DESIGNING A MODULAR QUERY ASSESSMENT PROCESS FOR STRUCTURED QUERY LANGUAGES

By

Andama, Allen Benedict
Flores, Jeshurun Ray
Parcon, Kennet Ralph

SCHOOL OF ARTS AND SCIENCES
ATENEO DE DAVAO UNIVERSITY

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by

Andama, Allen Benedict
Flores, Jeshurun Ray
Parcon, Kennet Ralph

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ABSTRACT

Structured Query Language, or commonly known as SQL, is the most used query language in accessing, retrieving and manipulating Relational Database Management Systems. SQL is also the most common language being embedded in Application Systems in accompanying its Database Systems. Hence, tertiary departments of the academic institution with IT curriculum teaches introduction to advanced level in writing SQL queries. The proponents have come to the direction of studying the assessment of SQL queries. In the evaluation of student-submitted SQL queries, professors are given the gauge of ensuring the learning level of their students.

Keywords:

Computer Assisted Learning and Assessment, SQL, Query Equivalence, Query Assessment, Query Formulation, Structured Query Languages

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Structured Query Language (SQL) is a standard interactive and programming language for getting information to and from a database. Constructing database queries in SQL is one of the most essential skills that software developers must have, since the concept of using databases is already at a high degree. Databases are prevalent in many business applications providing assistance in the business' transactions.

This study primarily focused on SQL query assessment. It examined the difficulty in a detailed assessment of queries and setting rubrics for the assessment.

1.2 Statement of the Problem

Since there is difficulty in evaluating students' skills in devising useful SQL database queries, a proper assessment tool, equipped with an efficient query assessment process, is required. Therefore, the proponents addressed the following issues:

How can instructors assess the correctness of SQL queries?

- How will correctness be identified?
- How will correctness of a query be verified?

- Is it possible to specifically identify and note the query's errors?

How should the modular assessment tool be designed?

- How should the assessment process be modularized?
- What will be the basis for the assessment of specific SQL queries?
- What are the existing developments on the area of SQL Assessment?
- What are the problems and issues concerning existing assessment tools?
- What gaps are found within the context of these existing assessment tools?
- What can be an effective and efficient solution in order to address and solve these identified gaps and issues?

1.3 Objectives of the Study

For this study, the proponents aimed to achieve the following objectives:

- Develop an efficient and accurate assessment process for SQL
    - Analyze and implement a suitable analysis that will fulfill the assessment's functionality
    - Construct realizable rubrics for the basis of assessment
    - Identify input and output schemes and mechanism for the development of the assessment tool

- Guide instructors in the detection of erroneous SQL queries brought about by the assessment process
    - The assessment tool must be able to detect user errors and insufficient solution
- Perform an acceptance test of the designed modular assessment methods
- Identify existing developments on the area of SQL Assessment
    - Site important problems and issues found in existing SQL assessment methods
    - Identify existing gaps in query assessment methods
    - Define an effective and efficient solution that could resolve these gaps and issues

1.4 Significance of the Study

This study is significant for developers. Students will be able to practice their skills in constructing SQL database queries, and receive immediate feedback on the validity of their solution. On the other hand, professors will have reduced marking, as the tests are assessed by an application. Not only will this study help professors save time, but also in the consistency of checking the queries made by the students.

Existing assessment tools assess queries on a yes/no basis. A tiny error in the query will immediately return a zero on the query's assessment without notice of the specific error. In that case, the assessment process does not give its true purpose and is simply a simple query compiler.

Through this study, the proponents addressed the issue of compiler-like assessment of queries and produce a more elaborate assessment of the former. With a more elaborate assessment of queries, students may be able to see the specific errors and correct it. Furthermore, there will be a fairer assessment of the queries and the different aspects of the query (i.e. syntax, output) will be considered.

By considering SQL assessment tools to be a partial need especially for database management course professors, designing an efficient and comprehensive assessment process would be helpful in contributing to the same field of assessment technologies.

1.5 Scope and Limitations of the Study

The assessment method created in this study assesses the correctness of queries submitted by students. The queries submitted are assessed by correct syntax and may also be compared to a rubric given by the professor. In addition, an answer key query is to be provided as reference for the assessment of a students' query.

The assessment process will return its assessment of the query or queries and will be given a rating and the description of this rating. If the query has errors, the error and its description will also be returned. The final rating will be given by the professor, but a default rating will be provided by the assessment process. A set of rubrics prepared by the professor is to be added and used in evaluating the submitted query. The following is the basic rubrics for assessment:

- Correct and executable SQL Syntax
- Correct application of clauses (i.e.: WHERE, GROUP BY, and the like)
- Correct output
    - Correct selection of tables
    - Correct selection of columns

This study focused largely on the assessment of student-made queries for easier and faster checking of professors. This study has no particular target platform but is tested using MySQL.

1.6 Definition of Terms

a. Algorithm – a mathematical rule or procedure for solving a problem
b. Assessment – essentially a measurement process of the learning that has either taken place or can take place
c. Database – a collection of data organized for rapid search and retrieval by a computer
d. Grammar – systems, rules, or underlying principles that describe the structure of the language
e. Heuristic – a computational method that uses trial-and-error methods to approximate a solution for computationally difficult problems.
f. Pedagogical – indicates that what is being described is related to the practice of teaching. In the context of educational technology, it is the range of methods for teaching in multimedia and/or distance learning environments.

g. Query – a search request submitted to a database to find a particular piece of information or all records that meet the search criteria

h. Rubrics – a set of categories that define and describe the important components of the work being completed, critiqued or assessed

i. Syntax – the rules of a language which determine what is and is not acceptable to the compiler