# Course: Big Data

# *Lab 05*

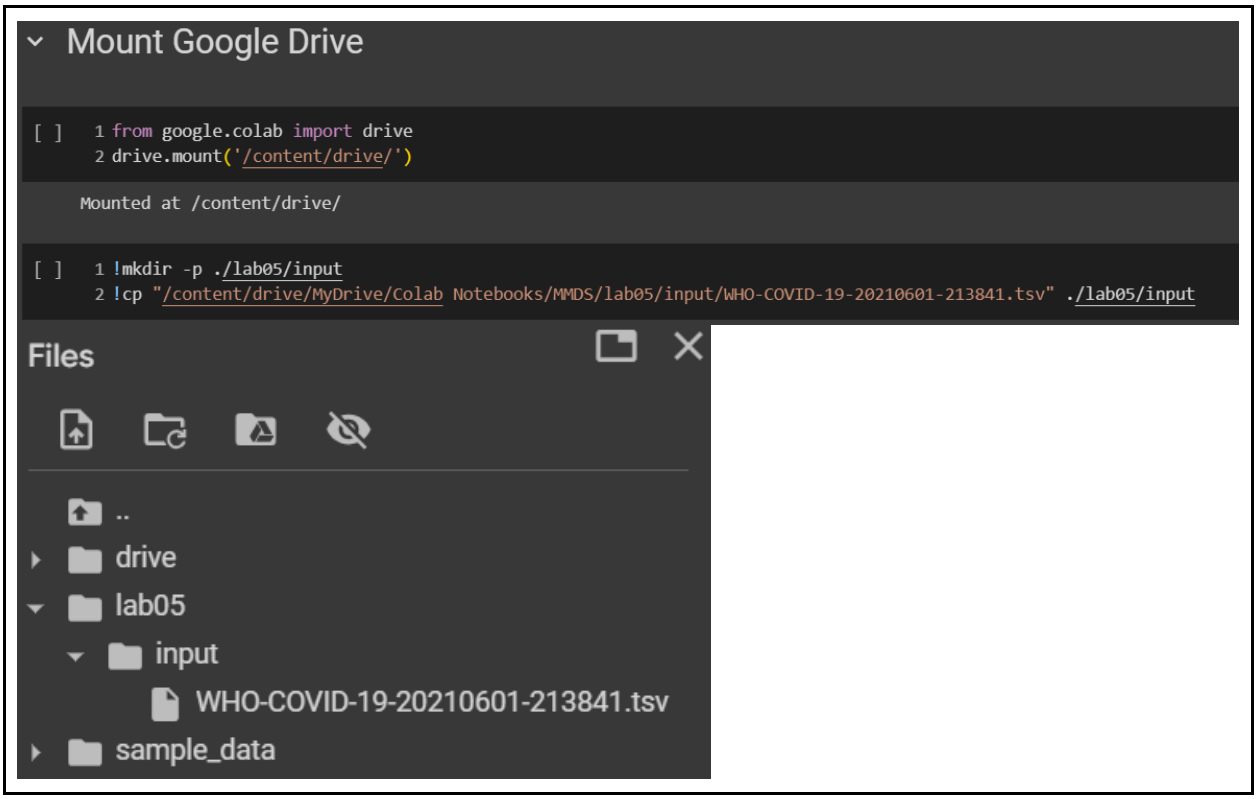
# PySpark - DataFrame

## Question 1:

Given a tsv file WHO-COVID-19-20210601-213841.tsv which is corresponding to the WHO Coronavirus (COVID-19) Dashboard.

Students are required to create a folder, named **lab05**, in **/content** directory of Google Colab and then copy the tsv to **/content/lab05/input/**

Take a screenshot to show your work.



# Question 2:

Write a PySpark program, located in **ASEANCaseCount.py**, using DataFrames to

- to count the number of cumulative total cases among ASEAN countries (*South-East Asia Region in the given data table*)
- to find the country with the maximum number of cumulative total cases among ASEAN countries.
- to find the top 3 countries with the lowest number of cumulative cases among ASEAN countries.

- Insert your source code into the table below.

```
from pyspark.sql import SparkSession
from pyspark.sql.functions import udf, col
from pyspark.sql.types import FloatType
import re
from tabulate import tabulate

spark = SparkSession.builder.appName("ASEANCaseCount").getOrCreate()

data = spark.read.csv("/content/lab05/input/WHO-COVID-19-20210601-213841.tsv", sep="\t", header=True, inferSchema=True)

asean_data = data.filter(data["WHO Region"] == "South-East Asia")

remove_commas = udf(lambda x: float(re.sub('[,.]', '', x)), FloatType())

asean_data = asean_data.withColumn("Cases - cumulative total", remove_commas("Cases - cumulative total"))

print("\n==================== Question 1 ====================\n")
print("Number of cumulative total cases among ASEAN countries:", asean_data.groupby('Name').sum("Cases - cumulative total").collect()[0][1])

print("\n==================== Question 2 ====================\n")
max_cases_country = asean_data.orderBy(col("Cases - cumulative total").desc()).first()
print("Country with the maximum number of cumulative total cases among ASEAN countries:", max_cases_country[0])
print("Maximum Cumulative Cases:", max_cases_country[2])

print("\n==================== Question 3 ====================\n")
lowest_cases_countries = asean_data.orderBy(col("Cases - cumulative total")).limit(3).collect()
print("Top 3 countries with the lowest number of cumulative cases among ASEAN countries:")
print(tabulate([[country[0], country[2]] for country in lowest_cases_countries], headers=["Country", "Cases - cumulative total"], tablefmt="grid"))

spark.stop()
```

- Take a screenshot of the terminal to visualize the program result.

```
==================== Question 1 ====================

Number of cumulative total cases among ASEAN countries: 64396000.0

==================== Question 2 ====================

Country with the maximum number of cumulative total cases among ASEAN countries: India
Maximum Cumulative Cases: 28175044608.0

==================== Question 3 ====================

Top 3 countries with the lowest number of cumulative cases among ASEAN countries:
+-------------------------------------+----------------------------+
| Country                             |   Cases - cumulative total |
+=====================================+============================+
| Democratic People's Republic of Korea |                  0         |
+-------------------------------------+----------------------------+
| Bhutan                              |                  1.62e+06  |
+-------------------------------------+----------------------------+
| Timor-Leste                         |                  6.994e+06 |
+-------------------------------------+----------------------------+
```

## Submission Notice

- Export your answer file as pdf
- Rename the pdf following the format:

  **lab05_<student number>_HoTen.pdf**

  E.g. lab05_123456_NguyenThanhAn.pdf

  *If you have not been assigned a student number yet, then use 123456 instead.*
- Careless mistakes in filename, format, question order, etc. are not accepted (0 pts).