

A Sharable JAVA Class Library for E-Learning

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Abstract: In this paper, we define a sharable JAVA class library for e-learning which helps develop flexible e-learning courses with the ability of interaction between client side and server side. Also we refine SCORM by absorbing the spirit of Component-based software engineering which let the course developers benefit by reuse of JAVA class.

Keywords: asset, e-learning, OO, reuse, SCORM

Introduction

When we discover SCORM, we find a problem of being unable to develop a course with the ability of interaction between client side and server side. We solve the problem by introducing the new plug-in asset, JAVA class.

Pressman (2001) indicated that substantial business benefits can be derived from aggressive software reuse. Product quality, development productivity, and overall cost are all improved. Therefore, we define a sharable JAVA class library for e-learning which helps develop flexible e-learning courses and reuse JAVA class.

1. Sharable JAVA Class Library

The sharable JAVA class library is shown in Fig.1. In the SCORM-compliant runtime environment, we refine and add two new units, Sharable Class Library and Class Library Management System (CLMS), which perform the function of the reusability of JAVA class. The Class Library Management System handles basic operations of this database table and the import/export of the plug-in. If someone wants to import a course module zip file with plug-in asset inside to e-learning course repository, Learning Content Management System (LCMS) will first verify the format of the zip file. If the format is correct and the plug-in can be shared, Class Library Management System will validate the XML file of the plug-in and then put the description of the plug-in defined in TABLE 1 into the Sharable Class Library. The plug-in will be copied to the web application runtime library and the help document of it will be placed to a definite directory for storing all the help documents of sharable plug-ins.

We define the description of the plug-in asset shown in TABLE 1. This description is the kernel of sharable JAVA class library and independent of any learning management system. The course developer can search for a suitable reusable JAVA class and download it for reuse by means of the description of the plug-in asset. Then the developer can design a course with the ability of interaction between client side and server side.

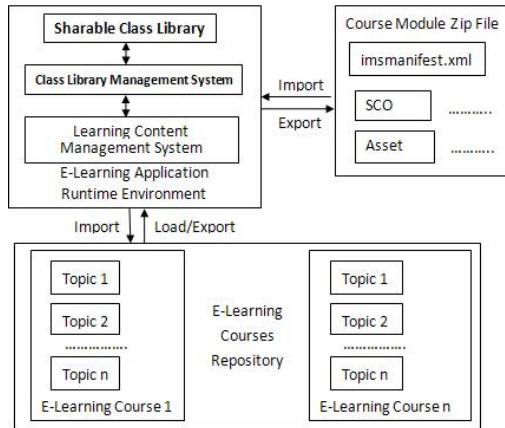


Fig.1 Sharable JAVA Class Library

TABLE 1 the description of the plug-in (an XML file)

Essential Description	Example value
plug-in author	C.F.Hsiao
plug-in type	JAVA class
package	math.function
help document	FunctionGraph.htm
plug-in keyword	JAVA, math, function
plug-in subject	e-learning
plug-in name	FunctionGraph.class

2. The UI of the Sharable JAVA Class Library

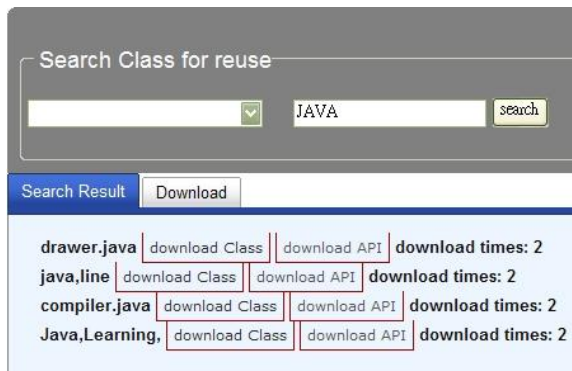


Fig.2 the UI of Class Library

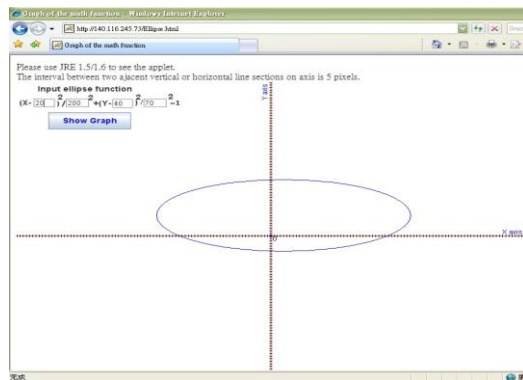


Fig.3 the example course

3. Conclusion

We conclude that the ability to reuse JAVA class is important to help course developer utilize the benefit of OO (Object Orientation) and incorporate JAVA technology in the design of the e-learning course. Davies (1999) predicts that the production of teaching material may be farmed out to technicians, which our sharable JAVA class library for e-learning paves the way for.

References

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