

Ex No: 6

Import a JASON file from the command line. Apply the following actions with the data present in the JASON file where, projection, aggregation, remove, count, limit, skip and sort

AIM:

To import a JASON file from the command line and apply the following actions with the data present in the JASON file where, projection, aggregation, remove, count, limit, skip and sort.

PROCEDURE:**PROCEDURE:****Step 1: Install Required Packages**

Install the necessary packages using pip:
\$ pip install pandas --break-system-packages

Step 2: Verify Package Installation

Verify that the required packages are installed:

```
$ python
>>> import pandas as pd
>>> from hdfs import InsecureClient
>>> print("Pandas version:", pd._version_)
>>> client = InsecureClient('http://localhost:9870', user='hadoop')
>>> print("HDFS status:", client.status('/'))
>>> exit()
```

Step 3: Create process_data.py File

Create the Python script for processing data:

\$ nano process_data.py
Paste the following code into the file:

```
from hdfs import InsecureClient
import pandas as pd
import json

# Connect to HDFS
hdfs_client = InsecureClient('http://localhost:9870', user='hdfs')

# Read JSON data from HDFS
try:
    with hdfs_client.read('/home/hadoop/emp.json', encoding='utf-8') as reader:
        json_data = reader.read()
    if not json_data.strip():
        raise ValueError("The JSON file is empty.")
```

```
data = json.loads(json_data)
except Exception as e:
    print(f"Error reading or parsing JSON data: {e}")
    exit(1)

# Convert JSON data to DataFrame
df = pd.DataFrame(data)

# Projection: Select 'name' and 'salary'
projected_df = df[['name', 'salary']]

# Aggregation: Calculate total salary
total_salary = df['salary'].sum()

# Count: Employees earning more than 50000
high_earners_count = df[df['salary'] > 50000].shape[0]

# Limit: Top 5 highest earners
top_5_earners = df.nlargest(5, 'salary')

# Skip: Skip the first 2 employees
skipped_df = df.iloc[2:]

# Remove: Filter out employees from IT department
filtered_df = df[df['department'] != 'IT']

# Save the filtered data back to HDFS
filtered_json = filtered_df.to_json(orient='records')
try:
    with hdfs_client.write('/home/hadoop/filtered_employees.json', encoding='utf-8', overwrite=True) as
writer:
        writer.write(filtered_json)
except Exception as e:
    print(f"Error saving filtered JSON data: {e}")
```

Step 4: Run the Script

Execute the script to process the data:

```
$ python3 process_data.py
```

Step 5: To view the output

hadoop@Ubuntu:~/Documents\$ hdfs dfs -cat /home/hadoop/emp.json

```
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varunesh@varunesh:~$ python3 processdata.py

Raw JSON Data: [
  {"name": "John Doe", "age": 30, "department": "HR", "salary": 50000},
  {"name": "Jane Smith", "age": 25, "department": "IT", "salary": 60000},
  {"name": "Alice Johnson", "age": 35, "department": "Finance", "salary": 70000},
  {"name": "Bob Brown", "age": 28, "department": "Marketing", "salary": 55000},
  {"name": "Charlie Black", "age": 45, "department": "IT", "salary": 80000}
]

Filtered JSON file saved successfully.
Projection: Select only name and salary columns
   name  salary
0  John Doe   50000
1  Jane Smith  60000
2  Alice Johnson 70000
3  Bob Brown   55000
4  Charlie Black 80000
Aggregation: Calculate total salary
Total Salary: 315000

Count: Number of employees earning more than 50000
Number of High Earners (>50000): 4

Top 5 highest salary
Top 5 Earners:
   name  age  department  salary
4  Charlie Black   45      IT   80000
2  Alice Johnson   35  Finance   70000
1  Jane Smith     25      IT   60000
3  Bob Brown      28  Marketing  55000
0  John Doe       30      HR   50000

Skipped DataFrame (First 2 rows skipped):
   name  age  department  salary
2  Alice Johnson   35  Finance   70000
```

```
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Filtered JSON file saved successfully.
Projection: Select only name and salary columns
   name  salary
0  John Doe   50000
1  Jane Smith  60000
2  Alice Johnson 70000
3  Bob Brown   55000
4  Charlie Black 80000
Aggregation: Calculate total salary
Total Salary: 315000

Count: Number of employees earning more than 50000
Number of High Earners (>50000): 4

Top 5 highest salary
Top 5 Earners:
   name  age  department  salary
4  Charlie Black   45      IT   80000
2  Alice Johnson   35  Finance   70000
1  Jane Smith     25      IT   60000
3  Bob Brown      28  Marketing  55000
0  John Doe       30      HR   50000

Skipped DataFrame (First 2 rows skipped):
   name  age  department  salary
2  Alice Johnson   35  Finance   70000
3  Bob Brown      28  Marketing  55000
4  Charlie Black   45      IT   80000

Filtered DataFrame (IT department removed):
   name  age  department  salary
0  John Doe   30      HR   50000
2  Alice Johnson   35  Finance   70000
3  Bob Brown      28  Marketing  55000
varunesh@varunesh:~$
varunesh@varunesh:~$
```

RESULT:

Thus to import a JASON file from the command line and apply the following actions with the data present in the JASON file where, projection, aggregation, remove, count, limit, skip and sort has been executed and verified successfully.