

Exp No: 6**Handling JSON data using HDFS and Python AIM:**

To handle JSON data using HDFS and python.

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}  
]
```

A screenshot of a terminal window with a dark background. It shows the same JSON array as the previous block, with each object on a new line. The text is color-coded: strings are in red, numbers in green, and keys in blue. The array is enclosed in square brackets with commas separating the objects.

```
[  
  {"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 : Check json is readable or any error by giving

install jq by `sudo apt-get install jq` hadoop@Ubuntu:~\$

`jq . emp.json`

```

osboxes@fedora:~$ cd Downloads/
osboxes@fedora:~/Downloads$ jq . emp.json
[
  {
    "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
  },
]

```

Step 3: Install pandas and hdfs dependencies for

python. Step 4: Create process_data.py 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() # 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"\n")
```

```
print(f"# Count: Number of employees earning more than 50000")
```

```
print(f"Number of High Earners (>50000): {high_earners_count}")
```

```
print(f"\n") print(f"limit Top 5 highest salary")
```

```
print(f"Top 5 Earners: \n{top_5_earners}") print(f"\n")
```

```
print(f"Skipped DataFrame (First 2 rows skipped): \n{skipped_df}")
```

```
print(f"\n") print(f"Filtered DataFrame (Sales department removed):
```

```
\n{filtered_df}") Step 5: run the file by bash: python3
```

```
process_data.py
```

```
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 (Sales department removed):
   name  age department  salary
0    John Doe    30          HR   50000
2  Alice Johnson   35        Finance   70000
3    Bob Brown   28       Marketing   55000
```

RESULT:

Experiment has been successfully executed and output has been verified.