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**Exam** : **CCA175**

**Title** : CCA Spark and Hadoop  
Developer Exam

**Vendor** : Cloudera

**Version** : DEMO

### NO.1 CORRECT TEXT

Problem Scenario 49 : You have been given below code snippet (do a sum of values by key), with intermediate output.

```
val keysWithValuesList = Array("foo=A", "foo=A", "foo=A", "foo=A", "foo=B", "bar=C",
"bar=D", "bar=D")
```

```
val data = sc.parallelize(keysWithValuesList)
```

```
//Create key value pairs
```

```
val kv = data.map(_.split("=")).map(v => (v(0), v(1))).cache()
```

```
val initialCount = 0;
```

```
val countByKey = kv.aggregateByKey(initialCount)(addToCounts, sumPartitionCounts)
```

Now define two functions (addToCounts, sumPartitionCounts) such, which will produce following results.

Output 1

```
countByKey.collect
```

```
res3: Array[(String, Int)] = Array((foo,5), (bar,3))
```

```
import scala.collection._
```

```
val initialSet = scala.collection.mutable.HashSet.empty[String]
```

```
val uniqueByKey = kv.aggregateByKey(initialSet)(addToSet, mergePartitionSets)
```

Now define two functions (addToSet, mergePartitionSets) such, which will produce following results.

Output 2:

```
uniqueByKey.collect
```

```
res4: Array[(String, scala.collection.mutable.HashSet[String])] = Array((foo,Set(B, A)),
(bar,Set(C, D)))
```

#### **Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

```
val addToCounts = (n: Int, v: String) => n + 1
```

```
val sumPartitionCounts = (p1: Int, p2: Int) => p1 + p2
```

```
val addToSet = (s: mutable.HashSet[String], v: String) => s += v
```

```
val mergePartitionSets = (p1: mutable.HashSet[String], p2: mutable.HashSet[String]) => p1
+= p2
```

### NO.2 CORRECT TEXT

Problem Scenario 81 : You have been given MySQL DB with following details. You have been given following product.csv file productID,productCode,name,quantity,price

```
1001,PEN,Pen Red,5000,1.23
```

```
1002,PEN,Pen Blue,8000,1.25
```

```
1003,PEN,Pen Black,2000,1.25
```

```
1004,PEC,Pencil 2B,10000,0.48
```

```
1005,PEC,Pencil 2H,8000,0.49
```

```
1006,PEC,Pencil HB,0,9999.99
```

Now accomplish following activities.

1 . Create a Hive ORC table using SparkSql

2 . Load this data in Hive table.

3 . Create a Hive parquet table using SparkSQL and load data in it.

### **Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

Step 1 : Create this file in HDFS under following directory (Without header)

```
/user/cloudera/he/exam/task1/productcsv
```

Step 2 : Now using Spark-shell read the file as RDD

```
// load the data into a new RDD
```

```
val products = sc.textFile("/user/cloudera/he/exam/task1/product.csv")
```

```
// Return the first element in this RDD
```

```
product.csv.first()
```

Step 3 : Now define the schema using a case class

```
case class Product(productid: Integer, code: String, name: String, quantity: Integer, price: Float)
```

Step 4 : create an RDD of Product objects

```
val prdRDD = products.map(_.split(",")).map(p => Product(p(0).toInt,p(1),p(2),p(3).toInt,p(4).toFloat))
```

```
prdRDD.first()
```

```
prdRDD.count()
```

Step 5 : Now create data frame val prdDF = prdRDD.toDF()

Step 6 : Now store data in hive warehouse directory. (However, table will not be created ) import

```
org.apache.spark.sql.SaveMode
```

```
prdDF.write.mode(SaveMode.Overwrite).format("orc").saveAsTable("product_orc_table")
```

step 7: Now create table using data stored in warehouse directory. With the help of hive.

```
hive
```

```
show tables
```

```
CREATE EXTERNAL TABLE products (productid int,code string,name string .quantity int, price float) STORED AS ore
```

```
LOCATION /user/hive/warehouse/product_orc_table';
```

Step 8 : Now create a parquet table

```
import org.apache.spark.sql.SaveMode
```

```
prdDF.write.mode(SaveMode.Overwrite).format("parquet").saveAsTable("product_parquet_table")
```

Step 9 : Now create table using this

```
CREATE EXTERNAL TABLE products_parquet (productid int,code string,name string .quantity int, price float)
```

```
STORED AS parquet
```

```
LOCATION /user/hive/warehouse/product_parquet_table';
```

Step 10 : Check data has been loaded or not.

```
Select * from products;
```

```
Select * from products_parquet;
```

### **NO.3 CORRECT TEXT**

Problem Scenario 84 : In Continuation of previous question, please accomplish following activities.

1. Select all the products which has product code as null
2. Select all the products, whose name starts with Pen and results should be order by Price descending order.

3. Select all the products, whose name starts with Pen and results should be order by Price descending order and quantity ascending order.
4. Select top 2 products by price

**Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

Step 1 : Select all the products which has product code as null

```
val results = sqlContext.sql(.....SELECT' FROM products WHERE code IS NULL.....) results. showQ
```

```
val results = sqlContext.sql(.....SELECT * FROM products WHERE code = NULL ",,M ) results.showQ
```

Step 2 : Select all the products , whose name starts with Pen and results should be order by Price descending order. val results = sqlContext.sql(.....SELECT \* FROM products WHERE name LIKE 'Pen %' ORDER BY price DESC.....)

```
results. showQ
```

Step 3 : Select all the products , whose name starts with Pen and results should be order by Price descending order and quantity ascending order. val results = sqlContext.sql('.....SELECT \* FROM products WHERE name LIKE 'Pen %' ORDER BY price DESC, quantity.....) results. showQ

Step 4 : Select top 2 products by price

```
val results = sqlContext.sql(.....SELECT' FROM products ORDER BY price desc LIMIT2.....}
```

```
results. show()
```

**NO.4 CORRECT TEXT**

Problem Scenario 4: You have been given MySQL DB with following details.

user=retail\_dba

password=cloudera

database=retail\_db

table=retail\_db.categories

jdbc URL = jdbc:mysql://quickstart:3306/retail\_db

Please accomplish following activities.

Import Single table categories (Subset data) to hive managed table , where category\_id between 1 and 22

**Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

Step 1 : Import Single table (Subset data)

```
sqoop import --connect jdbc:mysql://quickstart:3306/retail_db -username=retail_dba -
```

```
password=cloudera -table=categories -where "'category_id' between 1 and 22" --hive- import --m 1
```

Note: Here the ' is the same you find on ~ key

This command will create a managed table and content will be created in the following directory.

```
/user/hive/warehouse/categories
```

Step 2 : Check whether table is created or not (In Hive)

```
show tables;
```

```
select * from categories;
```

### NO.5 CORRECT TEXT

Problem Scenario 13 : You have been given following mysql database details as well as other info.

user=retail\_dba

password=cloudera

database=retail\_db

jdbc URL = jdbc:mysql://quickstart:3306/retail\_db

Please accomplish following.

1. Create a table in retaildb with following definition.

```
CREATE table departments_export (department_id int(11), department_name varchar(45),  
created_date T1MESTAMP DEFAULT NOWQ);
```

2. Now import the data from following directory into departments\_export table,  
/user/cloudera/departments new

#### **Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

Step 1 : Login to musql db

```
mysql --user=retail_dba -password=cloudera
```

```
show databases; use retail_db; show tables;
```

step 2 : Create a table as given in problem statement.

```
CREATE table departments_export (departmentjd int(11), department_name varchar(45),  
created_date T1MESTAMP DEFAULT NOW()); show tables;
```

Step 3 : Export data from /user/cloudera/departmentsnew to new table departments\_export sqoop

```
export -connect jdbc:mysql://quickstart:3306/retail_db \
```

```
-username retaildba \
```

```
--password cloudera \
```

```
--table departments_export \
```

```
-export-dir /user/cloudera/departments_new \
```

```
-batch
```

Step 4 : Now check the export is correctly done or not. mysql -user\*retail\_dba - password=cloudera

```
show databases; use retail_db;
```

```
show tables;
```

```
select' from departments_export;
```

### NO.6 CORRECT TEXT

Problem Scenario 96 : Your spark application required extra Java options as below. -

```
XX:+PrintGCDetails-XX:+PrintGCTimeStamps
```

Please replace the XXX values correctly

```
./bin/spark-submit --name "My app" --master local[4] --conf spark.eventLog.enabled=talse -
```

```
-conf XXX hadoopexam.jar
```

#### **Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution

```
XXX: Mspark.executoi\extraJavaOptions=-XX:+PrintGCDetails -XX:+PrintGCTimeStamps"
```

Notes: ./bin/spark-submit \

```
--class <main-class>
--master <master-url> \
--deploy-mode <deploy-mode> \
-conf <key>=<value> \
# other options
< application-jar> \
[application-arguments]
```

Here, conf is used to pass the Spark related contigs which are required for the application to run like any specific property(executor memory) or if you want to override the default property which is set in Spark-default.conf.

### **NO.7 CORRECT TEXT**

Problem Scenario 35 : You have been given a file named spark7/EmployeeName.csv (id,name).

EmployeeName.csv

E01,Lokesh

E02,Bhupesh

E03,Amit

E04,Ratan

E05,Dinesh

E06,Pavan

E07,Tejas

E08,Sheela

E09,Kumar

E10,Venkat

1. Load this file from hdfs and sort it by name and save it back as (id,name) in results directory. However, make sure while saving it should be able to write In a single file.

#### **Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution:

Step 1 : Create file in hdfs (We will do using Hue). However, you can first create in local filesystem and then upload it to hdfs.

Step 2 : Load EmployeeName.csv file from hdfs and create PairRDDs

```
val name = sc.textFile("spark7/EmployeeName.csv")
```

```
val namePairRDD = name.map(x=> (x.split(",")(0),x.split(",")(1)))
```

Step 3 : Now swap namePairRDD RDD.

```
val swapped = namePairRDD.map(item => item.swap)
```

step 4: Now sort the rdd by key.

```
val sortedOutput = swapped.sortByKey()
```

Step 5 : Now swap the result back

```
val swappedBack = sortedOutput.map(item => item.swap)
```

Step 6 : Save the output as a Text file and output must be written in a single file.

```
swappedBack.repartition(1).saveAsTextFile("spark7/result.txt")
```

### **NO.8 CORRECT TEXT**

Problem Scenario 89 : You have been given below patient data in csv format,  
patientID,name,dateOfBirth,lastVisitDate

1001,Ah Teck,1991-12-31,2012-01-20

1002,Kumar,2011-10-29,2012-09-20

1003,Ali,2011-01-30,2012-10-21

Accomplish following activities.

1 . Find all the patients whose lastVisitDate between current time and '2012-09-15'

2 . Find all the patients who born in 2011

3 . Find all the patients age

4 . List patients whose last visited more than 60 days ago

5 . Select patients 18 years old or younger

**Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

Step 1:

```
hdfs dfs -mkdir sparksql3
```

```
hdfs dfs -put patients.csv sparksql3/
```

Step 2 : Now in spark shell

```
// SQLContext entry point for working with structured data
```

```
val sqlContext = new org.apache.spark.sql.SQLContext(sc)
```

```
// this is used to implicitly convert an RDD to a DataFrame.
```

```
import sqlContext.implicits._
```

```
// Import Spark SQL data types and Row.
```

```
import org.apache.spark.sql._
```

```
// load the data into a new RDD
```

```
val patients = sc.textFile("sparksql3/patients.csv")
```

```
// Return the first element in this RDD
```

```
patients.first()
```

```
//define the schema using a case class
```

```
case class Patient(patientid: Integer, name: String, dateOfBirth:String , lastVisitDate: String)
```

```
// create an RDD of Product objects
```

```
val patRDD = patients.map(_.split(",")).map(p => Patient(p(0).toInt,p(1),p(2),p(3))) patRDD.first() patRDD.count()
```

```
// change RDD of Product objects to a DataFrame val patDF = patRDD.toDF()
```

```
// register the DataFrame as a temp table patDF.registerTempTable("patients")
```

```
// Select data from table
```

```
val results = sqlContext.sql(".....SELECT * FROM patients '.....')
```

```
// display dataframe in a tabular format
```

```
results.show()
```

```
//Find all the patients whose lastVisitDate between current time and '2012-09-15' val results =
```

```
sqlContext.sql(".....SELECT * FROM patients WHERE
```

```
TO_DATE(CAST(UNIX_TIMESTAMP(lastVisitDate, 'yyyy-MM-dd') AS TIMESTAMP))
```

```
BETWEEN '2012-09-15' AND current_timestamp() ORDER BY lastVisitDate.....) results.show()
```

```
/.Find all the patients who born in 2011
```

```

val results = sqlContext.sql(.....SELECT * FROM patients WHERE
YEAR(TO_DATE(CAST(UNIX_TIMESTAMP(dateOfBirth, 'yyyy-MM-dd') AS
TIMESTAMP))) = 2011 .....)
results.show()
//Find all the patients age
val results = sqlContext.sql(.....SELECT name, dateOfBirth, datediff(current_date(),
TO_DATE(CAST(UNIX_TIMESTAMP(dateOfBirth, 'yyyy-MM-dd') AS TIMESTAMP)))/365
AS age
FROM patients
Mini >
results.show()
//List patients whose last visited more than 60 days ago
-- List patients whose last visited more than 60 days ago
val results = sqlContext.sql(.....SELECT name, lastVisitDate FROM patients WHERE
datediff(current_date(), TO_DATE(CAST(UNIX_TIMESTAMP[lastVisitDate, 'yyyy-MM-dd']
AS TIMESTAMP))) > 60.....);
results.showQ;
-- Select patients 18 years old or younger
SELECT' FROM patients WHERE TO_DATE(CAST(UNIX_TIMESTAMP(dateOfBirth,
'yyyy-MM-dd') AS TIMESTAMP)) > DATE_SUB(current_date(),INTERVAL 18 YEAR); val results =
sqlContext.sql(.....SELECT' FROM patients WHERE
TO_DATE(CAST(UNIX_TIMESTAMP(dateOfBirth, 'yyyy-MM--dd') AS TIMESTAMP)) >
DATE_SUB(current_date(), T8*365).....);
results.showQ;
val results = sqlContext.sql(.....SELECT DATE_SUB(current_date(), 18*365) FROM patients.....);
results.show();

```

**NO.9 CORRECT TEXT**

Problem Scenario 40 : You have been given sample data as below in a file called spark15/file1.txt

```
3070811,1963,1096,, "US", "CA" ,,1,
```

```
3022811,1963,1096,, "US", "CA" ,,1,56
```

```
3033811,1963,1096,, "US", "CA" ,,1,23
```

Below is the code snippet to process this file.

```
val field= sc.textFile("spark15/file1.txt")
```

```
val mapper = field.map(x=> A)
```

```
mapper.map(x => x.map(x=> {B})).collect
```

Please fill in A and B so it can generate below final output

```
Array(Array(3070811,1963,1096, 0, "US", "CA", 0,1, 0)
```

```
,Array(3022811,1963,1096, 0, "US", "CA", 0,1, 56)
```

```
,Array(3033811,1963,1096, 0, "US", "CA", 0,1, 23)
```

```
)
```

**Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

```
A. x.split(",",-1)
```

B. if (x.isEmpty) 0 else x

### **NO.10** CORRECT TEXT

Problem Scenario 46 : You have been given below list in scala (name,sex,cost) for each work done.  
List( ("Deepak" , "male" , 4000), ("Deepak" , "male" , 2000), ("Deepika" , "female" , 2000),("Deepak" , "female" , 2000), ("Deepak" , "male" , 1000) , ("Neeta" , "female" , 2000))  
Now write a Spark program to load this list as an RDD and do the sum of cost for combination of name and sex (as key)

#### **Answer:**

See the explanation for Step by Step Solution and configuration.

Explanation:

Solution :

Step 1 : Create an RDD out of this list

```
val rdd = sc.parallelize(List( ("Deepak" , "male" , 4000), ("Deepak" , "male" , 2000),  
("Deepika" , "female" , 2000),("Deepak" , "female" , 2000), ("Deepak" , "male" , 1000) ,  
("Neeta" , "female" , 2000))}
```

Step 2 : Convert this RDD in pair RDD

```
val byKey = rdd.map({case (name,sex,cost) => (name,sex)->cost})
```

Step 3 : Now group by Key

```
val byKeyGrouped = byKey.groupByKey
```

Step 4 : Now sum the cost for each group

```
val result = byKeyGrouped.map{case ((id1,id2),values) => (id1,id2,values.sum)}
```

Step 5 : Save the results result.repartition(1).saveAsTextFile("spark12/result.txt")