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Import Json file and do projetion, aggregation, limit,count ,skip and remove using python and hdfs.

Aim:

To import Json file and do projetion, aggregation, limit,count ,skip and remove using python and hdfs.

Procedure:

Step 1: Create json file on bash & save as emp.json

nano emp.json ; Paste the below content on it

```
[
{"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}
]
```

Step 2: put the employees.json local directory to home/hadoop directory Step 3: Install Required Packages

Open your terminal or command prompt and run the following commands to install the required Python packages.

pip install pandas

pip install hdfs Step 4: Verify

Installation

Test the package installations by running the following Python commands in a Python shell or a script:

```
import pandas as pd
from hdfs import InsecureClient


# Check pandas version print("Pandas
version:", pd.__version__) # Test HDFS
```

```
client connection client =
InsecureClient('http://localhost:9870',
user='hadoop')
print("HDFS status:", client.status('/'))
```

This will print the version of Pandas installed and confirm whether the HDFS connection is successful.

Step 5: Create the process_data.py File

Create a new Python file named process_data.py and add the following code to it:

```
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()  # Read the raw data as a string
if not json_data.strip():  # Check if data is empty            raise
ValueError("The JSON file is empty.")
    print(f"Raw JSON Data: {json_data[:1000]}")  # Print first 1000 characters for
debugging
    data = json.loads(json_data)  # Load the JSON data
except json.JSONDecodeError as e:     print(f"JSON
Decode Error: {e}")
  exit(1)
except Exception as e:
  print(f"Error reading or parsing JSON data: {e}")
```

```
    exit(1)

# Convert JSON data to DataFrame
try:
    df = pd.DataFrame(data) except
ValueError as e:
    print(f"Error converting JSON data to DataFrame: {e}")
    exit(1)

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

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

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

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

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

# Remove: Remove employees from a specific department
filtered_df = df[df['department'] != 'IT']

# Save the filtered result 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)
print("Filtered JSON file saved successfully.")
except Exception as e:
   print(f"Error saving filtered JSON data: {e}")
   exit(1)


# Print results print(f"Projection: Select only name and
salary columns") print(f"{projected_df}")
print(f"Aggregation: Calculate total salary") print(f"Total
Salary: {total_salary}")
print(f"# Count: Number of employees earning more than 50000")
print(f"Number of High Earners (>50000): {high_earners_count}")
print(f"Top 5 Earners: \n{top_5_earners}") print(f"Skipped
DataFrame (First 2 rows skipped): \n{skipped_df}")
print(f"Filtered DataFrame (IT department removed): \n{filtered_df}")
```

Step 6: Run the process_data.py Script

Run the script in your terminal or command prompt by typing the following command:

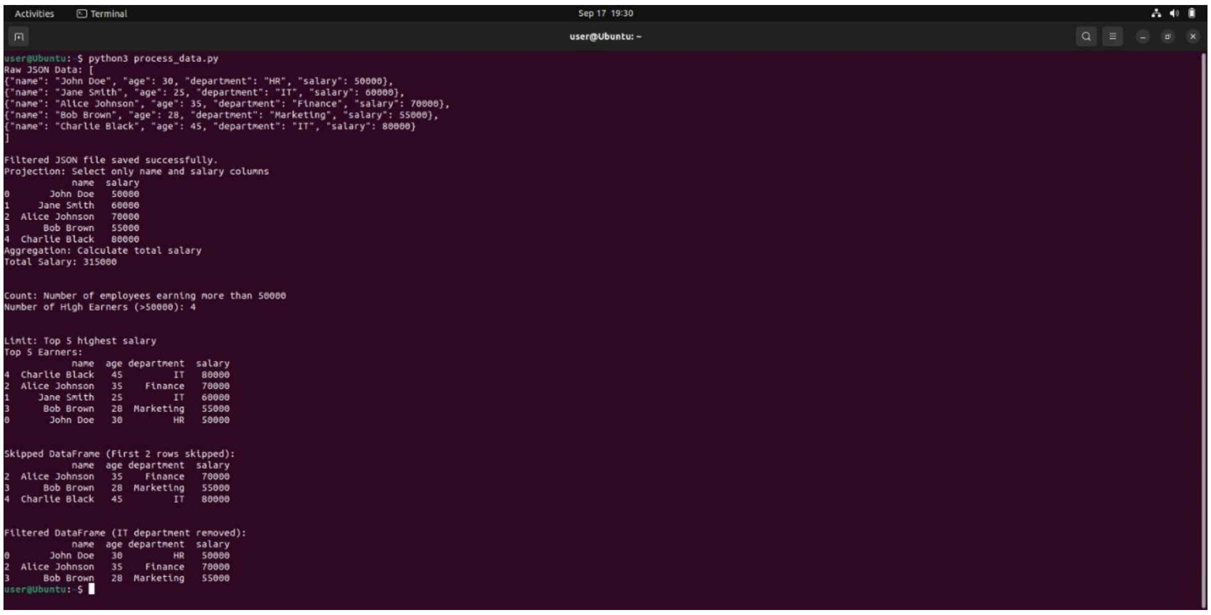
```
python3 process_data.py
```

Make sure your HDFS is up and running, and the /home/hadoop/emp.json file exists on your HDFS.

The script will read the JSON file from HDFS, process the data, and save the filtered results back to HDFS.

Step 7: Check the output.

OUTPUT:



```
user@Ubuntu:~$ python3 process_data.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


Limit: 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
user@Ubuntu:~$ 
```

Result:

Thus the program to import Json file and to do projetion, aggregation, limit,count ,skip and remove using python and hdfs is executed successfully.