

For task 4, Dataset used is: https://nyc-tlc-upgrad.s3.amazonaws.com/yellow_tripdata_2017-05.csv

Task 4. Write MapReduce codes to perform the tasks using the files you've downloaded on your EMR Instance:

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

```
[hadoop@ip-172-31-34-221 ~]$ python mrtask_a.py yellow_tripdata_2017-05.csv > mrtask_a.t
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_a.hadoop.20230711.080915.677828
Running step 1 of 2...
Running step 2 of 2...
job output is in /tmp/mrtask_a.hadoop.20230711.080915.677828/output
Streaming final output from /tmp/mrtask_a.hadoop.20230711.080915.677828/output...
Removing temp directory /tmp/mrtask_a.hadoop.20230711.080915.677828...
[hadoop@ip-172-31-34-221 ~]$ ls
mrtask_a.py mrtask_a.txt mrtask_b.py mrtask_c.py mrtask_d.py mrtask_e.py mrtask_f.
[hadoop@ip-172-31-34-221 ~]$ cat mrtask_a.txt
"2"      92896777.54522054
```

Vendor 2 i.e. VeriFone Inc. has most trips and revenue generated is 92896777.545

- Which pickup location generates the most revenue?

```
[hadoop@ip-172-31-34-221 ~]$ python mrtask_b.py yellow_tripd
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_b.hadoop.20230711.081820
Running step 1 of 2...
Running step 2 of 2...
job output is in /tmp/mrtask_b.hadoop.20230711.081820.834912
Streaming final output from /tmp/mrtask_b.hadoop.20230711.08
Removing temp directory /tmp/mrtask_b.hadoop.20230711.081820
[hadoop@ip-172-31-34-221 ~]$ cat mrtask_b.txt
"132"    14040591.220016211
```

Pickup location 132 generate most revenue (14040591.22)

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

```
[hadoop@ip-172-31-34-221 ~]$ python mrtask_c.py yellow
task_c.txt
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_c.hadoop.20230711
Running step 1 of 3...
Running step 2 of 3...
Running step 3 of 3...
job output is in /tmp/mrtask_c.hadoop.20230711.082928
Streaming final output from /tmp/mrtask_c.hadoop.2023
.
Removing temp directory /tmp/mrtask_c.hadoop.20230711
[hadoop@ip-172-31-34-221 ~]$ cat mrtask_c.txt
"1"      6780947
"2"      3250362
"3"      55027
"4"      15791
```

Different payment types used by customers with their count

1= Credit card 6780947 times

2= Cash 3250362 times

3= No charge 55027 times

4= Dispute 15791 times

Payment through credit card has done more often.

- What is the average trip time for different pickup locations?

```

[hadoop@ip-172-31-34-221 ~]$ python mrtask_d.py yellow_tr
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_d.hadoop.20230711.083
Running step 1 of 1...
job output is in /tmp/mrtask_d.hadoop.20230711.083318.497
Streaming final output from /tmp/mrtask_d.hadoop.20230711
Removing temp directory /tmp/mrtask_d.hadoop.20230711.083
[hadoop@ip-172-31-34-221 ~]$ cat mrtask_d.txt
"1"      1.8963513513513515
"10"     14.784510175106485
"100"    2.3583416159916184
"101"    4.407368421052632
"102"    4.257391304347826
"105"    5.123333333333333
"106"    2.9348579970104627
"107"    2.1812257303114073
"108"    4.271621621621622
"109"    9.471666666666666
"11"     3.6414545454545455
"111"    4.137777777777778
"112"    3.204110059009193
"113"    2.1453345228565595
"114"    2.4499525294398175
"115"    7.224117647058824
"116"    3.2416491850895612
"117"    3.902
"118"    5.0325

```

| | |
|-------|--------------------|
| "119" | 4.112847457627119 |
| "12" | 4.305276752767527 |
| "120" | 3.9216666666666664 |
| "121" | 5.069833333333333 |
| "122" | 4.136428571428572 |
| "123" | 3.4856190476190476 |
| "124" | 9.489130434782611 |
| "125" | 2.689897507338673 |
| "126" | 3.7986046511627913 |
| "127" | 4.1472131147540985 |
| "128" | 4.010151515151515 |
| "129" | 3.1797690150140263 |
| "13" | 4.079870218579237 |
| "130" | 10.670037926675096 |
| "131" | 3.891428571428572 |
| "132" | 15.813210471679033 |
| "133" | 3.710020161290322 |
| "134" | 4.848827838827839 |
| "135" | 4.610677966101695 |
| "136" | 3.2123214285714283 |
| "137" | 2.273821482798653 |
| "138" | 9.803271122424995 |
| "139" | 6.4399999999999995 |
| "14" | 4.21104748603352 |
| "140" | 2.4399056430656008 |
| "141" | 2.031282508800451 |
| "142" | 2.1924750966178936 |
| "143" | 2.130199310503332 |
| "144" | 2.567911105272376 |
| "145" | 2.7707153569286134 |
| "146" | 2.9258572614107874 |
| "147" | 3.644929577464789 |
| "148" | 2.9983711720299726 |
| "149" | 3.667241379310345 |
| "15" | 5.758846153846155 |
| "150" | 10.890588235294118 |
| "151" | 2.373422336811584 |
| "152" | 2.7701452419126675 |
| "153" | 3.2430841121495333 |
| "154" | 12.090454545454547 |
| "155" | 7.9753703703703716 |
| "156" | 6.326666666666667 |
| "157" | 5.11553775743707 |
| "158" | 2.5407339206902777 |

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| "159" | 2.741303418803419 |
| "16" | 3.882264150943396 |
| "160" | 5.027348066298342 |
| "161" | 2.407829960083504 |
| "162" | 2.4564139713089146 |
| "163" | 2.505548649501257 |
| "164" | 2.443977289220907 |
| "165" | 3.4146527777777775 |
| "166" | 2.771817204105071 |
| "167" | 2.529025641025641 |
| "168" | 2.6316693079767566 |
| "169" | 3.2544848484848488 |
| "17" | 2.6008758643398084 |
| "170" | 2.306999374466153 |
| "171" | 3.461692307692308 |
| "172" | 13.6275 |
| "173" | 3.0229629629629624 |
| "174" | 4.04 |
| "175" | 5.009655172413794 |
| "176" | 1.9 |
| "177" | 3.598070866141732 |
| "178" | 2.0275 |
| "179" | 2.94429705882353 |
| "18" | 2.7466666666666666 |
| "180" | 6.739895833333332 |
| "181" | 3.083214468958441 |
| "182" | 3.17288 |
| "183" | 4.5660000000000001 |
| "184" | 3.3619999999999997 |
| "185" | 4.61734375 |
| "186" | 2.333892982507892 |
| "187" | 0.515 |
| "188" | 3.176027190332326 |
| "189" | 2.9525265871737023 |
| "19" | 5.386202531645569 |
| "190" | 3.3897969543147206 |
| "191" | 5.857777777777779 |
| "192" | 4.213578947368421 |
| "193" | 2.2481397697434864 |
| "194" | 6.300750187546888 |
| "195" | 5.015010570824523 |
| "196" | 4.499245283018869 |
| "197" | 4.336206896551724 |
| "198" | 3.3302356020942403 |

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| "2" | 15.628 |
| "20" | 4.199482758620689 |
| "200" | 4.011764705882353 |
| "201" | 1.5875000000000001 |
| "202" | 3.7194517543859646 |
| "203" | 7.559298245614035 |
| "204" | 0.0 |
| "205" | 5.99439024390244 |
| "206" | 4.365 |
| "207" | 0.9527977839335181 |
| "208" | 7.199746835443038 |
| "209" | 3.86251104004873 |
| "21" | 4.673584905660377 |
| "210" | 4.63673076923077 |
| "211" | 2.487208488665291 |
| "212" | 3.9333333333333336 |
| "213" | 4.587924528301888 |
| "214" | 3.0537500000000004 |
| "215" | 14.194060150375941 |
| "216" | 9.401535714285712 |
| "217" | 2.477798861480076 |
| "218" | 5.3277215189873415 |
| "219" | 14.985766283524905 |
| "22" | 5.637155963302751 |
| "220" | 3.6425405405405398 |
| "221" | 7.362857142857143 |
| "222" | 7.351851851851852 |
| "223" | 3.7075352509870276 |
| "224" | 2.432679651913794 |
| "225" | 2.8636828422876945 |
| "226" | 3.2215771675120997 |
| "227" | 3.3641747572815532 |
| "228" | 3.601782608695652 |
| "229" | 2.2175258394501753 |
| "23" | 0.37076923076923074 |
| "230" | 2.9488900969213856 |
| "231" | 2.947517054689152 |
| "232" | 3.1251747491225452 |
| "233" | 2.629417871624205 |
| "234" | 2.140370254363903 |
| "235" | 3.1768152866242034 |
| "236" | 1.915109196411948 |
| "237" | 1.7858244907075234 |
| "238" | 2.1976654486807954 |

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| "239" | 2.1699935475198275 |
| "24" | 2.5398004462862622 |
| "240" | 6.55 |
| "241" | 5.511960784313724 |
| "242" | 3.1065030674846623 |
| "243" | 3.9280823244552057 |
| "244" | 3.859655078018067 |
| "245" | 6.5566666666666675 |
| "246" | 2.43037444545538 |
| "247" | 3.396094141211817 |
| "248" | 3.960555555555556 |
| "249" | 2.331100343216705 |
| "25" | 3.223044561306395 |
| "250" | 3.658545454545455 |
| "251" | 0.0 |
| "252" | 11.043285714285714 |
| "253" | 10.870333333333331 |
| "254" | 3.2384126984126986 |
| "255" | 3.2587630169144663 |
| "256" | 3.071776916058395 |
| "257" | 3.529800995024877 |
| "258" | 5.009236641221373 |
| "259" | 6.80018181818182 |
| "26" | 2.775660377358491 |
| "260" | 3.1187947882736156 |
| "261" | 4.118910211089791 |
| "262" | 2.351199813220393 |
| "263" | 2.247442936074819 |
| "264" | 2.740137116264891 |
| "265" | 3.004131668558456 |
| "27" | 5.5225 |
| "28" | 9.276488888888888 |
| "29" | 4.562096774193549 |
| "3" | 5.643076923076924 |
| "30" | 4.5725 |
| "31" | 5.776785714285714 |
| "32" | 4.486 |
| "33" | 3.9401166890530575 |
| "34" | 2.890483870967742 |
| "35" | 2.7346067415730335 |
| "36" | 3.374567053854276 |
| "37" | 2.9127586206896563 |
| "38" | 11.412500000000001 |
| "39" | 4.854562500000001 |

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|------|--------------------|
| "4" | 2.6611554332874814 |
| "40" | 3.513990759917158 |
| "41" | 2.380275691184145 |
| "42" | 2.3619086651053878 |
| "43" | 2.1714665761838225 |
| "44" | 3.2249999999999996 |
| "45" | 3.005350604956598 |
| "46" | 10.254444444444443 |
| "47" | 3.3429126213592237 |
| "48" | 2.4923745818332486 |
| "49" | 2.7995866417561883 |
| "5" | 0.0 |
| "50" | 2.5360595959391246 |
| "51" | 4.086923076923077 |
| "52" | 3.7498505349276265 |
| "53" | 6.21578125 |
| "54" | 3.3693464052287574 |
| "55" | 8.087078651685394 |
| "56" | 5.232658227848102 |
| "57" | 4.577674418604651 |
| "58" | 2.6833333333333336 |
| "59" | 5.491666666666667 |
| "6" | 3.3785416666666666 |
| "60" | 3.4399999999999995 |
| "61" | 3.182284122562674 |
| "62" | 3.131752988047809 |
| "63" | 5.67 |
| "64" | 5.251785714285715 |
| "65" | 3.8151426675514264 |
| "66" | 3.8902724458204347 |
| "67" | 3.525735294117647 |
| "68" | 2.371367752915331 |
| "69" | 3.49967816091954 |
| "7" | 2.686767478813559 |
| "70" | 7.64059966685175 |
| "71" | 2.570574712643679 |
| "72" | 4.611609195402299 |
| "73" | 7.617894736842104 |
| "74" | 2.4368271939893584 |
| "75" | 2.3318668335127883 |
| "76" | 5.570760869565218 |
| "77" | 4.140232558139535 |
| "78" | 2.3609345794392524 |
| "79" | 2.5185250136273907 |

| | |
|------|--------------------|
| "6" | 3.3785416666666666 |
| "60" | 3.4399999999999995 |
| "61" | 3.182284122562674 |
| "62" | 3.131752988047809 |
| "63" | 5.67 |
| "64" | 5.251785714285715 |
| "65" | 3.8151426675514264 |
| "66" | 3.8902724458204347 |
| "67" | 3.525735294117647 |
| "68" | 2.371367752915331 |
| "69" | 3.49967816091954 |
| "7" | 2.686767478813559 |
| "70" | 7.64059966685175 |
| "71" | 2.570574712643679 |
| "72" | 4.611609195402299 |
| "73" | 7.617894736842104 |
| "74" | 2.4368271939893584 |
| "75" | 2.3318668335127883 |
| "76" | 5.570760869565218 |
| "77" | 4.140232558139535 |
| "78" | 2.3609345794392524 |
| "79" | 2.5185250136273907 |
| "8" | 6.190934579439252 |
| "80" | 3.290249366582214 |
| "81" | 4.055000000000001 |
| "82" | 3.0552781501340487 |
| "83" | 3.0685819793205313 |
| "84" | 0.7566666666666667 |
| "85" | 3.629917695473251 |
| "86" | 4.97875 |
| "87" | 4.404339442750863 |
| "88" | 4.554268827687057 |
| "89" | 3.6615224191866527 |
| "9" | 5.005217391304348 |
| "90" | 2.080642816342809 |
| "91" | 5.015877862595421 |
| "92" | 4.557424547283702 |
| "93" | 9.69424668227947 |
| "94" | 2.5869999999999997 |
| "95" | 4.579155313351499 |
| "96" | 5.0180952380952375 |
| "97" | 3.096598906894239 |
| "98" | 6.322750000000001 |

- Calculate the average tips to revenue ratio of the drivers for different pickup locations

in sorted format.

```
[hadoop@ip-172-31-34-221 ~]$ python mrtask_e.py yellow_tr
No configs found; falling back on auto-configuration
No configs specified for inline runner
Creating temp directory /tmp/mrtask_e.hadoop.20230711.084
Running step 1 of 1...
job output is in /tmp/mrtask_e.hadoop.20230711.084941.508
Streaming final output from /tmp/mrtask_e.hadoop.20230711
Removing temp directory /tmp/mrtask_e.hadoop.20230711.084
[hadoop@ip-172-31-34-221 ~]$ cat mrtask_e.txt
"1"      0.11961918264336044
"10"     0.1031314953272488
"100"    0.10054811858030266
"101"    0.1538484771604267
"102"    0.09686867923894887
"105"    0.07175925925925926
"106"    0.11203391656570175
"107"    0.11929564967810695
"108"    0.12120884627098828
"109"    0.23737785016286642
"11"     0.058159884648828326
"111"    0.077659754354142
"112"    0.10900187462682069
"113"    0.11769752457713911
"114"    0.11571668143567702
"115"    0.1014877461571702
"116"    0.09140144834181262
"117"    0.029865191166550988
"118"    0.03324247058041353
```

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|-------|----------------------|
| "119" | 0.06439098561727422 |
| "12" | 0.09033344274559964 |
| "120" | 0.14485426649668087 |
| "121" | 0.06025386778698323 |
| "122" | 0.035274937009041045 |
| "123" | 0.0750228876958997 |
| "124" | 0.09886020334918795 |
| "125" | 0.1223467893609015 |
| "126" | 0.05493403420192623 |
| "127" | 0.08833111068775 |
| "128" | 0.10511320192841678 |
| "129" | 0.06647065796213625 |
| "13" | 0.12390141102889671 |
| "130" | 0.1073558396219219 |
| "131" | 0.10384807204137783 |
| "132" | 0.1025660513460536 |
| "133" | 0.09147281347725217 |
| "134" | 0.10314438578934823 |
| "135" | 0.0785122214655781 |
| "136" | 0.032600578121018825 |
| "137" | 0.11253077758026406 |
| "138" | 0.1304834446631976 |
| "139" | 0.025278845473624637 |
| "14" | 0.09666329734829485 |
| "140" | 0.1110704470853594 |
| "141" | 0.11186974122790275 |
| "142" | 0.1131558975317282 |
| "143" | 0.11473162975887714 |
| "144" | 0.1105272721674073 |
| "145" | 0.09866671202718473 |
| "146" | 0.09229805528093973 |
| "147" | 0.04671430427439263 |
| "148" | 0.11347366987186253 |
| "149" | 0.12259087582337157 |
| "15" | 0.12542820971105154 |
| "150" | 0.10633375877472878 |
| "151" | 0.10794854174655912 |
| "152" | 0.08497213797829244 |
| "153" | 0.08409909578769388 |
| "154" | 0.07400473993394348 |
| "155" | 0.09130948944530835 |
| "156" | 0.07496251874062969 |
| "157" | 0.11154334990834797 |
| "158" | 0.1177428105347338 |

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|-------|----------------------|
| "159" | 0.04880437380957894 |
| "16" | 0.1296825635625094 |
| "160" | 0.09369565599255213 |
| "161" | 0.09989106877197958 |
| "162" | 0.11962265897953572 |
| "163" | 0.11101476605573193 |
| "164" | 0.11138449806107008 |
| "165" | 0.07196634804086764 |
| "166" | 0.11344656333427505 |
| "167" | 0.0356042774025466 |
| "168" | 0.050410277807923884 |
| "169" | 0.11765956298165817 |
| "17" | 0.08304806476027186 |
| "170" | 0.11737627919224174 |
| "171" | 0.04416689447785676 |
| "172" | 0.27196083763937995 |
| "173" | 0.0662888212150767 |
| "174" | 0.09292588232864547 |
| "175" | 0.08816570904350345 |
| "176" | 0.19982277359326542 |
| "177" | 0.09851238280057963 |
| "178" | 0.03941897087008663 |
| "179" | 0.08647112167836499 |
| "18" | 0.07413049841666887 |
| "180" | 0.10306335321889983 |
| "181" | 0.11383678943060177 |
| "182" | 0.04935382990636337 |
| "183" | 0.04058310746465461 |
| "184" | 0.03374233128834356 |
| "185" | 0.07860584480628201 |
| "186" | 0.10968385132719934 |
| "187" | 0.03211303789338471 |
| "188" | 0.07172143661981017 |
| "189" | 0.10932535246060386 |
| "19" | 0.11032972645756875 |
| "190" | 0.10117750519544694 |
| "191" | 0.05438239409744308 |
| "192" | 0.0720589495330306 |
| "193" | 0.03922346473669742 |
| "194" | 0.12076731965739748 |
| "195" | 0.09492841545380133 |
| "196" | 0.09427848086047703 |
| "197" | 0.10215364731577099 |
| "198" | 0.10078643815066789 |

| | |
|-------|----------------------|
| "2" | 0.11989767545323099 |
| "20" | 0.0736013986013986 |
| "200" | 0.13187606166264348 |
| "201" | 0.132044713553796 |
| "202" | 0.09899140045991586 |
| "203" | 0.048087416271543615 |
| "204" | 0.0684931506849315 |
| "205" | 0.07523246599344224 |
| "206" | 0.08833170762908359 |
| "207" | 0.0815078125388226 |
| "208" | 0.08291166272142231 |
| "209" | 0.11297948250644907 |
| "21" | 0.06386360722984234 |
| "210" | 0.07934380776340108 |
| "211" | 0.11310320504679515 |
| "212" | 0.06409624702307627 |
| "213" | 0.11780938978546256 |
| "214" | 0.02993836219547989 |
| "215" | 0.10353565292295142 |
| "216" | 0.11008942973165864 |
| "217" | 0.07868790199337758 |
| "218" | 0.19235819846724786 |
| "219" | 0.1049626881741011 |
| "22" | 0.05041866234795492 |
| "220" | 0.056836272960188075 |
| "221" | 0.10844779603195978 |
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- **How does revenue vary over time? Calculate the average trip revenue per month - analysing it by hour of the day (day vs night) and the day of the week (weekday vs weekend).**


```
[ec2-user@ip-172-31-44-171 ~]$ python mrtask_f.py yellow_  
No configs found; falling back on auto-configuration  
No configs specified for inline runner  
Creating temp directory /tmp/mrtask_f.ec2-user.20230711.0  
Running step 1 of 1...  
job output is in /tmp/mrtask_f.ec2-user.20230711.092853.3  
Streaming final output from /tmp/mrtask_f.ec2-user.20230711.0  
Removing temp directory /tmp/mrtask_f.ec2-user.20230711.0  
[ec2-user@ip-172-31-44-171 ~]$ cat mrtask_f.txt  
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[5, 0, 1]      19.42010595117413  
[5, 0, 2]      17.686158986637274  
[5, 0, 3]      17.25599944664103  
[5, 0, 4]      18.099999027301898  
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