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BRIDGING BETWEEN PROGRAMMING EXERCISES FORMATS WITH BABELO

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Assessment plays a vital role in learning. This is certainly the case with assessment of computer programs, both in curricular and competitive learning. The lack of a standard – or at least a widely used format – creates a modern Babel tower made of Learning Objects, of assessment items that cannot be shared among automatic assessment systems. These systems whose interoperability is hindered by the lack of a common format include contest management systems, evaluation engines, repositories of learning objects and authoring tools. A pragmatical approach to remedy this problem is to create a service to convert among existing formats. A kind of translation service specialized in programming problems formats.

To convert programming exercises on-the-fly among the most used formats is the purpose of the BabeLO – a service to cope with the existing Babel of Learning Object formats for programming exercises. BabeLO was designed as a service to act as a middleware in a network of systems typically used in automatic assessment of programs. It provides support for multiple exercise formats and can be used by: 1) evaluation engines to assess exercises regardless of its format; 2) repositories to import exercises from various sources; 3) authoring systems to create exercises in multiple formats or based on exercises from other sources.

This paper analyses several of existing formats to highlight both their differences and their similar features. Based on this analysis it presents an approach to extensible format conversion. It presents also the features of PExIL, the pivotal format in which the conversion is based; and the function definitions of the proposed service – BabeLO. Details on the design and implementation of BabeLO, including the service API and the interfaces required to extend the conversion to a new format, are also provided. To evaluate the effectiveness and efficiency of this approach this paper reports on two actual uses of BabeLO: to relocate exercises to a different repository; and to use an evaluation engine in a network of heterogeneous systems.