During Object-Oriented development, developers often face the challenge of extracting classes with many responsibilities, or class complexes (also known as Blobs). Class complexes can grow rapidly, making the source code more complex and difficult to maintain. Extract Class Refactoring is a technique used to address this issue, where a complex class is split into simpler classes.

The ARIES (An Eclipse plug-in to Support Extract Class Refactoring) tool is designed to automate this process. It uses an approach based on graph theory to identify strongly related methods and extract them into separate classes. The tool computes an overall quality of the classes extracted, considering factors such as cohesion and coupling.

To use ARIES, developers must select a class to be refactored. The tool then identifies strongly related methods and creates a weighted graph where nodes represent methods and edges represent relationships between them. The tool calculates a measure of cohesion for each class and uses this to determine which classes should be extracted.

The process involves the following steps:

1. **Identification of Relationships**: The tool identifies relationships between methods using various measures. It then constructs a weighted graph to represent these relationships.
2. **Cohesion Calculation**: The tool calculates a cohesion value for each method, with higher values indicating a stronger relationship.
3. **Threshold Selection**: The tool uses a threshold to determine which methods should be included in the same class.
4. **Class Extraction**: Methods that exceed the threshold are extracted into a new class, and the process is repeated until all methods are classified.
5. **Refactoring**: The tool assists in refining the extracted classes, ensuring they have high cohesion and low coupling.

ARIES is an Eclipse plug-in that provides support for Extract Class Refactoring operations in Eclipse. It has been shown to support Extract Class Refactoring through a three step wizard, allowing software engineers to easily identify and extract classes with many responsibilities.

In conclusion, ARIES is a valuable tool for developers looking to improve the quality and maintainability of their code by automating the process of extracting complex classes into simpler, more manageable components.

**References**: [1-16]
only cohesion and coupling as the main indicators of class quality in this context. Hence, Blobs are usually outliers or classes having a quality much lower than the average quality of the system under analysis [9]. The identification of Blobs in ARIES is based on such a conjecture. In the second step of the wizard, the software engineer has the possibility to further analyze a candidate Blob and get insights on the different responsibilities implemented by analyzing its topic map, represented as the five most frequent terms in a class (the terms present in the highest number of methods). For this reason, the topic map is represented by a pentagon where each vertex represents one of the main topics. Once a class that needs to be refactored is identified, the software engineer activates the last step of the wizard (shown in figure 2) to obtain a possible restructuring of the class under analysis. ARIES reports for each class that should be extracted from the Blob the following information: (i) its topic map; (ii) the set of methods composing it; and (ii) a text field where the developer can assign a name to the class. The tool also allows the developer to customize the proposed refactoring moving the methods between the extracted classes.

In addition, ARIES offers the software engineer on-demand analysis of the quality improvement obtained by refactoring the Blob, by comparing various measures of the new classes with the measures of the Blob. When the developer ends the analysis, the extraction process begins. ARIES will generate the new classes making sure that the changes made by the refactoring do not introduce any syntactic error. A video of the tool is available on Youtube.1

REFERENCES


1http://www.youtube.com/watch?v=csNhgJlhH8