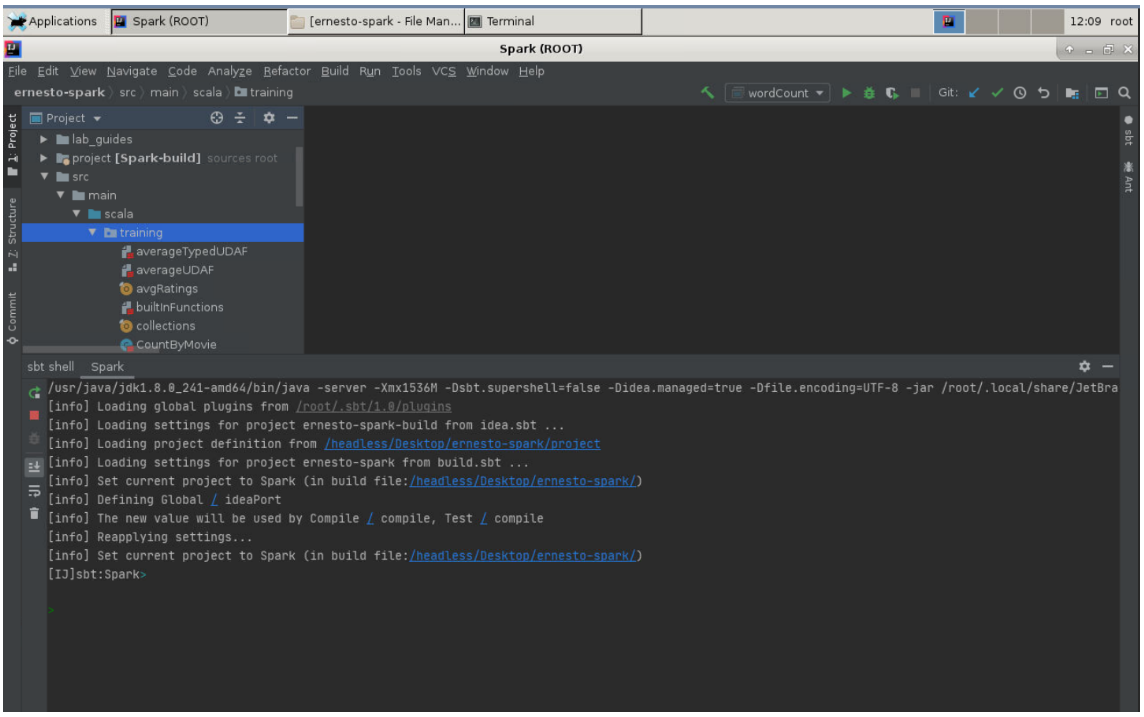
Lab : Apache Spark Paired RDD Advanced

Pre-reqs:

- Google Chrome (Recommended)

Note:

- The supplied commands in the next steps MUST be run from your `~/Desktop/ernesto-spark` directory.
- Final code was already cloned from github for this lab. You can just understand the application code in the next steps and run it using the instructions.
- Start IntelliJ IDE and open `~/work/ernesto-spark/src/main/scala/training/tags.scala` to view scala file.



```
/usr/java/jdk1.8.0_241-amd64/bin/java -server -Xmx1536M -Dsbt.supershell=false -Didea.managed=true -Dfile.encoding=UTF-8 -jar /root/.local/share/JetBra
[info] Loading global plugins from /root/.sbt/1.0/plugins
[info] Loading settings for project ernesto-spark-build from idea.sbt ...
[info] Loading project definition from /headless/Desktop/ernesto-spark/project
[info] Loading settings for project ernesto-spark from build.sbt ...
[info] Set current project to Spark (in build file:/headless/Desktop/ernesto-spark/)
[info] Defining Global / ideaPort
[info] The new value will be used by Compile / compile, Test / compile
[info] Reapplying settings...
[info] Set current project to Spark (in build file:/headless/Desktop/ernesto-spark/)
[IJ]sbt:Spark>
```

The aim of the following lab exercises is to start writing Spark code in **vscode** editor to learn about Paired RDDs. We will cover following topics in this scenario.

- Creating a Paired RDD
- Performing Operations on Paired RDD

Prerequisites

We need following packages to perform the lab exercise:

- Java Development Kit
- SBT

JAVA

Verify the installation with: `java -version`

You'll see the following output:

```
java version "1.8.0_201"
Java(TM) SE Runtime Environment (build 1.8.0_201-b09)
Java HotSpot(TM) 64-Bit Server VM (build 25.201-b09, mixed mode)
```

SBT

Verify your sbt installation version by running the following command.

`sbt sbtVersion`

You will get following output. If you get an error first time, please run the command again.

```
[info] Loading project definition from /headless/Desktop/ernesto-spark/project
[info] Loading settings for project apache-spark from build.sbt ...
[info] Set current project to Spark (in build file:/headless/Desktop/ernesto-spark/)
[info] 1.3.2
```

Paired RDD

Let us now look at advance operations that we can perform on Paired RDDs.

Step 1: Download the tags.csv file from the URL below. This file contains four columns: userId, movieID, tag and timestamp.

tags.csv - http://bit.ly/2YTVGFk

Note: We already have cloned a github repository which contains a required file. Open `~/work/ernesto-spark/Files/chapter_5` to view file.

Step 2: Start IntelliJ IDE and open `~/work/ernesto-spark/src/main/scala/training/tags.scala` to view scala file.

```
import org.apache.spark._
import org.apache.spark.SparkContext._
import org.apache.log4j._
```

Step 3: Write the recordsParser function as in the previous task. For this task, let us extract the movieID and tag fields. The recordsParser function is as shown below.

```
def parseRecords (rows: String): (Int, String)={
val records = rows.split(",")
val movieID = records(1).toInt
val tags = records(2).toString
(movieID, tags)
}
```

Step 4: Create a paired RDD as in Task 2 by writing the main function, setting error log level (optional), creating a SparkContext object and loading the file using the textFile API.

```
def main(args: Array[String]): Unit = {
  Logger.getLogger("Org").setLevel(Level.ERROR)

val sc = new SparkContext("local[*]", "Paired RDD Operations")

val data = sc.textFile("chapter_5/tags.csv")
```

Now create an RDD pair by parsing the data RDD using the recordsParser function.

```
val RDDPair = data.map(parseRecords)
```

We now have our paired RDD. Let us use some operations in the next step on our paired RDD in the next step.

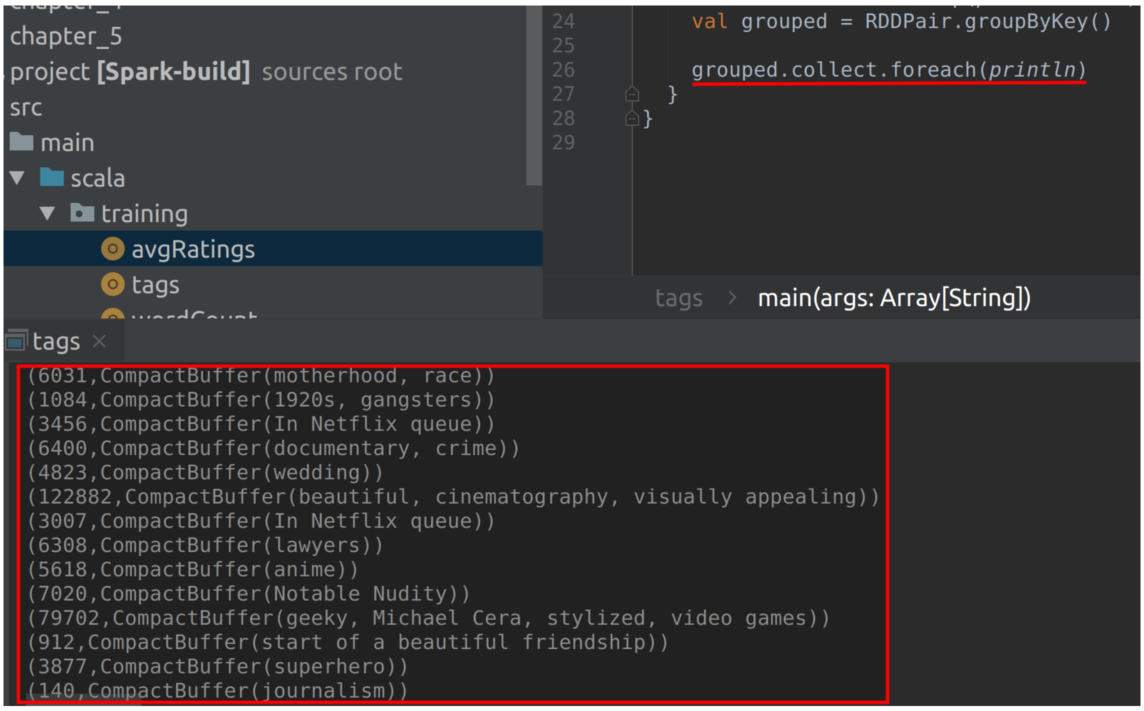
Step 5: Now that we have our paired RDD, let us group all the tags by movieID using the groupByKey function.

```
val grouped = RDDPair.groupByKey()
```

Let us now print out the result of grouped RDD to the console.

```
grouped.collect.foreach(println)
```

The output is as shown in the screenshot below with all the tags for a movie are grouped together.



```
    val grouped = RDDPair.groupByKey()

    grouped.collect.foreach(println)
  }
}
```

```
(6031,CompactBuffer(motherhood, race))
(1084,CompactBuffer(1920s, gangsters))
(3456,CompactBuffer(In Netflix queue))
(6400,CompactBuffer(documentary, crime))
(4823,CompactBuffer(wedding))
(122882,CompactBuffer(beautiful, cinematography, visually appealing))
(3007,CompactBuffer(In Netflix queue))
(6308,CompactBuffer(lawyers))
(5618,CompactBuffer(anime))
(7020,CompactBuffer(Notable Nudity))
(79702,CompactBuffer(geeky, Michael Cera, stylized, video games))
(912,CompactBuffer(start of a beautiful friendship))
(3877,CompactBuffer(superhero))
(140,CompactBuffer(journalism))
```

Step 5: To run this program from the terminal, simply run the following command. The program will the then be compiled and executed.

Run solution using intelliJ IDEA. You can also run using sbt CLI:

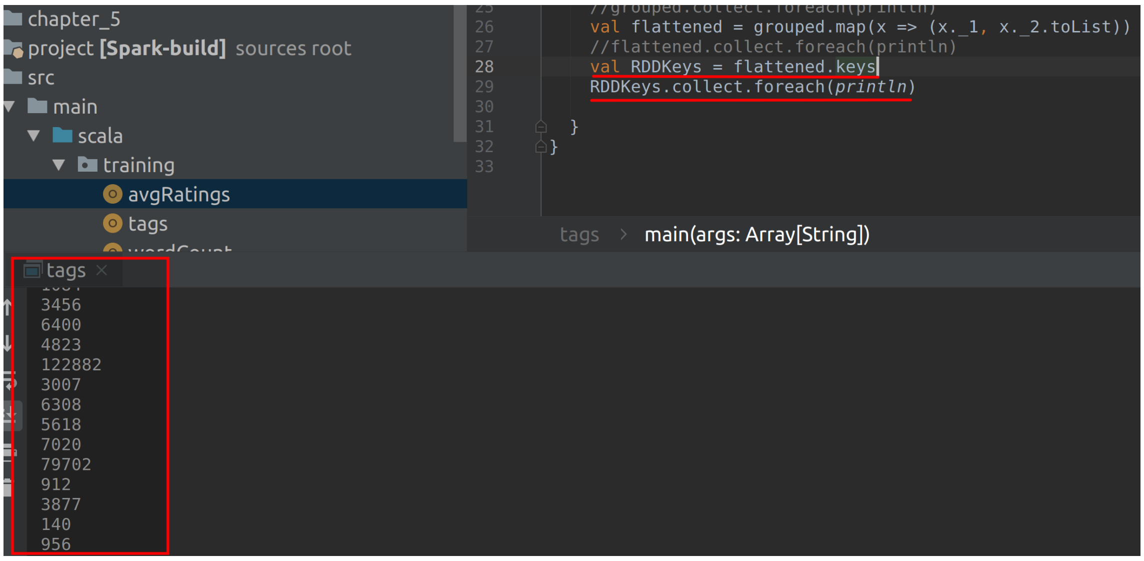
```
sbt "runMain training.tags"
```

You may optionally convert the values from compactBuffer to a list by simply mapping the output and converting them to a List as shown below.

Step 6: We can also extract the keys and values to separate RDDs as shown below.

```
val RDDKeys = flattened.keys

RDDKeys.collect.foreach(println)
```


chapter_5
project [Spark-build] sources root
src
main
scala
training
avgRatings
tags
tags
tags › main(args: Array[String])

```
    //grouped.collect.foreach(println)
    val flattened = grouped.map(x => (x._1, x._2.toList))
    //flattened.collect.foreach(println)
    val RDDKeys = flattened.keys
    RDDKeys.collect.foreach(println)

  }
}
```

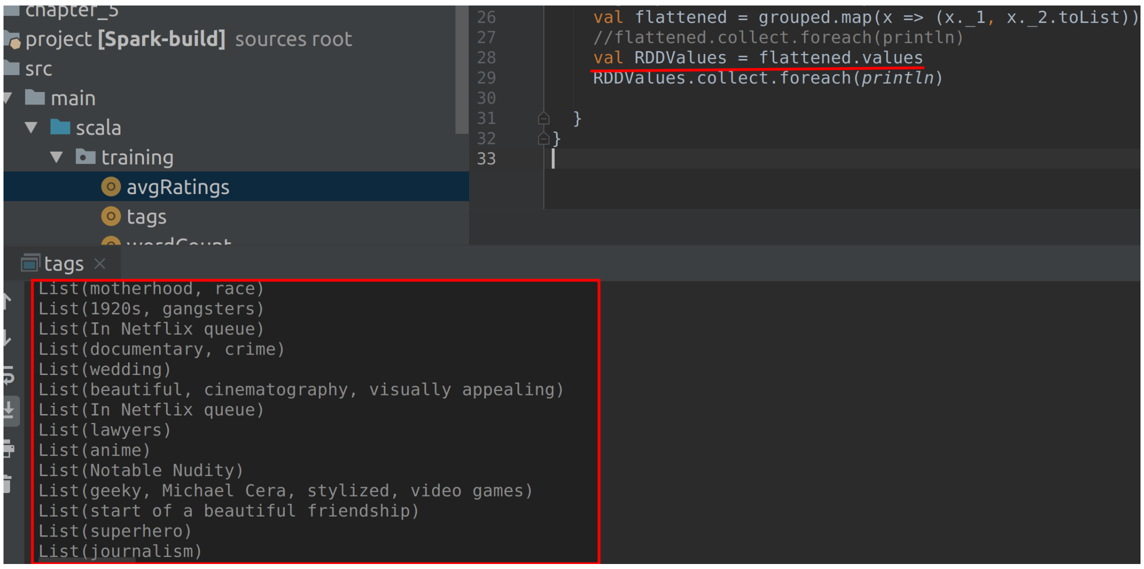
```
3456
6400
4823
122882
3007
6308
5618
7020
79702
912
3877
140
956
```

Similarly, we can extract the values using the code below.

```
val RDDValues = flattened.values

RDDValues.collect.foreach(println)
```

Important: You need to uncomment above line in `tags.scala` using **vscode** editor before running program again.



```
    val flattened = grouped.map(x => (x._1, x._2.toList))
    //flattened.collect.foreach(println)
    val RDDValues = flattened.values
    RDDValues.collect.foreach(println)

  }
}
```

```
List(motherhood, race)
List(1920s, gangsters)
List(In Netflix queue)
List(documentary, crime)
List(wedding)
List(beautiful, cinematography, visually appealing)
List(In Netflix queue)
List(lawyers)
List(anime)
List(Notable Nudity)
List(geeky, Michael Cera, stylized, video games)
List(start of a beautiful friendship)
List(superhero)
List(journalism)
```

Run solution using intelliJ IDEA. You can also run using sbt CLI:

```
sbt "runMain training.tags"
```

Task is complete!