

## **Task 4: Performing Data Analysis with MapReduce on EMR Instance**

- To begin, I set up the environment on the EMR (Elastic MapReduce) instance by updating the system using the command 'sudo yum update' and installing the necessary Python packages such as mrjob using 'pip3 install mrjob'.
- Once the environment was configured, I proceeded to write Python scripts for performing MapReduce tasks. After writing the scripts, I transferred them to the EMR instance using WinSCP and granted execution permissions using the command 'chmod 700'.
- For running the MapReduce jobs, I utilized the following general code structure:

**python mr\_script.py input > output\_file**

- This command executed the Python script 'mr\_script.py' on the specified input data and redirected the output to the designated output file.
- For this task, I used the all the dataset **yellow\_tripdata\_2017\_01.csv**, **yellow\_tripdata\_2017\_02.csv**, **yellow\_tripdata\_2017\_03.csv**, **yellow\_tripdata\_2017\_04.csv**, **yellow\_tripdata\_2017\_05.csv**, **yellow\_tripdata\_2017\_06.csv**, to perform data analysis.
- Regarding the installation of mrjob, you can install it using pip3 with the following command:

**pip3 install mrjob**

- This command will install mrjob and its dependencies, allowing you to use it for MapReduce tasks in Python.

**A : Which vendors have the most trips, and what is the total revenue generated by that vendor?**

**Among all the Vendors, Vendor 2 has the highest trip generating different revenues for different datasets.**

```
[hadoop@ip-172-31-59-4 ~]$ ls
mrtask_a_Vendor.py  mrtask_c_Payment.py  mrtask_e_AvgTips.py  yellow_tripdata_2017-01.csv  yellow_tripdata_2017-03.csv  yellow_tripdata_2017-05.csv
mrtask_b_Pickup.py  mrtask_d_AvgTripTime.py  mrtask_f_RevcncuVary.py  yellow_tripdata_2017-02.csv  yellow_tripdata_2017-04.csv  yellow_tripdata_2017-06.csv
[hadoop@ip-172-31-59-4 ~]$ pwd
/home/hadoop
[hadoop@ip-172-31-59-4 ~]$ pip3 install mrjob
Deferring to user installation because normal site-packages is not writeable
Collecting mrjob
  Downloading mrjob-0.7.4-py2.py3-none-any.whl (439 kB)
     ━━━━━━━━━━ 439 kB 29.3 MB/s
Requirement already satisfied: PyYAML<3.10 in /usr/local/lib64/python3.7/site-packages (from mrjob) (5.4.1)
Installing collected packages: mrjob
  WARNING: The scripts mrjob, mrjob-3 and mrjob-3.7 are installed in '/home/hadoop/.local/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed mrjob-0.7.4
[hadoop@ip-172-31-59-4 ~]$
```

**"python mrtask\_a\_Vendor.py yellow\_tripdata\_2017-06.csv > mrtask\_a\_Vendor\_out6.txt"**

```
[hadoop@ip-172-31-59-4 ~]$ python mrtask_a_Vendor.py yellow_tripdata_2017-06.csv > mrtask_a_Vendor_out6.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.081942.030527
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_a_Vendor.hadoop.20240506.081942.030527/output
Streaming final output from /tmp/mrtask_a_Vendor.hadoop.20240506.081942.030527/output...
Removing temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.081942.030527...
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor.out6.txt
"2"    88663878.19566278
[hadoop@ip-172-31-59-4 ~]$
```

**Vendor 2 has the most trips with varying revenues as shown below**

**In yellow\_tripdata\_2017-06.csv, Vendor 2 has the most trips, total revenue generated is 88663878.19566278.**

**"python mrtask\_a\_Vendor.py yellow\_tripdata\_2017-01.csv > mrtask\_a\_Vendor\_out1.txt"**

```
-bash: chmod 700: command not found
[hadoop@ip-172-31-59-4 ~]$ chmod 700 /home/hadoop
[hadoop@ip-172-31-59-4 ~]$ ./mrtask_a_Vendor.py yellow_tripdata_2017-01.csv > mrtask_a_Vendor_out1.txt
-bash: mrtask_a_Vendor.py: command not found
[hadoop@ip-172-31-59-4 ~]$ python mrtask_a_Vendor.py yellow_tripdata_2017-01.csv > mrtask_a_Vendor_out1.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.0/4556.603873
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_a_Vendor.hadoop.20240506.074556.603873/output
Streaming final output from /tmp/mrtask_a_Vendor.hadoop.20240506.074556.603873/output...
Removing temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.074556.603873...
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor.out1.txt
cat: mrtask_a_Vendor.out1.txt: No such file or directory
[hadoop@ip-172-31-59-4 ~]$ chmod 700 mrtask_a_Vendor.py
mrtask_a_Vendor.py  mrtask_c_Payment.py  mrtask_f_RevcncuVary.py  yellow_tripdata_2017-03.csv  yellow_tripdata_2017-06.csv
mrtask_b_Pickup.py  mrtask_d_AvgTripTime.py  yellow_tripdata_2017-01.csv  yellow_tripdata_2017-04.csv
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor_out1.txt
"2"    82859254.39585336
[hadoop@ip-172-31-59-4 ~]$
```

**In yellow\_tripdata\_2017-01.csv, Vendor 2 has the most trips, total revenue generated is 82859254.39585336.**

**"python mrtask\_a\_Vendor.py yellow\_tripdata\_2017-02.csv > mrtask\_a\_Vendor\_out2.txt"**

```
[hadoop@ip-172-31-59-4 ~]$ python mrtask_a_Vendor.py yellow_tripdata_2017-02.csv > mrtask_a_Vendor_out2.txt
No config found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.075324.450573
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_a_Vendor.hadoop.20240506.075324.450573/output
Streaming final output from /tmp/mrtask_a_Vendor.hadoop.20240506.075324.450573/output...
Removing temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.075324.450573...
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor_out2.txt
"2"    78947447.68633662
[hadoop@ip-172-31-59-4 ~]$
```

**In yellow\_tripdata\_2017-02.csv, Vendor 2 has the most trips, total revenue generated is 78947447.68633662**

**“python mrtask\_a\_Vendor.py yellow\_tripdata\_2017-01.csv > mrtask\_a\_Vendor\_out3.txt”**

```
[hadoop@ip-172-31-59-4 ~]$ python mrtask_a_Vendor.py yellow_tripdata_2017-03.csv > mrtask_a_Vendor_out3.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.075742.095745
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_a_Vendor.hadoop.20240506.075742.095745/output...
Streaming final output from /tmp/mrtask_a_Vendor.hadoop.20240506.075742.095745/output...
Removing temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.075742.095745...
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor_out3.txt
"2"
91682368.32536966
[hadoop@ip-172-31-59-4 ~]$
```

**In yellow\_tripdata\_2017-03.csv, Vendor 2 has the most trips, total revenue generated is 91682368.32536966.**

**“python mrtask\_a\_Vendor.py yellow\_tripdata\_2017-04.csv > mrtask\_a\_Vendor\_out4.txt”**

```
[hadoop@ip-172-31-59-4 ~]$ python mrtask_a_Vendor.py yellow_tripdata_2017-04.csv > mrtask_a_Vendor_out4.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.080525.125498
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_a_Vendor.hadoop.20240506.080525.125498/output...
Streaming final output from /tmp/mrtask_a_Vendor.hadoop.20240506.080525.125498/output...
Removing temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.080525.125498...
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor_out4.txt
"2"
89987931.82539217
[hadoop@ip-172-31-59-4 ~]$
```

**In yellow\_tripdata\_2017-05.csv, Vendor 2 has the most trips, total revenue generated is 89987931.82539217.**

**“python mrtask\_a\_Vendor.py yellow\_tripdata\_2017-05.csv > mrtask\_a\_Vendor\_out5.txt”**

```
[hadoop@ip-172-31-59-4 ~]$ python mrtask_a_Vendor.py yellow_tripdata_2017-05.csv > mrtask_a_Vendor_out5.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.081435.204673
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_a_Vendor.hadoop.20240506.081435.204673/output...
Streaming final output from /tmp/mrtask_a_Vendor.hadoop.20240506.081435.204673/output...
Removing temp directory /tmp/mrtask_a_Vendor.hadoop.20240506.081435.204673...
[hadoop@ip-172-31-59-4 ~]$ cat mrtask_a_Vendor_out5.txt
"2"
92896777.54522054
[hadoop@ip-172-31-59-4 ~]$
```

**In yellow\_tripdata\_2017-05.csv, Vendor 2 has the most trips, total revenue generated is 92896777.54522054.**

**B: Which pickup location generates the most revenue?**

**Among all the pickup location 132 has the highest revenue varying for different datasets.**

**“mrtask\_b\_Pickup.py yellow\_tripdata\_2017-06.csv > mrtask\_b\_Pickup\_out6.txt”**

```
[hadoop@ip-172-31-62-12 ~]$ pwd
/home/hadoop
[hadoop@ip-172-31-62-12 ~]$ chmod 700 /home/hadoop
[hadoop@ip-172-31-62-12 ~]$ python mrtask_b Pickup.py yellow_tripdata_2017-06.csv > mrtask_b_Pickup_out6.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.092223.655302
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_b_Pickup.hadoop.20240506.092223.655302/output...
Streaming final output from /tmp/mrtask_b_Pickup.hadoop.20240506.092223.655302/output...
Removing temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.092223.655302...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_b_Pickup_out6.txt
"132" 13022071.03001022
[hadoop@ip-172-31-62-12 ~]$
```

**In yellow\_tripdata\_2017\_06.csv, Pickup location 132 generates the most revenue :  
13022071.03001022**

**“mrtask\_b\_Pickup.py yellow\_tripdata\_2017-01.csv > mrtask\_b\_Pickup\_out1.txt”**

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_b Pickup.py yellow_tripdata_2017-01.csv > mrtask_b_Pickup_out1.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.092937.422613
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_b_Pickup.hadoop.20240506.092937.422613/output...
Streaming final output from /tmp/mrtask_b_Pickup.hadoop.20240506.092937.422613/output...
Removing temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.092937.422613...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_b_Pickup_out1.txt
"132" 12660835.900003651
[hadoop@ip-172-31-62-12 ~]$
```

**In yellow\_tripdata\_2017\_01.csv, Pickup location 132 generates the most revenue :  
12660835.900003651.**

**“mrtask\_b\_Pickup.py yellow\_tripdata\_2017-03.csv > mrtask\_b\_Pickup\_out3.txt”**

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_b Pickup.py yellow_tripdata_2017-03.csv > mrtask_b_Pickup_out3.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.094211.002923
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_b_Pickup.hadoop.20240506.094211.002923/output...
Streaming final output from /tmp/mrtask_b_Pickup.hadoop.20240506.094211.002923/output...
Removing temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.094211.002923...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_b_Pickup_out3.txt
"132" 13307409.48001407
[hadoop@ip-172-31-62-12 ~]$
```

**In yellow\_tripdata\_2017\_03.csv, Pickup location 132 generates the most revenue :  
13307409.48001407.**

**“mrtask\_b\_Pickup.py yellow\_tripdata\_2017-02.csv > mrtask\_b\_Pickup\_out2.txt”**

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_b Pickup.py yellow_tripdata_2017-02.csv > mrtask_b_Pickup_out2.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.093550.881273
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_b_Pickup.hadoop.20240506.093550.881273/output...
Streaming final output from /tmp/mrtask_b_Pickup.hadoop.20240506.093550.881273/output...
Removing temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.093550.881273...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_b_Pickup_out2.txt
"132" 10472838.379996026
```

**In yellow\_tripdata\_2017\_02.csv, Pickup location 132 generates the most revenue :  
10472838.379996026.**

**“mrtask\_b\_Pickup.py yellow\_tripdata\_2017-04.csv > mrtask\_b\_Pickup\_out4.txt”**

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_b Pickup.py yellow_tripdata_2017-04.csv > mrtask_b_Pickup_out4.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.094824.658403
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_b_Pickup.hadoop.20240506.094824.658403/output...
Streaming final output from /tmp/mrtask_b_Pickup.hadoop.20240506.094824.658403/output...
Removing temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.094824.658403...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_b_Pickup_out4.txt
"132" 13693066.230013674
[hadoop@ip-172-31-62-12 ~]$
```

**In yellow\_tripdata\_2017\_04.csv, Pickup location 132 generates the most revenue :  
13693066.230013674.**

"mrtask\_b\_Pickup.py yellow\_tripdata\_2017-05.csv > mrtask\_b\_Pickup\_out5.txt"

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_b_Pickup.py yellow_tripdata_2017-05.csv > mrtask_b_Pickup_out5.txt
No configs specified; falling back on auto-configuration
No configs found; falling back on auto-configuration
Creating temp directory /tmp/mrtask_b_Pickup.hadoop.20240506.095952.762823
Running step 1 of 2...
Running step 2 of 2...
Job output is in /tmp/mrtask_b_Pickup.hadoop.20240506.095952.762823/output...
Streaming final output from /tmp/mrtask_b_Pickup.hadoop.20240506.095952.762823...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_b_Pickup_out5.txt
"132"    14040591.220016211
[hadoop@ip-172-31-62-12 ~]$
```

In yellow\_tripdata\_2017\_05.csv, Pickup location 132 generates the most revenue :  
14040591.220016211.

C: What are the different payment types used by customers and their count? The final results should be in a sorted format.

The code, different payment types used by customers and their count are shown below:

"mrtask\_c\_Payment.py yellow\_tripdata\_2017-06.csv > mrtask\_c\_Payment\_out6.txt"

In yellow\_trip\_data\_2017-06 these different payment types used by customers and their counts

Numeric Code	Payment Type	Count
1	Credit Card	6514906
2	Cash	3073865
3	No Charge	52711
4	Dispute	15510

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_c_Payment.py yellow_tripdata_2017-06.csv > mrtask_c_Payment_out6.txt
/usr/bin/python3: can't open file 'mrtask_c_Payment.py': [Errno 2] No such file or directory
[hadoop@ip-172-31-62-12 ~]$ python mrtask_c_Payment.py yellow_tripdata_2017-06.csv > mrtask_c_Payment_out6.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_c_Payment.hadoop.20240506.100758.921801
Running step 1 of 3...
Running step 2 of 3...
Running step 3 of 3...
Job output is in /tmp/mrtask_c_Payment.hadoop.20240506.100758.921801/output...
Streaming final output from /tmp/mrtask_c_Payment.hadoop.20240506.100758.921801/output...
Removing temp directory /tmp/mrtask_c_Payment.hadoop.20240506.100758.921801...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_c_Payment_out6.txt
"1"    6514906
"2"    3073865
"3"    52711
"4"    15510
```

"mrtask\_c\_Payment.py yellow\_tripdata\_2017-01.csv > mrtask\_c\_Payment\_out1.txt"

In yellow\_trip\_data\_2017-01 these different payment types used by customers and their counts

Numeric Code	Payment Type	Count
1	Credit Card	6506189
2	Cash	3144926
3	No Charge	46257
4	Dispute	13447

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_c_Payment.py yellow_tripdata_2017-01.csv > mrtask_c_Payment_out1.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_c_Payment.hadoop.20240506.101721.083058
Running step 1 of 3...
Running step 2 of 3...
Running step 3 of 3...
Job output is in /tmp/mrtask_c_Payment.hadoop.20240506.101721.083058/output
Streaming final output from /tmp/mrtask_c_Payment.hadoop.20240506.101721.083058/output...
Removing temp directory /tmp/mrtask_c_Payment.hadoop.20240506.101721.083058...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_c_Payment_out1.txt
"1"
6506189
"2"
3144926
"3"
46257
"4"
13447
```

"mrtask\_c\_Payment.py yellow\_tripdata\_2017-02.csv > mrtask\_c\_Payment\_out2.txt"

In yellow\_trip\_data\_2017-02 these different payment types used by customers and their counts

Numeric Code	Payment Type	Count
1	Credit Card	6261976
2	Cash	2849713
3	No Charge	44719
4	Dispute	13367

```
[hadoop@ip-172-31-62-12 ~]$ python mrtask_c_Payment.py yellow_tripdata_2017-02.csv > mrtask_c_Payment_out2.txt
No configs found; falling back on auto-configuration
No config specified for inline runner
Creating temp directory /tmp/mrtask_c_Payment.hadoop.20240506.102607.390017
Running step 1 of 3...
Running step 2 of 3...
Running step 3 of 3...
Job output is in /tmp/mrtask_c_Payment.hadoop.20240506.102607.390017/output
Streaming final output from /tmp/mrtask_c_Payment.hadoop.20240506.102607.390017/output...
Removing temp directory /tmp/mrtask_c_Payment.hadoop.20240506.102607.390017...
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_c_Payment_out2.txt
"1"
6261976
"2"
2849713
"3"
44719
"4"
13367
```

"mrtask\_c\_Payment.py yellow\_tripdata\_2017-03.csv > mrtask\_c\_Payment\_out3.txt"

In yellow\_trip\_data\_2017-03 these different payment types used by customers and their counts

Numeric Code	Payment Type	Count
1	Credit Card	6994699
2	Cash	3231928
3	No Charge	53815
4	Dispute	14999

```
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_c_Payment_out3.txt
"1"          6994699
"2"          3231928
"3"          53815
"4"          14999
[hadoop@ip-172-31-62-12 ~]$
```

"mrtask\_c\_Payment.py yellow\_tripdata\_2017-04.csv > mrtask\_c\_Payment\_out4.txt"

In yellow\_trip\_data\_2017-04 these different payment types used by customers and their counts

Numeric Code	Payment Type	Count
1	Credit Card	6695495
2	Cash	3281576
3	No Charge	54383
4	Dispute	15680

```
for k, v in self.map_pairs(read_lines(), step num step num):
    File "/home/hadoop/.local/lib/python3.7/site-packages/mrjob/job.py", line 830, in map_pairs
        for k, v in mapper(key, value) or ():

KeyboardInterrupt
[hadoop@ip-172-31-62-12 ~]$ cat mrtask_c_Payment.out4.txt
"1"          6695495
"2"          3281576
"3"          54383
"4"          15680
[hadoop@ip-172-31-62-12 ~]$
```

"mrtask\_c\_Payment.py yellow\_tripdata\_2017-05.csv > mrtask\_c\_Payment\_out5.txt"

In yellow\_trip\_data\_2017-05 these different payment types used by customers and their count.

Numeric Code	Payment Type	Count
1	Credit Card	6780947
2	Cash	3250362
3	No Charge	55027
4	Dispute	15791

```
[hadoop@ip-172-31-60-118 ~]$ python mrtask_c_Payment.py yellow_tripdata_2017-06.csv > mrtask_c_payment_out5
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_c_Payment.hadoop.20240506.232021.328279
Running step 1 of 3...
Running step 2 of 3...
Running step 3 of 3...
job output is in /tmp/mrtask_c_Payment.hadoop.20240506.232021.328279/output
Streaming final output from /tmp/mrtask_c_Payment.hadoop.20240506.232021.328279/output...
Removing temp directory /tmp/mrtask_c_Payment.hadoop.20240506.232021.328279...
[hadoop@ip-172-31-60-118 ~]$ cat mrtask_c_payment_out5
"1"      6780947
"2"      3250362
"3"      55027
"4"      15791
```

#### D:What is the average trip time for different pickup locations?

The average trip time for different pickup locations and code used is shown below:

' python mrtask\_d.py yellow\_tripdata\_2017-06.csv > mrtask\_d.txt'

```
[hadoop@ip-172-31-0-39 ~]$ cat mrtask_d.txt
"1"      5.338660265203475
"10"     52.437377504753535
"100"    16.125691157068825
"101"    6.0959259259259255
"102"    17.935955056179775
"104"    23.616666666666667
"105"    23.20595238095238
"106"    13.447445972495084
"107"    14.582236916319776
"108"    16.499603174603173
"109"    0.06666666666666667
"11"     15.567610062893085
"111"    10.931884057971013
"112"    14.983972247179802
"113"    15.246709027538865
"114"    16.294550231141617
"115"    16.663888888888888
"116"    16.947191858810125
"117"    17.430864197530866
"118"    3.5595238095238098
"119"    20.20280193236715
"12"     24.6838491234732
"120"    16.28937198067633
```

```

"170" 15.245945603125477
"171" 11.465671641791046
"172" 12.147619047619047
"173" 17.319151138716354
"174" 10.038501111111111
"175" 9.1557407407407407
"176" 15.683333233333333
"177" 18.15905947441217
"178" 7.864930555555555
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**"python mrtask\_d\_AvgTripTime.py yellow\_tripdata\_2017-05.csv > mrtask\_d\_AvgT\_out5.txt"**

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[hadoop@ip-172-31-60-110 ~]$ cat mrtask_d_AvgT_out5.txt
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**"python mrtask\_d\_AvgTripTime.py yellow\_tripdata\_2017-04.csv > mrtask\_d\_AvgT\_out4.txt"**

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[hadoop@ip-172-31-60-118 ~]$ cat mrtask_d_AvgT_out4.txt
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[hadoop@ip-172-31-60-118 ~]$ ls

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```

"python mrtask_d_AvgTripTime.py yellow_tripdata_2017-01.csv >
mrtask_d_AvgT_out1.txt"

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[hadoop@ip-172-31-59-199 ~]$ cat mrtask_d Avro.outl.txt
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1.hadoop@ip-172-31-19-199 ~ %
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**"python mrtask\_d\_AvgTripTime.py yellow\_tripdata\_2017-02.csv > mrtask\_d\_AvgT\_out2.txt"**

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"python mrtask_d_AvgTripTime.py yellow_tripdata_2017-03.csv > mrtask_d_AvgT_out3.txt"
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**E: Calculate the average tips to revenue ratio of the drivers for different pickup locations in sorted format.**

**The average tips to revenue ratio of the drivers for different pickup locations in sorted format and codes are shown below:**

**“python mrtask\_e.py yellow\_tripdata\_2017-06 > mrtask\_e.txt”**

```
[hadoop@ip-172-31-5-239 ~]$ python mrtask_e.py yellow_tripdata_2017-06.csv > mrtask_e.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_e.hadoop.20240304.133614.271126
Running step 1 of 1...

job output is in /tmp/mrtask_e.hadoop.20240304.133614.271126/output
Streaming final output from /tmp/mrtask_e.hadoop.20240304.133614.271126/output...
Removing temp directory /tmp/mrtask_e.hadoop.20240304.133614.271126...
```

```
[hadoop@ip-172-31-5-239 ~]$ mrtask_e.txt
-bash: mrtask_e.txt: command not found
[hadoop@ip-172-31-5-239 ~]$ cat mrtask_e.txt
"1" 0.11567304069705615
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"108" 0.035734939936089356
"109" 0.0
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“python mrtask\_e.py yellow\_tripdata\_2017-01 > mrtask\_e\_AvgTips\_out1.txt”

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**"python mrtask\_e.py yellow\_tripdata\_2017-02 > mrtask\_e\_AvgTips\_out2.txt"**

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removing temp directory /tmp/mrtask_c_AvgTips.hadoop.20246566.143746.550625...
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**“python mrtask\_e.py yellow\_tripdata\_2017-03 > mrtask\_e\_AvgTips\_out3.txt”**

```

[hadoop@ip-1-2-31-60-64 ~]$ cat mrtask_e_AvgTips_out3.txt
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"python mrtask\_e.py yellow\_tripdata\_2017-04 > mrtask\_e\_AvgTips\_out4.txt"

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[hadoop@ip-172-31-60-118 ~]$ cat mrtask_e_AvgTips_out4.txt
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[hadoop@ip-172-31-60-118 ~]$
```

## "python mrtask\_e.py yellow\_tripdata\_2017-05 > mrtask\_e\_AvgTips\_out5.txt"

```

removing temp directory /tmp/mrtask_e_AvgTips.hadoop.20240506.211431.950102...
[hadoop@ip-172-31-60-118 ~]$ cat mrtask_e_AvgTips_out5.txt
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**F: How does revenue vary over time? Calculate the average trip revenue per month - analyzing it by hour of the day (day vs night) and the day of the week (weekday vs weekend).**

Variation in revenue over time is shown below including code used :

**"python mrtask\_f\_RevenuVary.py yellow\_tripdata\_2017-04.csv > mrtask\_f\_out4.txt"**

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[hadoop@ip-172-31-60-118 ~]$ python mrtask_f_RevenuVary.py yellow_tripdata_2017-05.csv > mrtask_f_out5.txt
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**"python mrtask\_f\_RevenuVary.py yellow\_tripdata\_2017-05.csv > mrtask\_f\_out5.txt"**

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““python mrtask\_f\_RevenuVary.py yellow\_tripdata\_2017-06.csv > mrtask\_f.txt”

```
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mrtask_a.py mrtask_b.py mrtask_c.py mrtask_d.py mrtask_e.py mrtask_f.py yellow_tripdata_2017-06.csv
[hadoop@ip-172-31-0-39 ~]$ python mrtask_f.py yellow_tripdata_2017-06.csv > mrtask_F.txt
No configs found; falling back on auto-configuration
No config specifications for inline runner
creating temp directory /tmp/mrtask_F.hadoop.20240305.035441.623748
Running step 1 of 1...
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**"python mrtask\_f\_RevenuVary.py yellow\_tripdata\_2017-01.csv > mrtask\_f\_out1.txt"**

```
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"python mrtask\_f\_RevenuVary.py yellow\_tripdata\_2017-02.csv > mrtask\_f\_out2.txt"

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"python mrtask\_f\_RevenuVary.py yellow\_tripdata\_2017-03.csv > mrtask\_f\_out3.txt"

hadoop@ip-172-31-55-118 ~]\$ cat mrtask_f_out3.txt	
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