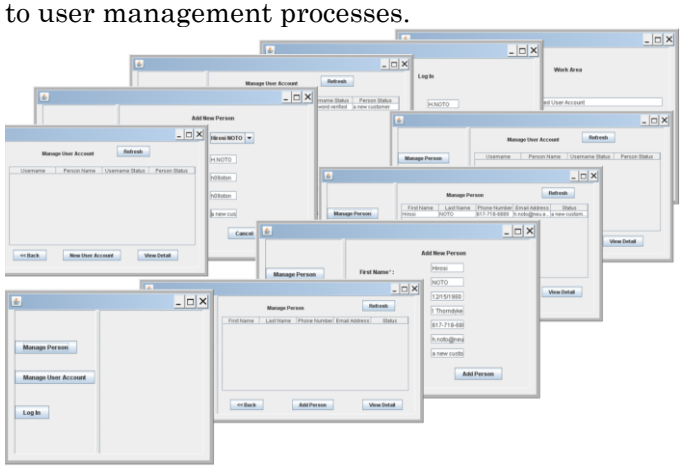
■ **Application II (Senior: 2nd semester)**
< Objective >
Web Application on Java Platform with Unified Modeling Language (UML) plugged in
--- Business application with Enterprise Java Beans (EJB) and MVC(Model-View-Controller) Framework ---

4. Contents and Teaching Material

We present one example of contents and teaching materials in our graduate school and our undergraduate school. Throughout the course dealt with are the items on the portal site for sales persons and sales managers in business as the examples of teaching materials and the problems for the students. In the Table below business related items and their object realization in Java programming are shown.

Business-related	Java programming or Object
Catalog, Account	Directory
Multi role	Categories
Business Model	Hierarchical structure
Screen	Interface, Modularity
Navigation of	Object model, Relationship
Work area	Event, Sequence of Screens
Role of processes	Use Case
Real time	Dynamical plug-in

Displayed below is the prototype of our User Management System, where we design screens and manipulate their sequences corresponding to user management processes.



5. Management of Class and Laboratory

For the students to learn earnestly with their concentration in the class room and to get down to the problems vibrantly with enthusiasm in the laboratory, special attention should be paid to running and managing the classes and laboratories of "Management and Information Development" courses. Itemized in the present talk are important remarks according to each category.

[1] H.NOTO,Hokusei Review, The School of Economics (Hokusei Gakuen University), Vol.53, No.2, March 2014 (to be published).