



What is our GOAL for this CLASS?

In this class, we learnt about differences b/w SQL and NoSQL databases, learnt about a few basic queries in SQL and performed a SQL Injection.

What did we ACHIEVE in the class TODAY?

- Introduction to SQL
- Differences b/w SQL and NoSQL databases
- Select query with where clause and boolean operators
- SQL Injection

Which CONCEPTS/ CODING BLOCKS did we cover today?

- SQL
- SQL Injection



How did we DO the activities?

Activity:

1. We discussed about some of the key differences b/w SQL and NoSQL databases

SQL Database	NoSQL Database
SQL databases are table based. Different tables are created for different data.	NoSQL databases are JSON based. Usually it's key-value pairs.
SQL databases strictly rely on relations. This means that that data is present in separate tables with a relation between them.	NoSQL databases do not use relations.
SQL databases have structured predefined schemas. All the columns in a particular table define the data type of all the data.	NoSQL databases do not have schemas and are not structured. You can have as many key-value pairs with any data type you want to use.
SQL databases are better with multi row based structured data.	NoSQL databases are better for JSON like or unstructured data.
Example - PostgreSQL	Example - Firebase

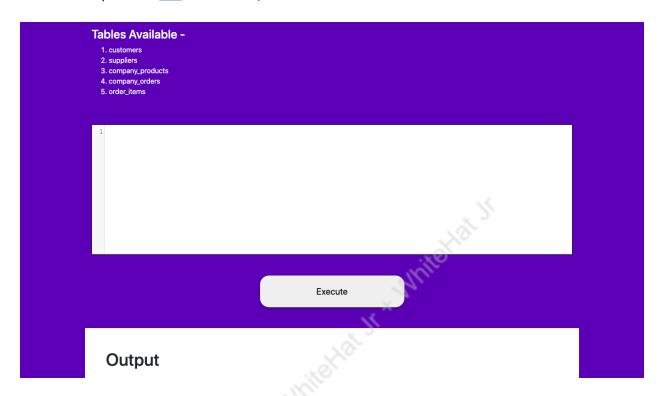
- 2. We discussed **DBMS Database Management Systems** and why they are important. It can be used for
 - a. Creation of a database
 - b. Retrieval of information from the database
 - c. Updating the database
 - d. Managing the database
- 3. SQL is a database language **Structured Query Language.**
- 4. SQL databases are usually in the form of Tables, consisting of rows and columns. Columns are usually the kind of data with its type. You cannot enter an integer into a String column. This is known as the DB schema.

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5. We open this <u>link</u> to learn SQL



6. We execute the following SQL statement -

SELECT * from customers;



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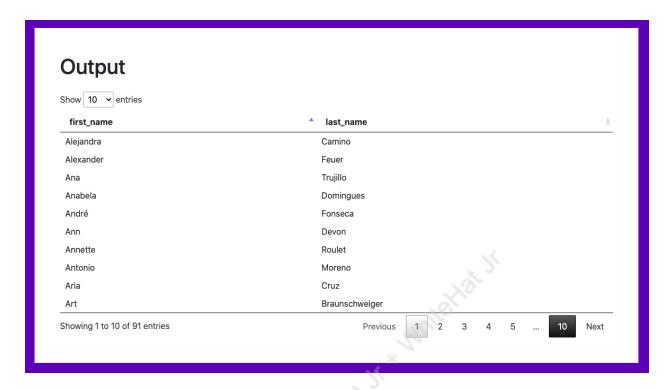


- a. Select statement is used to select data from a table.
- b. (*) asterisk is used to select all the columns
- c. **From** keyword is used to name the table from which we want to select data. In the case above, it's **customers**
- d. Semicolon (;) is mandatory in SQL after all the statements.
- 7. To select just specific columns, we can specify the column names in the query -

SELECT first_name, last_name from customers;

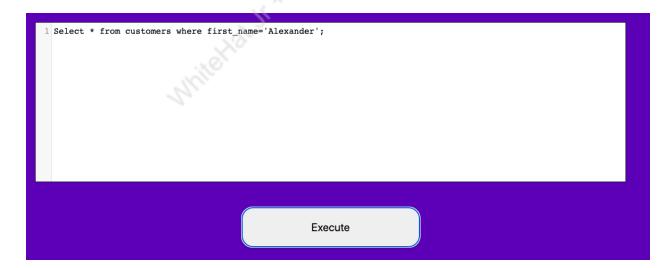






8. To select specific rows, we use where clause -

SELECT * from customers where first_name='Alexander';







a. String only works with single quotes "in SQL. Double quotes "" would throw an error.

Output (psycopg2.errors.UndefinedColumn) column "alexander" does not exist LINE 1: Select * from customers where first_name=Alexander; ^ [SQL: Select * from customers where first_name=Alexander;] (Background on this error at: https://sqlalche.me/e/14/f405)

9. We can use **AND** & **OR** boolean operators in our SQL statements to set the condition with **where** clause -

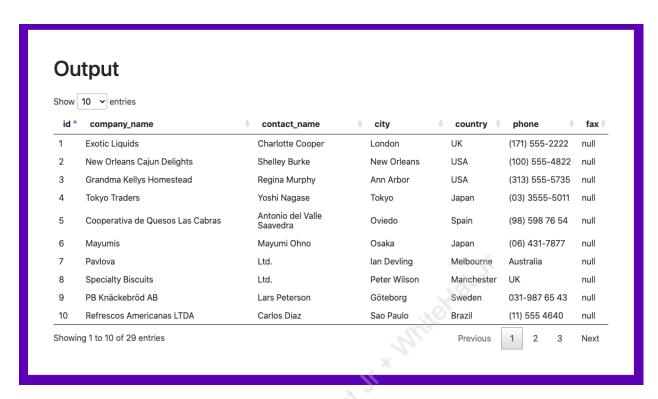
Select * from customers where first_name='Alexander' and last_name='Feuer';

Select * from customers where first_name='Alexander' or last_name='Feuer';

10. We perform a student activity to query all the suppliers.

SELECT * from suppliers;





11. We perform a student activity to query all the suppliers' company_name and contact_name based out of the USA or UK.

SELECT company_name, contact_name from suppliers where country='USA' or country='UK';

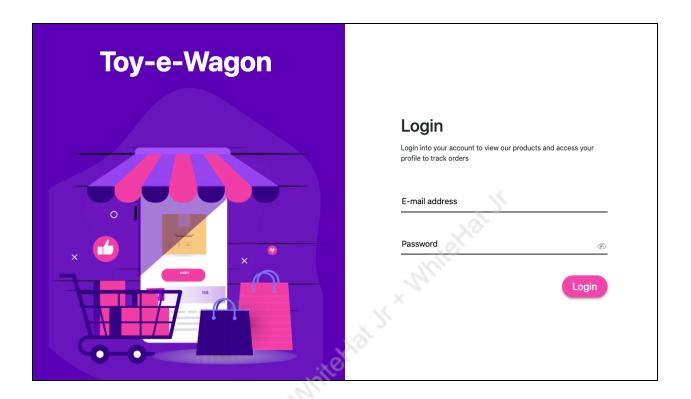


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12. We open this link and perform a SQL injection with the following credentials -

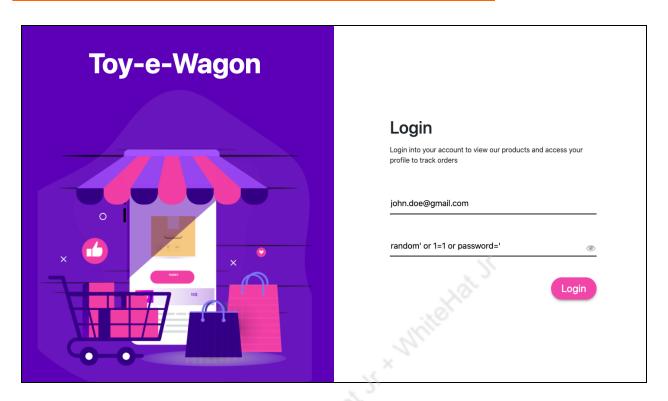


- a. Email john.doe@gmail.com
- b. Password random' or 1=1 or password='
- c. We understand this by thinking of the statement running in the background. Something like
 - i. Select * from users where email='{}' and password='{}'
 - ii. Here, it is simply going to replace the values of email and password with what is entered by the user, and see if a user exists or not. If it does, login is successful.
 - iii. With our values, this statement becomes -
 - 1. Select * from users where email='john.doe@gmail.com' and password='random' or 1=1 or password=";
 - 2. In this statement, the second part password='random' or 1=1 or password=' becomes true because 1=1.
 - Since the statement uses an AND statement, and we made the second part True without actually entering the right password by inserting some SQL, the statement changes and it lets you login.

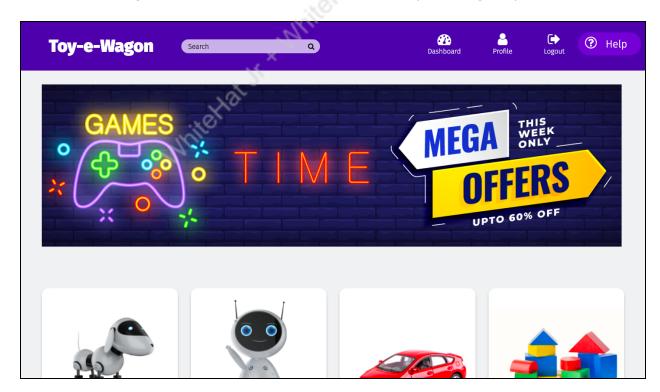
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And on login, we see the dashboard without actually entering the password -



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What's NEXT?

In the next class, we will learn about join statements in SQL

Expand Your Knowledge:

Explore more about SQL v/s NoSQL databases here.