```
import os
# Find the latest version of spark 3.0 from http://www.apache.org/dist/spark/ and enter as th
# For example:
# spark_version = 'spark-3.0.3'
spark_version = 'spark-3.0.3'
os.environ['SPARK_VERSION']=spark_version

# Install Spark and Java
!apt-get update
!apt-get install openjdk-11-jdk-headless -qq > /dev/null
!wget -q http://www.apache.org/dist/spark/$SPARK_VERSION/$SPARK_VERSION-bin-hadoop2.7.tgz
!tar xf $SPARK_VERSION-bin-hadoop2.7.tgz
!pip install -q findspark

# Set Environment Variables
import os
os.environ["JAVA_HOME"] = "/usr/lib/jvm/java-11-openjdk-amd64"
os.environ["SPARK_HOME"] = f"/content/{spark_version}-bin-hadoop2.7"

# Start a SparkSession
import findspark
findspark.init()


# Download the Postgres driver that will allow Spark to interact with Postgres.
!wget https://jdbc.postgresql.org/download/postgresql-42.2.16.jar


from pyspark.sql import SparkSession
spark = SparkSession.builder.appName("M16-Amazon-Challenge").config("spark.driver.extraClassP
```

## Load Amazon Data into Spark DataFrame

```
from pyspark import SparkFiles
url = "https://s3.amazonaws.com/amazon-reviews-pds/tsv/amazon_reviews_us_Furniture_v1_00.tsv.
spark.sparkContext.addFile(url)
df = spark.read.option("encoding", "UTF-8").csv(SparkFiles.get(""), sep="\t", header=True, in
df.show()
```

```
-------+--------------+--------------------+----------------+-----------+-------------+--
duct_id|product_parent|       product_title|product_category|star_rating|helpful_votes|to
-------+--------------+--------------------+----------------+-----------+-------------+--
4HB5E0E|     488241329|Shoal Creek Compu...|       Furniture|          4|            0|
42TNMMS|     205864445|Dorel Home Produc...|       Furniture|          5|            0|
30MPBZ4|     124663823|Bathroom Vanity T...|       Furniture|          5|            1|
5G02ESA|     382367578|Sleep Master Ulti...|       Furniture|          3|            0|
5JS8AUA|     309497463|1 1/4" GashGuards...|       Furniture|          3|            0|
AVUQQGQ|     574537906|Serta Bonded Leat...|       Furniture|          5|            0|
CFY20GQ|     407473883|Prepac Shoe Stora...|       Furniture|          5|            2|
```

```
FKC48QA|     435120460|HomCom PU Leather...|       Furniture|          5|            0|
N9IAL9K|     356495985|  Folding Step Stool|       Furniture|          5|            0|
1T4XU1C|     243050228|Ace Bayou Adult V...|       Furniture|          5|            0|
2HRFLBC|      93574483|4D Concepts Audio...|       Furniture|          5|            0|
5MISZOC|     941823468|Zinus SC-SBBK-14N...|       Furniture|          5|            0|
3BMGABC|     460567746|Poundex Marble Di...|       Furniture|          5|            1|
CO2VH5Y|     829613894|Safavieh Lyndhurs...|       Furniture|          5|            0|
LI4RJQ0|     816478187|Sauder Boone Moun...|       Furniture|          5|            2|
46EC1D0|     358594389|Winsome Wood Brea...|       Furniture|          1|            0|
OQQPL36|     312571325|HODEDAH IMPORT Me...|       Furniture|          3|            0|
3X7RWB2|     402665054|Flash Furniture H...|       Furniture|          4|            0|
1TJYPJ8|     854989315|Sleep Revolution ...|       Furniture|          5|            0|
9TMHX9A|     814079288|Flash Furniture V...|       Furniture|          5|            0|
-------+--------------+--------------------+----------------+-----------+-------------+--
```

## Create DataFrames to match tables

```
from pyspark.sql.functions import to_date
# Read in the Review dataset as a DataFrame
```

```
# Create the customers_table DataFrame
customers_df = df.groupby("customer_id").agg({"customer_id":"count"}).withColumnRenamed("coun
customers_df.show()
```

```
+-----------+--------------+
|customer_id|customer_count|
+-----------+--------------+
|   17067926|             2|
|   10714827|             1|
|   42560427|             1|
|   30717305|             1|
|    1178966|             1|
|   10429047|             1|
|   41351814|             1|
|   52541790|             2|
|   52512151|             1|
|   37534120|             1|
|   22555935|             1|
|   18681995|             1|
|    2119235|             2|
|   21846356|             1|
|   42251639|             1|
|    7730812|             1|
|   37666248|             1|
|   43676452|             1|
|   41466760|             1|
|   30403003|             1|
+-----------+--------------+
```

```
only showing top 20 rows
```

```
# Create the products_table DataFrame and drop duplicates.
products_df = df.select(['product_id','product_title']).drop_duplicates()
products_df.show()
```

```
+----------+--------------------+
|product_id|       product_title|
+----------+--------------------+
|B0049H81OM|Fun Rugs Surf Tim...|
|B001U0UOO6|Furniture Repair Set|
|B0076I51JE|Traditional Opera...|
|B007OWPBGU|Frenchi Home Furn...|
|B00DHWGB4M|Circle Design Sid...|
|B00RI6TNJ8|Abrahami Hariz Bu...|
|B00GHZA29Q|nuLOOM Varanas Co...|
|B00GSIIGQS|Milton Greens Sta...|
|B00VZ4RY1I|Dean Shifting San...|
|B007QUM5DM| Charles Petite Sofa|
|B00MN6NTDO|Safavieh Adironda...|
|B00BK31LDQ|Glass Computer De...|
|B0091SXURW|Altra Parsons Des...|
|B00TBVK0Y0|Best Price Mattre...|
|B00A2XM5QC|Legacy Decor Shoj...|
|B002KE7HTQ|Home Styles 5001-...|
|B00V3LVD2O|Roundhill Furnitu...|
|B00PN9YSAG|Baxton Studio Hir...|
|B005VAFFN6|Duro Hanley Silve...|
|B001BX1JSC|Flash Furniture V...|
+----------+--------------------+
only showing top 20 rows
```

```
# Create the review_id_table DataFrame.
# Convert the 'review_date' column to a date datatype with to_date("review_date", 'yyyy-MM-dd
review_id_df = df.select(['review_id', 'customer_id' , 'product_id', 'product_parent', to_dat
review_id_df.show()
```

```
+--------------+-----------+----------+--------------+-----------+
|     review_id|customer_id|product_id|product_parent|review_date|
+--------------+-----------+----------+--------------+-----------+
|R3VR960AHLFKDV|   24509695|B004HB5E0E|     488241329| 2015-08-31|
|R16LGVMFKIUT0G|   34731776|B0042TNMMS|     205864445| 2015-08-31|
|R1AIMEEPYHMOE4|    1272331|B0030MPBZ4|     124663823| 2015-08-31|
|R1892CCSZWZ9SR|   45284262|B005G02ESA|     382367578| 2015-08-31|
|R285P679YWVKD1|   30003523|B005JS8AUA|     309497463| 2015-08-31|
| RLB33HJBXHZHU|   18311821|B00AVUQQGQ|     574537906| 2015-08-31|
|R1VGTZ94DBAD6A|   42943632|B00CFY20GQ|     407473883| 2015-08-31|
|R168KF82ICSOHD|   43157304|B00FKC48QA|     435120460| 2015-08-31|
|R20DIYIJ0OCMOG|   51918480|B00N9IAL9K|     356495985| 2015-08-31|
| RD46RNVOHNZSC|   14522766|B001T4XU1C|     243050228| 2015-08-31|
|R2JDOCETTM3AXS|   43054112|B002HRFLBC|      93574483| 2015-08-31|
```

```
|R33YMW36IDZ6LE|   26622950|B006MISZOC|     941823468| 2015-08-31|
|R30ZGGUHZ04C1S|   17988940|B008BMGABC|     460567746| 2015-08-31|
| RS2EZU76IK2BT|   18444952|B00CO2VH5Y|     829613894| 2015-08-31|
|R1GJC1BP028XO9|   16937084|B00LI4RJQ0|     816478187| 2015-08-31|
|R2VKJPGXXEK5GP|   23665632|B0046EC1D0|     358594389| 2015-08-31|
|R17KS83G3KLT97|    4110125|B00DQQPL36|     312571325| 2015-08-31|
|R3PQL8SR4NEHWL|     107621|B003X7RWB2|     402665054| 2015-08-31|
|R2F5WW7WNO5RRG|    2415090|B001TJYPJ8|     854989315| 2015-08-31|
|R3UDJKVWQCFIC9|   48285966|B000TMHX9A|     814079288| 2015-08-31|
+--------------+-----------+----------+--------------+-----------+
only showing top 20 rows
```

```
# Create the vine_table. DataFrame
vine_df = df.select(['review_id', 'star_rating', 'helpful_votes', 'total_votes', 'vine', 'ver
vine_df.show()
```

```
+--------------+-----------+-------------+-----------+----+-----------------+
|     review_id|star_rating|helpful_votes|total_votes|vine|verified_purchase|
+--------------+-----------+-------------+-----------+----+-----------------+
|R3VR960AHLFKDV|          4|            0|          0|   N|                Y|
|R16LGVMFKIUT0G|          5|            0|          0|   N|                Y|
|R1AIMEEPYHMOE4|          5|            1|          1|   N|                Y|
|R1892CCSZWZ9SR|          3|            0|          0|   N|                Y|
|R285P679YWVKD1|          3|            0|          0|   N|                N|
| RLB33HJBXHZHU|          5|            0|          0|   N|                Y|
|R1VGTZ94DBAD6A|          5|            2|          2|   N|                Y|
|R168KF82ICSOHD|          5|            0|          0|   N|                Y|
|R20DIYIJ0OCMOG|          5|            0|          0|   N|                Y|
| RD46RNVOHNZSC|          5|            0|          0|   N|                Y|
|R2JDOCETTM3AXS|          5|            0|          0|   N|                Y|
|R33YMW36IDZ6LE|          5|            0|          0|   N|                Y|
|R30ZGGUHZ04C1S|          5|            1|          1|   N|                Y|
| RS2EZU76IK2BT|          5|            0|          0|   N|                Y|
|R1GJC1BP028XO9|          5|            2|          3|   N|                Y|
|R2VKJPGXXEK5GP|          1|            0|          0|   N|                Y|
|R17KS83G3KLT97|          3|            0|          0|   N|                Y|
|R3PQL8SR4NEHWL|          4|            0|          0|   N|                Y|
|R2F5WW7WNO5RRG|          5|            0|          0|   N|                Y|
|R3UDJKVWQCFIC9|          5|            0|          0|   N|                Y|
+--------------+-----------+-------------+-----------+----+-----------------+
only showing top 20 rows
```

## Connect to the AWS RDS instance and write each DataFrame to its table.

```
# Store environmental variable
from getpass import getpass
password = getpass('<password>')
# Configure settings for RDS
mode = "append"
jdbc_url="jdbc:<connector ID>:5432/<DB name>"
```

```
config = {"user":"postgres",
          "password": password,
          "driver":"org.postgresql.Driver"}
```

```
password··········
```

```
# Write review_id_df to table in RDS
# Took about 3 minutes
review_id_df.write.jdbc(url=jdbc_url, table='review_id_table', mode=mode, properties=config)
```

```
# Write products_df to table in RDS
# Took about 2 min
products_df.write.jdbc(url=jdbc_url, table='products_table', mode=mode, properties=config)
```

```
# Write customers_df to table in RDS
# Took 3 minutes 20 seconds
customers_df.write.jdbc(url=jdbc_url, table='customers_table', mode=mode, properties=config)
```

```
# Write vine_df to table in RDS
# Took 4 minutes 11 seconds
vine_df.write.jdbc(url=jdbc_url, table='vine_table', mode=mode, properties=config)
```

✓ 3m 47s completed at 2:37 AM