



## Database System Development Life Cycle (DSDLC) on System Libraries for Data Manipulation Language (DML) Using SQL Server 2008

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### ABSTRACT

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Database System Development Life Cycle (DSDCL) is a method in database development. While the database language used to modify and retrieve data in a database is Data Manipulation Language (DML). The DML that is often used is Structured Query Language (SQL) which is used to search and manipulate data in relational databases. SQL consists of simple syntax in the form of commands to manipulate data, these commands are called queries. The query language is used in implementing the Library System database using SQL Server 2008 RDBMS. The first step before performing DML using the query editor, must have a database and data that has been implemented with SQL Server 2008. In this discussion, only 4 (four) DML statements are explained, namely select, insert, update and delete by using the Library System database with SQL Server 2008 RDBMS. The select statement is used to display data from a table (1 or more) in the database. Update is used to make changes to data in tables in the database. Insert is used to fill in data and delete is used to delete data in tables in the database.

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### 1. Introduction

Database Management System (DBMS) is a collection of data that is integrated with each other and categorized in a table or several tables and an application program that regulates how to access the data. [1] This collection of data is usually known as a database (database). [2] The main purpose of a DBMS is to provide a way to store and retrieve information in the database quickly. [3] The database is an integrated collection of data, [4] which are integrated with each other which are stored in tables in a DBMS that is organized to meet the needs of end users in a company. [5][6]

In a relational database, [7] data is stored in the form of relations or two-dimensional tables and between tables with one another there is a data relationship. [8] The function of an RDBMS is not only to create tables, fill in data, modify and delete data. For data management on a large scale and in order to support sustainable and real-time business processes. [9] An RDBMS is ensured to have capabilities in user management and data security, data backup and recovery and other capabilities related to data processing speed. [10] [11] SQL Server 2018 is a new breakthrough in Microsoft's database development field. [12] SQL Server is one of the DBMS (Database Management System) created by Microsoft to perform data processing in the business world and industry in competitive database management such as IBM and Oracle. [13] SQL Server supports SQL as a language for performing data searches (queries) in existing tables in the database. [14] Microsoft SQL Server can be used in the world of business, education or government as a database solution or data storage. [15]

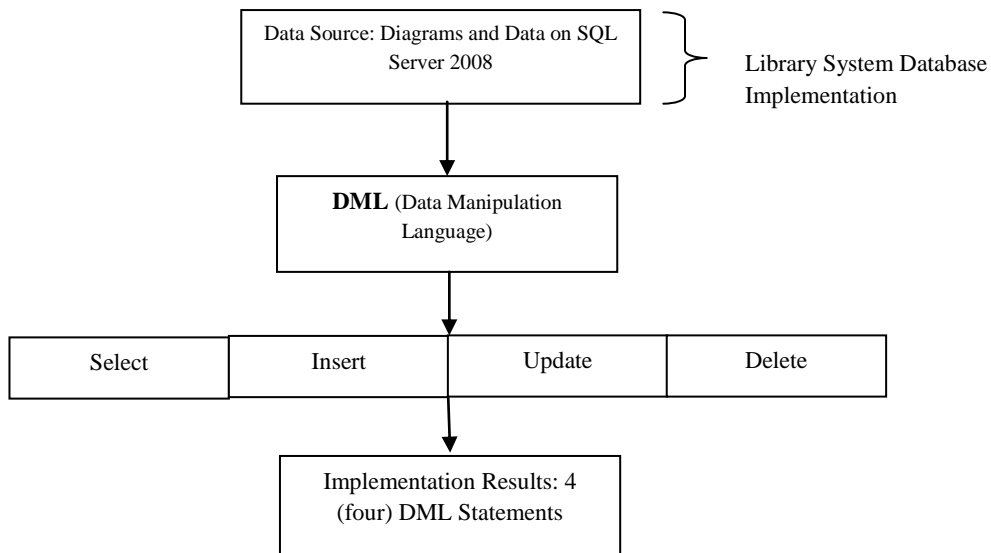
SQL (Structured Query Language) is basically a standard computer language defined for accessing and manipulating database systems. [16] A database contains one or more tables that have a different name for each table. Queries are used to access and process the database. [17] SQL consists of 5 (five) parts, namely data retrieving, data definition language (DDL), data manipulation language (DML), data control language (DCL) and data transaction language (DTL). [18] Based on the explanation above, this study discusses how to perform Data Manipulation Language (DML) using a query editor for a library system database that uses



SQL Server 2008 RDBMS. Implementation is based on diagrams and data that have been created. Implementation of DML with queries in the query editor in SQL Server 2008 consists of 4 (four) DML statements, namely Select, Insert, Update and Delete.

**2. Methodology**

In collecting data and facts in conducting this research, literature study obtained from the literature of books and journal publications relevant to the problem to be discussed. Database System Development Life Cycle (DSDLC) is a method in DML development which includes the stages of database planning, system definition, requirements analysis and gathering, database design, database selection, application design, prototype, implementation, data conversion, operational testing and maintenance. [19] In this study, it is only limited to the database implementation stage only on 4 (four) DML statements, namely select, insert, update and delete using SQL Server 2008. The following is a framework which represents the steps taken in implementing DML for a library system database. performed using SQL Server 2008 RDBMS.



**Fig 1.** Framework

The picture above explains that in implementing 4 (four) DML statements with the Library System database into SQL Server 2008. The initial stage is to obtain the source diagram data (tables and data) from the Library System database. After that, the implementation of DML is carried out using SQL Server 2008 RDBMS using a query editor with DML statements of select, insert, update and delete. The data source is obtained from the Library System database which consists of 5 (five) tables namely Members, Books, Authors, Publishers, Borrows and Returns as shown in the following Fig.

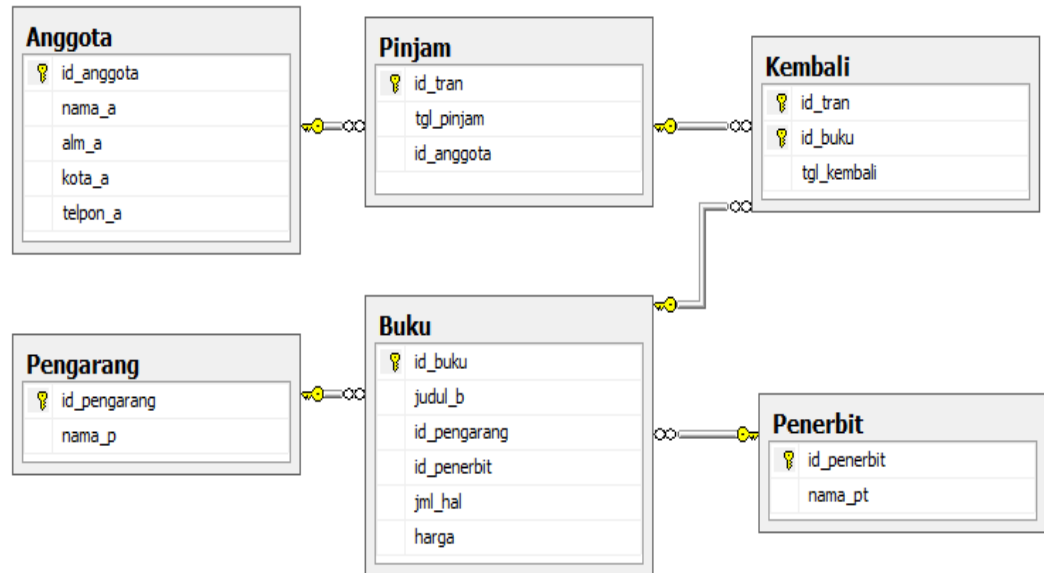


Fig 2. Library System Diagram

The data from the 5 (five) tables above in the Library System database are as follows:

**Table 1.**  
Data on the Members table

id_anggota	nama_a	alm_a	kota_a	telpon_a
a0002	Chairi Itda	Jl. Banyu Urip Raya No. 12	Jakarta Timur	021-7612322
a0004	Dewi Restuti	Jl. Cempaka I No. 1	Jakarta Pusat	021-5123211
a0011	Joni Wijaya	Jl. Perjuangan 1 No. 11	Jakarta Pusat	021-4545677
a0033	Wawan Budiman	Jl. Cendana II No. 1	Jakarta Selatan	021-7671112

**Table 2.**  
Data on Book table

id_buku	judul_b	id_pengarang	id_penerbit	jml_hal	harga
cp011	Pemrograman Mobile	pg11	pt11	237	78000
cp022	Perancangan DatabaseSQL Server 2008	pg33	pt11	132	90000
cp033	Pemrograman Multimedia	pg11	pt22	155	89000
cp044	Visual Basic Dot Net	pg22	pt33	211	110000
cp055	Pemrograman Java	pg22	pt22	167	75000

**Table 3.**  
Data on Author and Publisher table

id_pengarang	nama_p	id_pengarang	nama_p
pg11	Didik Setiyadi	pg11	Didik Setiyadi
pg22	Lintang Bagaskara	pg22	Lintang Bagaskara
pg33	Ghasan Randityo	pg33	Ghasan Randityo

**Table 4.**  
Data on the borrow and return table

id_tran	tgl_pinjam	id_anggota	id_tran	id_buku	tgl_kembali
t0001	2014-12-15	a0011	t0001	cp011	2014-12-21
t0003	2014-12-22	a0033	t0001	cp033	2014-12-22
t0011	2014-12-27	a0004	t0003	cp022	2014-12-26
t0022	2014-12-16	a0002	t0003	cp055	2014-12-25
			t0011	cp033	2014-12-29
			t0022	cp044	2014-12-20

### 3. Result and Discussion

#### 3.1. DML Select statement

In retrieving data from tables in the database, SQL provides a select command to access data. The following is an example of using the query syntax for select.

- a. Select command from 1 (one) table.

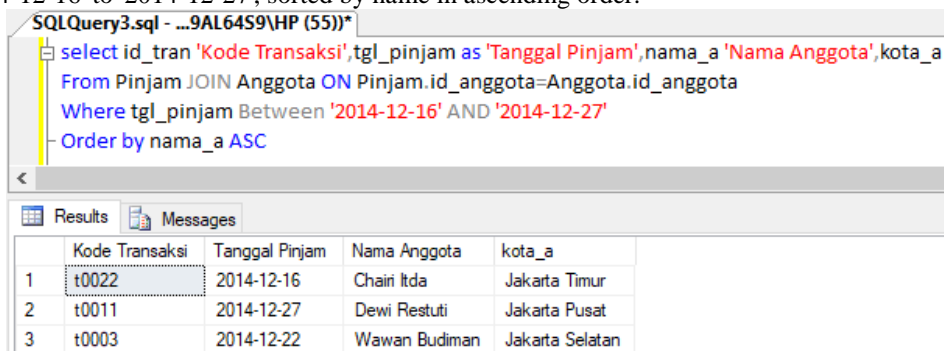
Displays data from the Members table, for all columns, where the member city is West Jakarta, sorted by name in Descending.



**Fig 3.** Select from 1 (one) table

- b. Select command from 2 (two) tables.

Displays data from the Members and Borrowing table, id\_tran becomes 'Kode Transaksi', tgl\_pinjam becomes 'Tanggal Pinjam', nama\_a becomes 'Nama Anggota', kota\_a, where borrow\_date is between '2014-12-16' to '2014-12-27', sorted by name in ascending order.



**Fig 4.** Select from 2 (two) tables

#### 3.2. DML statement Insert

There are 2 (two) forms of Insert sentence statements, namely the first form of Insert which allows a single row to be inserted into a table and the second form of Insert, which allows multiple rows to be copied into one or more tables at once.

a. First form Insert

This insert statement is to insert data in the Members table for all columns and certain columns.

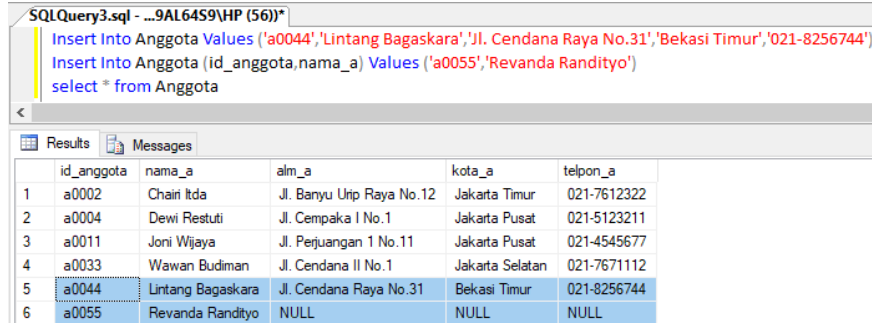


Fig 5. The first form of insert

b. The second form Insert

This insert statement is to insert data in the MembersNew table that has been created and then fill in the data from the Members table for certain columns.

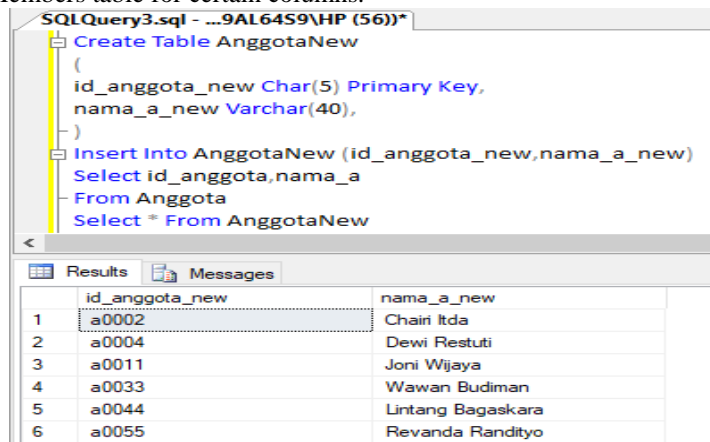


Fig 6. Insert data MemberNew from table Members

3.3. DML Update Statement

The Update sentence allows us to modify one or more column values for existing table data



Fig 7. Update data Anggota lebih dari 1 kolom

3.4. DML statement Delete

The Delete sentence allows us to delete one or more records in a table in the database.

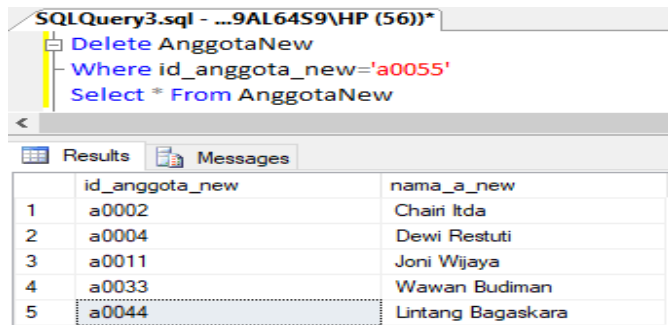


Fig 8. Delete certain rows (records)

#### 4. Conclusion

Based on the results of SQL implementation using the query editor in SQL Server 2008 from the DML select, insert update and delete statements from the Library System database that have been carried out, several conclusions can be drawn:

- The implementation of DML statements using SQL Server 2008 RDBMS can be run based on the data and structure of the Members, Books, Publishers, Authors, Borrow and Return tables that have been created as the basis for performing DML (select, insert update and delete).
- In the DML Select statement we can retrieve data from 1 (one) or more existing tables with various desired criteria.
- In the DML statement, insertion can be done by filling data into the desired record in the table by filling in data for all columns or certain columns.
- In the DML statement, updates can be made by changing the data in one or more columns for which data changes will be made.
- In the DML delete statement, you can delete data from certain records based on the where criteria or delete all records to be deleted.

#### 5. References

- [1] D. Setiyadi, *Sistem Basis Data dan SQL (Structured Query Language)*. Bogor: Mitra Macana Media, 2020.
- [2] D. Setiyadi and D. Abdullah, *Mudah dan Cepat Belajar Database dengan SQL Server 2008*. Lhokseumawe: Sefa Bumi Persada, 2020.
- [3] W. Widodo, Agus and D. Kurnianingtyas, *Sistem Basis Data*. Malang: UB Press, 2017.
- [4] T. Aziz, E. Haq, and D. Muhammad, "Performance based Comparison between RDBMS and OODBMS," *Int. J. Comput. Appl.*, vol. 180, no. 17, pp. 42–46, 2018.
- [5] N. Jayanti, Ari, Dewi, Ketut and N. Sumiari, Kadek, *Teori Basis Data*. Yogyakarta: Andi, 2018.
- [6] J. Kachaoui and A. Belangour, "MQL2SQL: A proposal data transformation algorithm from mongoDB to RDBMS," *Int. J. Adv. Trends Comput. Sci. Eng.*, vol. 9, no. 2, pp. 2457–2463, 2020.
- [7] C. Györödi, R. Györödi, and R. Sotoc, "A Comparative Study of Relational and Non Relational Database," vol. 6, no. 11, pp. 78–83, 2015.
- [8] J. Hakim Lubis and E. Muisa Zamzami, "Relational database reconstruction from SQL to Entity Relational Diagrams," *J. Phys. Conf. Ser.*, vol. 1566, no. 1, 2020.
- [9] M. Ohyver, J. V. Moniaga, I. Sungkawa, B. E. Subagyo, and I. A. Chandra, "The comparison firebase realtime database and MySQL database performance using wilcoxon signed-rank test," *Procedia Comput. Sci.*, vol. 157, pp. 396–405, 2019.
- [10] K. Bohora, A. Bothe, D. Sheth, and R. Chopade, "Backup and Recovery Mechanisms of Cassandra Database: A Review," *J. Digit. Forensics, Secur. Law*, vol. 15, no. February, 2021.
- [11] B. Sutejo, *Sukses Sertifikasi Oracle Certified Professional (OCP) Exam 1Z0-007 @ Exam 1Z0-051*. Jakarta: PT Elex Media Komputindo, 2010.
- [12] Sourav Mukherjee, "SQL Server Development Best Practices," *Int. J. Innov. Res. Sci. Eng. Technol.*, vol. 8, no. 3, p. 8, 2019.
- [13] K. Wahana, *SQL Server 2012*. Yogyakarta: Andi, 2013.
- [14] R. Taft et al., "CockroachDB: The Resilient Geo-Distributed SQL Database," *Proc. ACM SIGMOD Int. Conf. Manag. Data*, pp. 1493–1509, 2020.

- [15] M. Nuryana and Sulistiyono, "Analisa dan Perancangan Sistem Front Office Hotel Bidakara Serang," *Protekinfo*, vol. 1, no. September, pp. 1–5, 2014.
- [16] J. Guo *et al.*, "Towards complex text-to-SQL in cross-domain database with intermediate representation," *ACL 2019 - 57th Annu. Meet. Assoc. Comput. Linguist. Proc. Conf.*, pp. 4524–4535, 2020.
- [17] M. Rigger, Z. Su, E. T. H. Zurich, and M. Rigger, "Testing Database Engines via Pivoted Query Synthesis This paper is included in the Proceedings of the 14th USENIX Symposium on Operating Systems Design and Implementation Testing Database Engines via Pivoted Query Synthesis," 2020.
- [18] E. Utami and Sukrisno, *Mengoptimalkan Query pada Microsoft SQL Server*. Yogyakarta: Andi, 2008.
- [19] Indrajani, *Database Design All in One (Theory, Practice and Case Study)*. Jakarta: PT Elex Media Komputindo, 2018.
- [20] A. Sahfitri and S. Hartini, "Metode ADDIE Pada Aplikasi Interaktif Mengenal Bagian Tubuh Manusia Dua Bahasa Untuk Anak Sekolah Dasar," *Inf. Syst. Educ. Prof.*, vol. 3, no. 2, pp. 141–152, 2019.
- [21] S. Bakhri, "Animasi Interaktif Pembelajaran Huruf dan Angka Menggunakan Model ADDIE," *INTENSIF J. Ilm. Penelit. dan Penerapan Teknol. Sist. Inf.*, vol. 3, no. 2, p. 130, 2019.
- [22] S. Anwar, F. E. Schadaw, and Althafani, "Perancangan Animasi Interaktif Pengenalan Bahasa Sunda untuk Anak - anak dengan Metode ADDIE," *J. Ilmu Pengetah. Dan Teknol. Komput.*, vol. 3, no. 2, pp. 195–202, 2018.
- [23] W. N. Cholifah, Y. Yulianingsih, and S. M. Sagita, "Pengujian Black Box Testing pada Aplikasi Action & Strategy Berbasis Android dengan Teknologi Phonegap," *STRING (Satuan Tulisan Ris. dan Inov. Teknol.*, vol. 3, no. 2, p. 206, 2018.