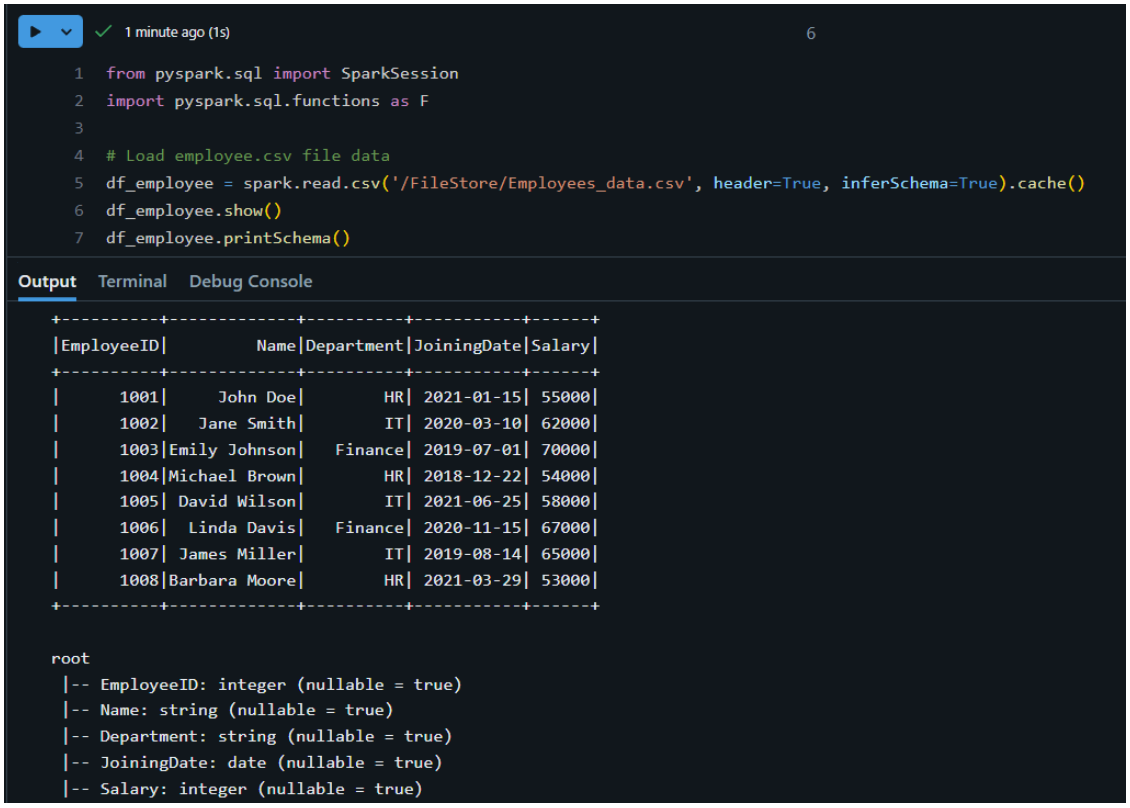
Assignment 3: Working with Delta Tables

Tasks:

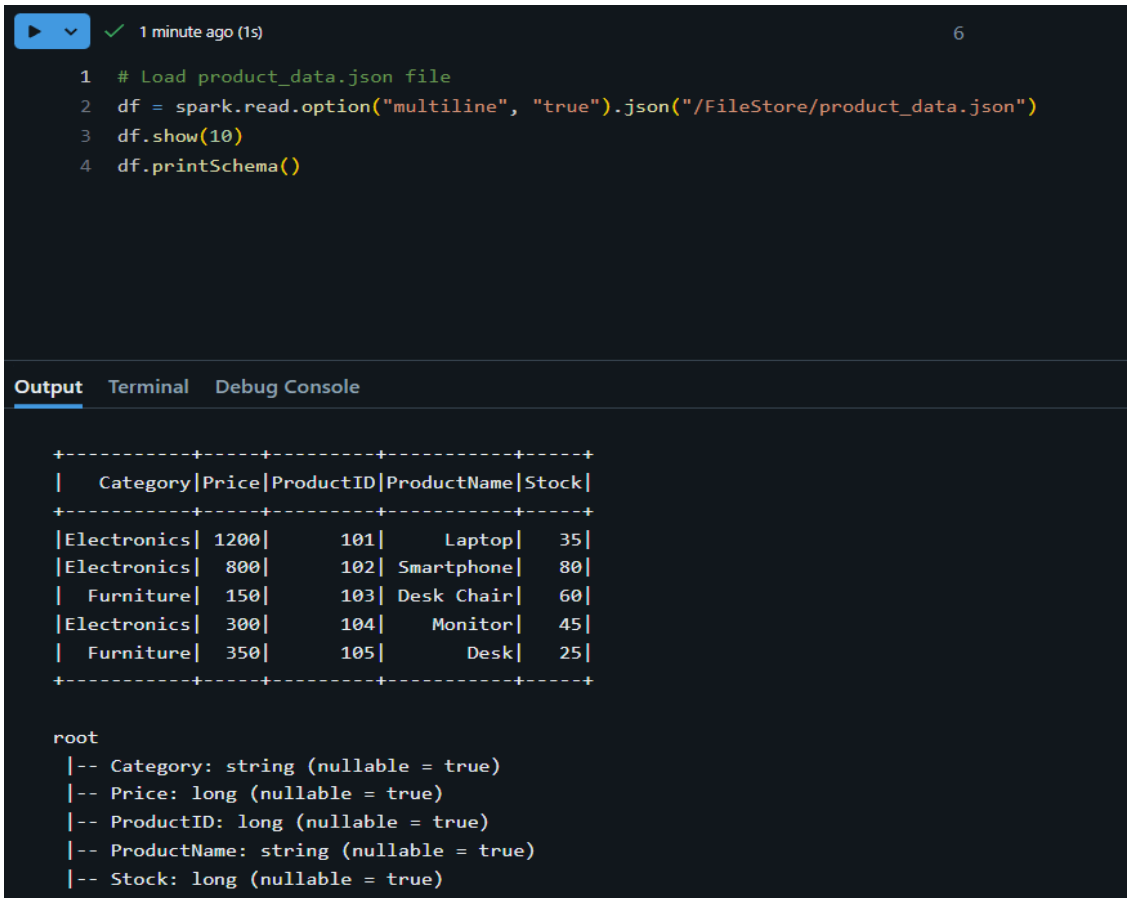
1. Convert CSV and JSON Data to Delta Format:



```
1 minute ago (1s)                                                    6

from pyspark.sql import SparkSession
import pyspark.sql.functions as F

# Load employee.csv file data
df_employee = spark.read.csv('/FileStore/Employees_data.csv', header=True, inferSchema=True).cache()
df_employee.show()
df_employee.printSchema()
```

Output Terminal Debug Console

```
+----------+-------------+----------+-----------+------+
|EmployeeID|         Name|Department|JoiningDate|Salary|
+----------+-------------+----------+-----------+------+
|      1001|     John Doe|        HR| 2021-01-15| 55000|
|      1002|   Jane Smith|        IT| 2020-03-10| 62000|
|      1003|Emily Johnson|   Finance| 2019-07-01| 70000|
|      1004|Michael Brown|        HR| 2018-12-22| 54000|
|      1005| David Wilson|        IT| 2021-06-25| 58000|
|      1006|  Linda Davis|   Finance| 2020-11-15| 67000|
|      1007| James Miller|        IT| 2019-08-14| 65000|
|      1008|Barbara Moore|        HR| 2021-03-29| 53000|
+----------+-------------+----------+-----------+------+

root
 |-- EmployeeID: integer (nullable = true)
 |-- Name: string (nullable = true)
 |-- Department: string (nullable = true)
 |-- JoiningDate: date (nullable = true)
 |-- Salary: integer (nullable = true)
```



```
1 minute ago (1s)                                                    6

# Load product_data.json file
df = spark.read.option("multiline", "true").json("/FileStore/product_data.json")
df.show(10)
df.printSchema()
```

Output Terminal Debug Console

```
+-----------+-----+---------+-----------+-----+
|   Category|Price|ProductID|ProductName|Stock|
+-----------+-----+---------+-----------+-----+
|Electronics| 1200|      101|     Laptop|   35|
|Electronics|  800|      102| Smartphone|   80|
|  Furniture|  150|      103| Desk Chair|   60|
|Electronics|  300|      104|    Monitor|   45|
|  Furniture|  350|      105|       Desk|   25|
+-----------+-----+---------+-----------+-----+

root
 |-- Category: string (nullable = true)
 |-- Price: long (nullable = true)
 |-- ProductID: long (nullable = true)
 |-- ProductName: string (nullable = true)
 |-- Stock: long (nullable = true)
```

2. Register Delta Tables:

- Register both the employee and product Delta tables as SQL tables.

3. Data Modifications with Delta Tables:

- Perform an update operation on the employee Delta table: Increase the salary by 5% for all employees in the IT department.
- Perform a delete operation on the product Delta table: Delete products where the stock is less than 40.

```
Just now (6s)                                                    6

# 2. Convert CSV and JSON Data to Delta Format
df_employee.write.format("delta").mode("overwrite").save("/dbfs/FileStore/delta/Employees_data")
df.write.format("delta").mode("overwrite").save("/dbfs/FileStore/delta/product_data")

# 3. Register Delta Tables as SQL Tables
spark.sql("CREATE TABLE IF NOT EXISTS Employees_delta USING DELTA LOCATION '/dbfs/FileStore/delta/Employees_data'")
spark.sql("CREATE TABLE IF NOT EXISTS product_delta USING DELTA LOCATION '/dbfs/FileStore/delta/product_data'")

# 3. Data Modifications with Delta Tables
# Increase salary by 5% for IT department employees
spark.sql("UPDATE Employees_delta SET Salary = Salary * 1.05 WHERE Department = 'IT'")
# Delete products where stock is less than 40
spark.sql("DELETE FROM product_delta WHERE Stock < 40")
```

```
+----------+-------------+----------+-----------+------+
|EmployeeID|         Name|Department|JoiningDate|Salary|
+----------+-------------+----------+-----------+------+
|      1001|     John Doe|        HR| 2021-01-15| 55000|
|      1002|   Jane Smith|        IT| 2020-03-10| 62000|
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|      1008|Barbara Moore|        HR| 2021-03-29| 53000|
+----------+-------------+----------+-----------+------+
```
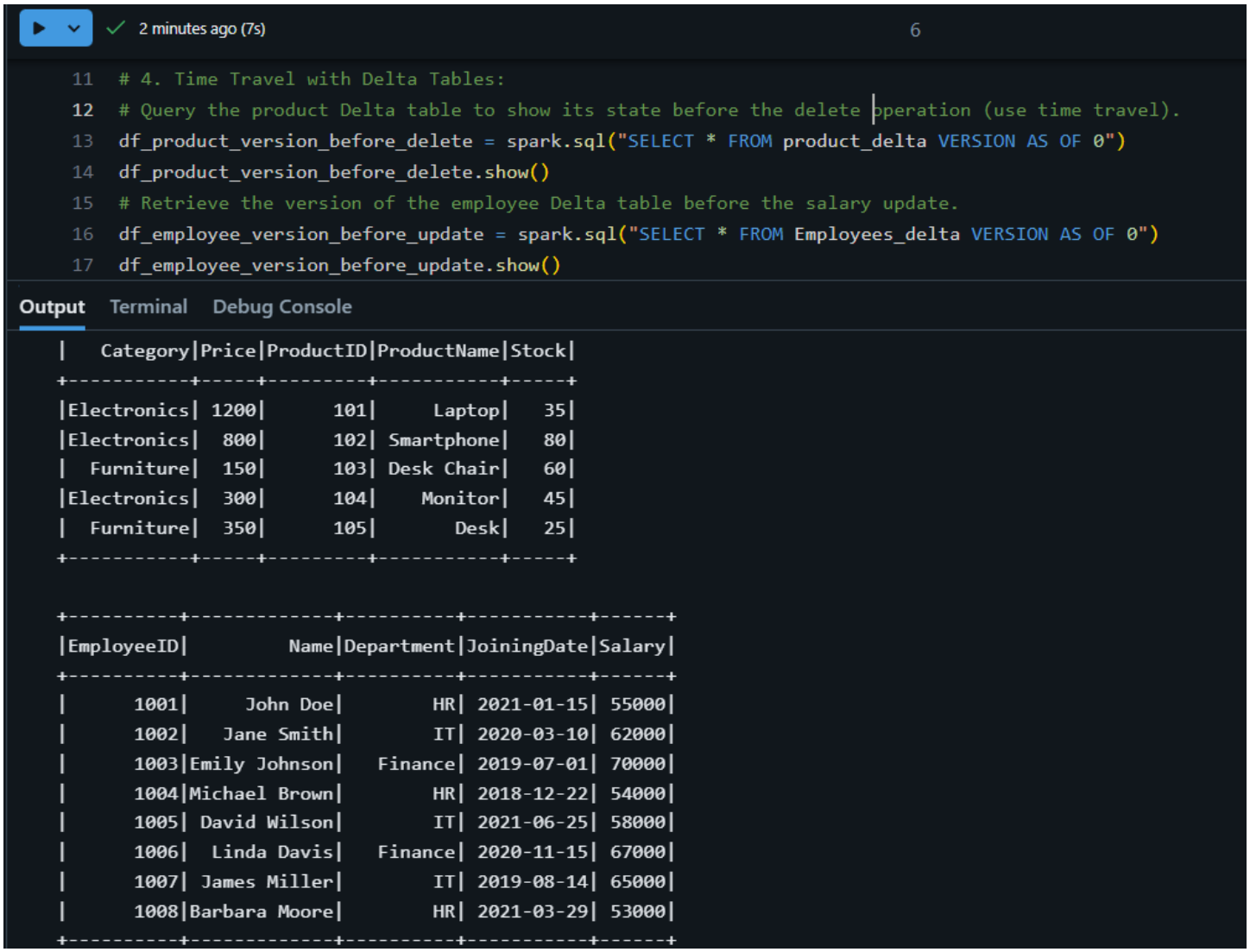

4. Time Travel with Delta Tables:

- Query the product Delta table to show its state before the delete operation (use time travel).
- Retrieve the version of the employee Delta table before the salary update.



5. Query Delta Tables:

- Query the employee Delta table to find the employees in the Finance department.
- Query the product Delta table to find all products in the Electronics category with a price greater than 500.