



Title : Development of Grader System for Data Manipulation Language

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Type of presentation* (choose 1) : Oral Presentation (เฉพาะ ตัวแทนนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
 Poster (กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
 Cooperative Education (กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

Traditionally, grading of SQL and NoSQL queries relies on manual grading, a time-consuming and error-prone process. To address these challenges, this research introduces an automated grading system for SQL and NoSQL queries. The system employs tokenization and parsing to meticulously analyze query structures, functions, and conditions, then compares student submissions with the solutions provided by the instructor.

A standout feature is its partial scoring capability, which awards points for each correctly written segment of a query. This approach not only enhances fairness but also encourages deeper conceptual understanding. In the SQL module, the system validates correctness of commands such as SELECT, FROM, WHERE, GROUP BY, HAVING, and ORDER BY. For the NoSQL module, it supports functions like find and aggregate and evaluates operators

including \$eq, \$gt, and \$lt. This comprehensive method allows for flexible grading while offering immediate, detailed feedback on errors.

In addition, the system includes robust functionalities for assignment creation, and performance reporting. Instructors can efficiently create and manage assignments, define grading criteria, and review student progress. Meanwhile, students benefit from real time feedback on their submissions, enabling them to quickly identify and correct mistakes. Developed with Django for the backend and React for the frontend and leveraging PostgreSQL and MongoDB for structured and unstructured database.

Test results show that the system significantly reduces instructors' workload, accelerates feedback delivery, and effectively aids students in understanding and rectifying errors. As a result, it enhances database education quality whether in relational or non-relational systems, improving learning experiences in the digital era.