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hr_db & gp_db Databases are available in Verulam Blue

```
scala> spark.sql("SHOW DATABASES").show()
+------------+
|databaseName|
+------------+
|    bogus_db|
|     default|
|      emr_db|
|       gp_db|
|       hr_db|
|    sales_db|
|solutions_db|
|    store_db|
|    union_db|
+------------+
```

1. Find the top 15 most common first names of the company's male's employees. Create a report showing the first name, its frequency, and its rank.

   # DATA DESCRIPTION:

   Employee records are stored in the metastore table hr_records in the database hr_db.

   # OUTPUT REQUIREMENTS:

   • Place the result data in the hdfs directory: /user/studentID/solution

   • Use a text format with a hyphen as the columnar delimiter.

   • Order results by rank in ascending order.

   • No ranks should be skipped if there are ranks with multiple names.

```
scala> spark.sql("use hr_db")
res1: org.apache.spark.sql.DataFrame = []

scala> var nomor1 = spark.sql("""
     | select first_name, frequency, dense_rank() over (order by frequency desc) rank
     | from
     | (
     | select first_name, count(*) frequency from hr_records
     | where gender='M'
     | group by first_name
     | order by count(*) desc
     | )T
     | """)
nomor1: org.apache.spark.sql.DataFrame = [first_name: string, frequency: bigint ... 1 more field]

scala> nomor1.write.mode("overwrite").format("csv").option("delimiter", "-").option("header", "true").save("hdfs:/user/2501967096/solution")
```

```
scala> spark.read.option("header", "true").csv("hdfs:/user/2501967096/solution").show(15)
+------------------------+
|first_name-frequency-rank|
+------------------------+
|              Fidel-253-1|
|             Ralph-252-2|
|              Otis-250-3|
|          Terrance-250-3|
|              Otha-249-4|
|             Lamar-247-5|
|            Efrain-246-6|
|            Alvaro-244-7|
|              Phil-243-8|
|            Walker-243-8|
|             Keith-242-9|
|              Amos-242-9|
|             Myron-242-9|
|             Luigi-242-9|
|         Garfield-241-10|
+------------------------+
only showing top 15 rows
```

```
verulam-blue ~ hdfs dfs -ls /user/2501967096/solution
Found 2 items
-rw-r--r--   1 verulam-blue supergroup          0 2023-02-04 03:08 /user/2501967096/solution/_SUCCESS
-rw-r--r--   1 verulam-blue supergroup      16738 2023-02-04 03:08 /user/2501967096/solution/part-00000-9a292037-9782-4603-b072-41b9a080678a-c000.csv
```

Note: Total records of final output should be 1219

```
scala> nomor1.count()
res4: Long = 1219
```

2. # INSTRUCTIONS:

Use the EMR data to find the total number of emergency department visits that were due to influenza-like illness and/or pneumonia that resulted in hospitalization for the months of May, June & July

DATA DESCRIPTION:

Emergency department visits records are stored as Parquet files, compressed using gzip, and stored in the HDFS directory. You may access the directory using this path: /user/verulam_blue/data/emr_data

- The 'date_of_visit' column represents the date of hospital visit.
- The 'column li_pne_admissions' represent the count of influenza-like illness and/or pneumonia visits that went on to be admitted to the hospital.

OUTPUT REQUIREMENTS:

- Place the result data in the hdfs directory: /user/studentID/solution
- Results should show month of visit and number of hospitalizations.
- Use a text format with a tab as the columnar delimiter.

```
verulam-blue ~ hdfs dfs -ls /user/verulam_blue/data/emr_data
Found 1 items
-rw-r--r--   1 verulam-blue supergroup    7688803 2020-10-13 06:39 /user/verulam_blue/data/emr_data/emr_flu_visits.gz.parquet
```

```
scala> var nomor2_read = spark.read.parquet("hdfs:/user/verulam_blue/data/emr_data/emr_flu_visits.gz.parquet")
nomor2_read: org.apache.spark.sql.DataFrame = [extract_date: date, date_of_visit: date ... 4 more fields]

scala> nomor2_read.createOrReplaceTempView("table_no2")

scala> var nomor2 = spark.sql("""
     | select  month(date_of_visit) as `month_of_visit`, sum(ili_pne_admissions) as `number_of_hospitalizations` from table_no2
     | where month(date_of_visit)>=5 and month(date_of_visit)<=7
     | group by  month(date_of_visit)
     | order by month(date_of_visit)
     | """)
nomor2: org.apache.spark.sql.DataFrame = [month_of_visit: int, number_of_hospitalizations: bigint]

scala> nomor2.write.mode("overwrite").format("csv").option("delimiter", "\t").option("header", "true").save("hdfs:/user/2501967096/solution")

scala> spark.read.option("header", "true").csv("hdfs:/user/2501967096/solution").show()
+----------------------------------------+
|month_of_visit number_of_hospitalizations|
+----------------------------------------+
|                               5     200801|
|                               6     113289|
|                               7     122021|
+----------------------------------------+
```

```
verulam-blue ~ hdfs dfs -ls /user/2501967096/solution
Found 4 items
-rw-r--r--   1 verulam-blue supergroup          0 2023-02-04 03:11 /user/2501967096/solution/_SUCCESS
-rw-r--r--   1 verulam-blue supergroup         51 2023-02-04 03:11 /user/2501967096/solution/part-00000-6ccb0e28-0078-4be3-a3c4-5cccf5d9dc30-c000.csv
-rw-r--r--   1 verulam-blue supergroup         51 2023-02-04 03:11 /user/2501967096/solution/part-00001-6ccb0e28-0078-4be3-a3c4-5cccf5d9dc30-c000.csv
-rw-r--r--   1 verulam-blue supergroup         51 2023-02-04 03:11 /user/2501967096/solution/part-00002-6ccb0e28-0078-4be3-a3c4-5cccf5d9dc30-c000.csv
```

3. Working with the "gp_db" database use the "items" column from the metastore table "gp_rx" together with the "gp_address" table to find the total number of prescriptions made by each GP practice in the city of Bolton.

- The "items" column, in the metastore table "gp_rx", represents the "total number of items prescribed".

- The first 4 letters of postcodes for GP practices in Bolton are: 'BL1 ','BL2 ','BL3 '

OUTPUT REQUIREMENTS

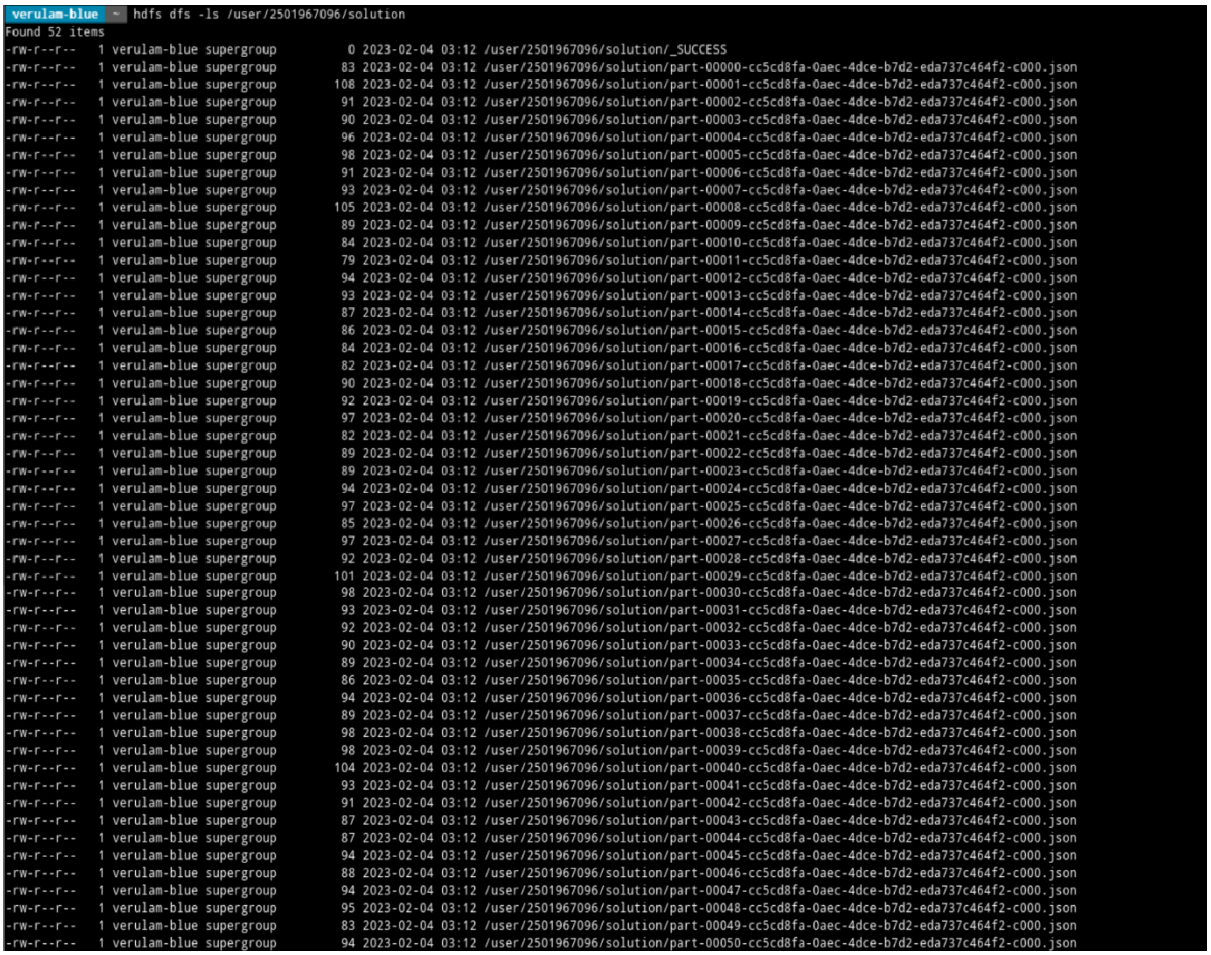
- Results data should be saved as a JSON file
- Place the result data in the hdfs directory: /user/studentID/solution
- Order results by "practice_code" in descending order.

```
scala> spark.sql("use gp_db")
res8: org.apache.spark.sql.DataFrame = []

scala> var nomor3 = spark.sql("""
     | select gp_rx.practice_code, surgery_name, sum(items) nbr_prescriptions
     | from gp_address
     | join gp_rx
     | on gp_address.practice_code=gp_rx.practice_code
     | where substring(postcode,1,4) like "BL1 " or substring(postcode,1,4) like "BL2 " or substring(postcode,1,4) like "BL3 "
     | group by  gp_rx.practice_code, surgery_name
     | order by gp_rx.practice_code desc
     | """)
nomor3: org.apache.spark.sql.DataFrame = [practice_code: string, surgery_name: string ... 1 more field]
```

```
scala> nomor3.show()
+-------------+--------------------+-----------------+
|practice_code|        surgery_name|nbr_prescriptions|
+-------------+--------------------+-----------------+
|       Y04600|       BARDOC GP OOH|             3042|
|       Y03641|BOLTON COMMUNITY ...|             2267|
|       Y03366|OLIVE FAMILY PRAC...|             5030|
|       Y03364|GREAT LEVER PRACTICE|             5619|
|       Y03079|BOLTON COMMUNITY ...|            22209|
|       Y02943|NEUROLOGY LONG TE...|               56|
|       Y02790|BOLTON MEDICAL CE...|             4155|
|       Y02319|BOLTON GENERAL PR...|             5095|
|       Y00747|HALLIWELL HEALTH ...|              165|
|       Y00552|MINOR TREATMENT C...|                1|
|       Y00448|     DIABETES CENTRE|              150|
|       Y00233|        THE PARALLEL|                1|
|       Y00215|ORTHOPAEDIC & RHE...|               70|
|       Y00208|TIER 2 DERMATOLOG...|                9|
|       Y00186|   3D MEDICAL CENTRE|             1547|
|       P82661|   INTERMEDIATE CARE|              470|
|       P82660|      DEANE CLINIC 1|             6620|
|       P82654|      BOLTON HOSPICE|               14|
|       P82640|AL FAL MEDICAL GROUP|             6785|
|       P82634|WYRESDALE ROAD SU...|             5443|
+-------------+--------------------+-----------------+
only showing top 20 rows


scala> nomor3.write.mode("overwrite").format("json").option("header", "true").save("hdfs:/user/2501967096/solution")
```


verulam-blue ~ hdfs dfs -ls /user/2501967096/solution
Found 52 items
-rw-r--r-- 1 verulam-blue supergroup 0 2023-02-04 03:12 /user/2501967096/solution/_SUCCESS
-rw-r--r-- 1 verulam-blue supergroup 83 2023-02-04 03:12 /user/2501967096/solution/part-00000-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 108 2023-02-04 03:12 /user/2501967096/solution/part-00001-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 91 2023-02-04 03:12 /user/2501967096/solution/part-00002-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 90 2023-02-04 03:12 /user/2501967096/solution/part-00003-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 96 2023-02-04 03:12 /user/2501967096/solution/part-00004-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 98 2023-02-04 03:12 /user/2501967096/solution/part-00005-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 91 2023-02-04 03:12 /user/2501967096/solution/part-00006-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 93 2023-02-04 03:12 /user/2501967096/solution/part-00007-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 105 2023-02-04 03:12 /user/2501967096/solution/part-00008-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 89 2023-02-04 03:12 /user/2501967096/solution/part-00009-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 84 2023-02-04 03:12 /user/2501967096/solution/part-00010-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 79 2023-02-04 03:12 /user/2501967096/solution/part-00011-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 94 2023-02-04 03:12 /user/2501967096/solution/part-00012-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 93 2023-02-04 03:12 /user/2501967096/solution/part-00013-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 87 2023-02-04 03:12 /user/2501967096/solution/part-00014-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 86 2023-02-04 03:12 /user/2501967096/solution/part-00015-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 84 2023-02-04 03:12 /user/2501967096/solution/part-00016-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 82 2023-02-04 03:12 /user/2501967096/solution/part-00017-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 90 2023-02-04 03:12 /user/2501967096/solution/part-00018-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 92 2023-02-04 03:12 /user/2501967096/solution/part-00019-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 97 2023-02-04 03:12 /user/2501967096/solution/part-00020-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 82 2023-02-04 03:12 /user/2501967096/solution/part-00021-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 89 2023-02-04 03:12 /user/2501967096/solution/part-00022-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 89 2023-02-04 03:12 /user/2501967096/solution/part-00023-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 94 2023-02-04 03:12 /user/2501967096/solution/part-00024-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 97 2023-02-04 03:12 /user/2501967096/solution/part-00025-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 85 2023-02-04 03:12 /user/2501967096/solution/part-00026-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 97 2023-02-04 03:12 /user/2501967096/solution/part-00027-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 92 2023-02-04 03:12 /user/2501967096/solution/part-00028-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 101 2023-02-04 03:12 /user/2501967096/solution/part-00029-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 98 2023-02-04 03:12 /user/2501967096/solution/part-00030-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 93 2023-02-04 03:12 /user/2501967096/solution/part-00031-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 92 2023-02-04 03:12 /user/2501967096/solution/part-00032-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 90 2023-02-04 03:12 /user/2501967096/solution/part-00033-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 89 2023-02-04 03:12 /user/2501967096/solution/part-00034-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 86 2023-02-04 03:12 /user/2501967096/solution/part-00035-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 94 2023-02-04 03:12 /user/2501967096/solution/part-00036-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 89 2023-02-04 03:12 /user/2501967096/solution/part-00037-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 98 2023-02-04 03:12 /user/2501967096/solution/part-00038-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 98 2023-02-04 03:12 /user/2501967096/solution/part-00039-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 104 2023-02-04 03:12 /user/2501967096/solution/part-00040-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 93 2023-02-04 03:12 /user/2501967096/solution/part-00041-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 91 2023-02-04 03:12 /user/2501967096/solution/part-00042-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 87 2023-02-04 03:12 /user/2501967096/solution/part-00043-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 87 2023-02-04 03:12 /user/2501967096/solution/part-00044-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 94 2023-02-04 03:12 /user/2501967096/solution/part-00045-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 88 2023-02-04 03:12 /user/2501967096/solution/part-00046-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 94 2023-02-04 03:12 /user/2501967096/solution/part-00047-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 95 2023-02-04 03:12 /user/2501967096/solution/part-00048-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 83 2023-02-04 03:12 /user/2501967096/solution/part-00049-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json
-rw-r--r-- 1 verulam-blue supergroup 94 2023-02-04 03:12 /user/2501967096/solution/part-00050-cc5cd8fa-0aec-4dce-b7d2-eda737c464f2-c000.json