

CS 476
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1st December 2023

Final Project Report

Topic: My project proposal is to implement a toy SQL in OCaml. I have implemented SQL interpreter for SELECT, INSERT, UPDATE, DELETE and CREATE.

Step 1: I have created Data Types for toy SQL which has Column Type, Expression Type and Clause Type.

Then I am using the below Database:

```
let database : db = [  
  ("Customer",  
    ([ "Name"; "Age"; "Place"],  
      [ ["Alex"; "20"; "Chicago"];  
        ["Boris"; "21"; "New York"];  
        ["Catherine"; "22"; "Los Angeles"];  
      ]));  
  ("Product",  
    ([ "P_Name"; "Quantity"],  
      [ ["T-Shirt"; "1"];  
        ["Jeans"; "2"];  
        ["Shoes"; "3"];  
      ]));  
]
```

Step 2: I have defined the AST for the SELECT, INSERT, UPDATE, DELETE and CREATE queries.

Step 3: Then I have created functions for eval_expr, eval_clause and printing the contents of the table.

Step 4: Now I have created functions:

eval_select: filtering rows based on the WHERE clause and selecting columns.

eval_insert: adding a new row to the specified table.

eval_delete: removing rows from the specified table based on the WHERE clause.

eval_update: modifying rows in the specified table based on the WHERE clause and SET clause.

eval_create_table: adding a new table to the database.

Step 5: I have involved test cases for each type of queries and demonstrates the evaluation of these queries on a toy database. The results are then printed to the console.

Challenges:

- 1) It was hard to match the dimension of my database.

- 2) It was challenging code the functions for all five queries because I couldn't get the desired output. Then `List.combine()` helped me combine two lists element-wise into a list of pairs. Its type signature is `('a list -> 'b list -> ('a * 'b) list)`.

Output with test cases:

```
● snehathakur@Snehas-MacBook-Pro downloads % ./output
Catherine, 22

Alex, 20, Chicago
Boris, 21, New York
Catherine, 22, Los Angeles
Diana, 23, San Francisco
Insertion into DB successful!

Boris, 21, New York
Catherine, 22, Los Angeles
Deletion from DB successful!

T-Shirt, 100
Jeans, 2
Shoes, 3
Updated the DB successful!

Account_No, Branch, Balance
Created a new table in DB successful!

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```