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Data Science with Python

Introduction To SQL

- History and Features of SQL
- Types Of TSQL Commands
- Data Definition Language (DDL) - Create, Alter and Drop
- Data Manipulation Language (DML) - Insert, Delete, Update, Truncate
- Data Query Language (DQL) - Select
- Data Control Language (DCL) - Grant and Revoke
- Transaction Control Language (TCL) - Rollback, Save point
- Constrains (Not Null, Unique, Default, Check constraints, Primary Key and
- Referential Integrity or foreign key constraints
- Data Types In SQL

Clauses

Where, Group by, Having and Order by Scalar Functions

- Numeric Functions
- Date Functions
- Aggregate Functions
- Super Aggregates Over (partition by ...) Clause
- Ranking Functions
- Common Table Expressions (CTE)
- Inner Join
- Self Join
- Outer Join
- Left Outer Join
- Right Outer Join
- Full Outer Join
- Cross Join
- Single Row Sub Queries
- Multi Row Sub Queries
- Co-Related Sub Queries

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- Clustered Index
- NonClustered Index
- Create, Alter and Drop Indexes
- Using Indexes
- Purpose of Views
- Creating, Altering and Dropping Indexes
- Simple and Complex View
- Encryption and Schema Binding Options in creating views

Transaction Management

- Introduction
- Begin Transaction
- Commit Transaction
- Rollback Transaction
- Save Transaction

Cursor

- Working with Cursors
- Types of Cursors
- Static, Dynamic and Keyset Cursors
- Local and Global Cursors

Stored procedure

- Creating, Altering, and Dropping
- Input and Output Parameters User-Defined Functions
- Creating, Altering, and Dropping
- Types of User-Defined Functions
- Table Valued Functions
- Inline Table-Valued Functions
- Multi Statement Table Valued Functions

Trigger

- Purpose of Triggers
- Differences Between Stored Procedures and User-Defined Functions and Triggers
- Creating, Altering and Dropping Triggers
- Python Basics

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Introduction to Python

- Python Installation
- Interpreters' vs Compilers
- Integrated Development Environments (IDES) (Notebook, VS code, Azure Data Studio etc.)
- Basic concepts

1.Types of Operators

- Python Arithmetic Operators
- Python Comparison Operators
- Python Assignment Operators
- Python Bitwise Operators
- Python Logical Operators

2.Data Types

- Variables
- Assigning Values to Variables
- Multiple Assignment

3.Python Numbers

4.Python Strings

5.Accessing Values in Strings

6.String Special Operators

7.String Formatting Operator

8.Triple Quotes

9.Built-in String Operations

10.Python Lists

- Accessing Values in Lists
- Updating Lists
- Delete List Elements
- Basic List Operations

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- Indexing, Slicing, and Matrixes
- Built-in List Functions & Methods

11.Python Tuples

- Accessing Values in Tuples
- Updating Tuples
- Delete Tuple Elements
- Basic Tuples Operations
- Indexing, Slicing, and Matrixes
- No Enclosing Delimiters
- Built-in Tuple Functions

12.Python Dictionary

- Accessing Values in Dictionary
- Updating Dictionary
- Delete Dictionary Elements
- Properties of Dictionary Keys
- Built-in Dictionary Functions & Methods

13.Loops and Decision Making

- if statements
- ..else statements
- nested if statements
- while loop
- for loop
- nested loops
- Loop Control Statements
- break statement
- continue statement
- pass statement

14.Functions

- Defining a Function
- Calling a Function
- Pass by reference vs value
- Function Arguments

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- Required arguments
- Keyword arguments
- Default arguments
- Variable-length arguments
- The return Statement
- Scope of Variables
- Global vs. Local variables

15.Basic OOPs Concept

- Creating class in Python
- Documented String
- Private Identifier
- Constructor
- Inheritance
- Polymorphism

16.Decorator, Iterator and Generator

17.Anonymous Function

- Lambda
- Map
- Filter
- Reduce

18. File Handling

- Create
- Open
- Read
- Write
- Delete
- Append
- Others

19.Connecting to Databases

20.Creating Json Files

21. Sending emails with Python

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VISUALIZATION WITH PYTHON

- Visualization Packages (Matplotlib)
- Components of A Plot, Sub-Plots
- Basic Plots: Line, Bar, Pie, Scatter
- Advanced Python Data Visualizations

INTRODUCTION TO STATISTICS

- What is statistics?
- Types of statistics
- Descriptive statistics
- Inferential statistics

STATISTICAL TERMS

- Population
- Sample
- Variable (discrete and continuous)
- Data and types of data
- Qualitative (nominal and ordinal)
- Quantitative (interval scale and ratio scale)

MEASURES OF CENTRAL TENDENCY

- Mean
- Median
- Mode

PROBABILITY

- Probability with replacement
- Probability without replacement
- Probability Mass Function (PMF)
- Probability Density Function (PDF)

MEASURES OF SHAPE

- Skewness
- Kurtosis

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MEASURES OF DISPERSION OR VARIABILITY

- variance
- std
- percentile
- quartile
- range
- IQR

APPLICATION OF VARIANCE OR STD

- Empirical Rule
- Problems on Empirical Rule
- Chebyshev's Theorem

PROBABILITY DISTRIBUTIONS

- Normal distribution
- Standard normal distribution
- Sampling distribution of sample means
- Central limit theorem
- T- Distribution
- Student T- Test
- Chi Square Test (Goodness of Fit)
- Binomial distribution
- Bernoulli distribution
- Geometric distribution
- Hypergeometric distribution
- Poisson distribution

HYPOTHESIS TESTING

- Upper tail test
- Lower tag test
- Two tag test

ANOVA

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Introduction to Power BI

- Datawarehouse
- Power Query
- DAX Functions
- Visualizations
- Data Cleaning and Shaping Dashboards
- Microsoft Fabric

Machine Learning in AI

- EXPLORATORY DATA ANALYSIS (EDA)
- OUTLIERS AND THEIR TREATMENT
- SUPERVISED LEARNING VS UNSUPERVISED LEARNING
- FEATURE EXTRACTION AND CONVERSION
- Regression Models
- Classification Models
- Unsupervised Learning
- Association rule Learning
- Model Selection

Deep Learning in AI

- Introduction to Deep Learning
- Activation functions
- Creating Neural Network in Python
- TensorFlow and Keras
- Convolution Neural Network (CNN)
- Recurrent Neural Network (RNN)

Natural Language Processing in AI (NLP)

- NLP Concepts
- Feature Extraction
- Text Classification using NLP

Computer vision in AI

- Object Detection by Computer

Project