Case Study 5

Task1

Create a Spark Application which streams data from a file on local directory on your machine and does the word count on the fly. The word should be done by the spark application in such a way that as soon as you drop the file in your local directory, your spark application should immediately do the word count for you.

Code

```
import org.apache.spark.{SparkConf, SparkContext}
import org.apache.spark.streaming.{Seconds, StreamingContext}
import org.apache.log4j.{Level,Logger}

object SparkFileStreamingWordCount {

  def main(args: Array[String]): Unit = {
    println("hey Spark Streaming")

    val conf = new SparkConf().setMaster("local[2]").setAppName("SparkSteamingExample")
    val sc = new SparkContext(conf)
val rootLogger =Logger.getRootLogger()
   rootLogger.setLevel(Level.ERROR)
    val ssc = new StreamingContext(sc, Seconds(15))
    val lines = ssc.textFileStream("/home/acadgild/case5")  //for creating a Text Stream from
the file
    val words = lines.flatMap(_.split(" "))
    val wordCounts = words.map(x => (x, 1)).reduceByKey(_ + _)  //calculating the wordcount
    wordCounts.print()                                          // printing the count
    ssc.start()                                                 //starting streaming
    ssc.awaitTermination()                                      //terminating the streaming

  }
}
```

Task2

Create a Spark Application which should do the following:

1. Pick up a file from the local directory and do the word count
2. Then in the same Spark Application, write the code to put the same file on HDFS.
3. Then in same Spark Application, do the word count of the file copied on HDFS in step 2
4. Lastly, compare the word count of step 1 and 2. Both should match, other throw an error.

Code

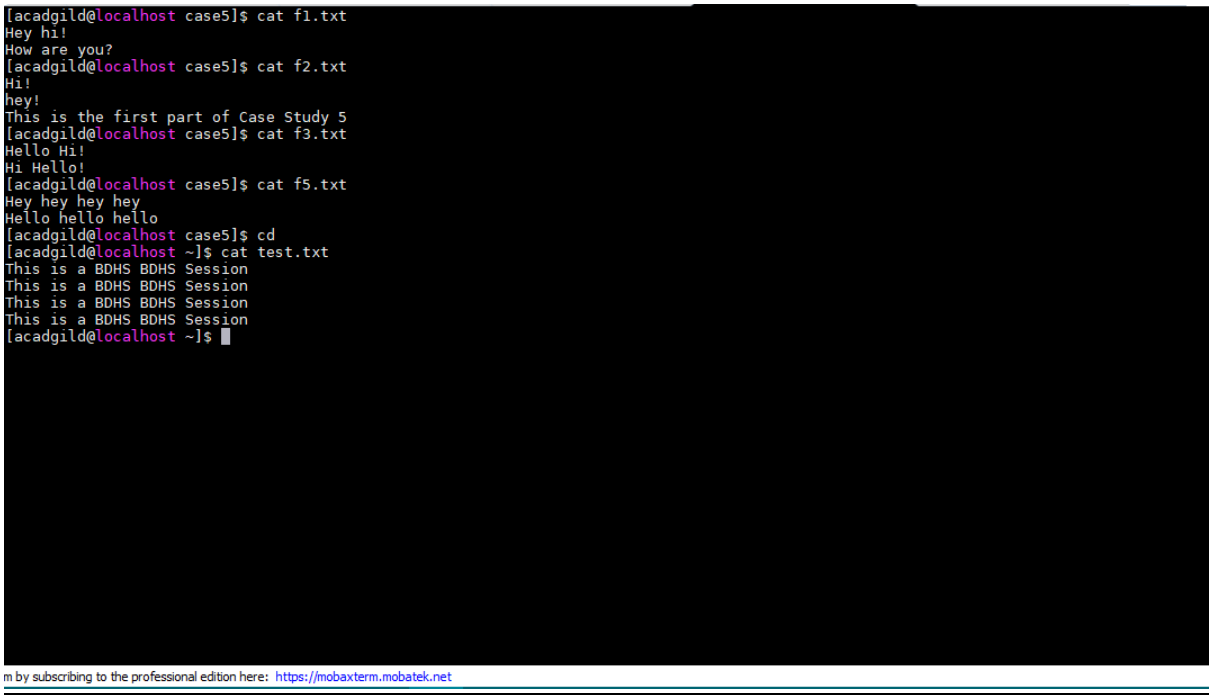
```
import java.io.File
import org.apache.spark.{SparkConf, SparkContext}
import scala.io.Source._
import org.apache.log4j.{Level,Logger}

object SparkHDFSWordCountComparison {

private var localFilePath: File = new File("/home/acadgild/ test.txt") //location of the local file for which the wordcount is to be calculated
  private var dfsDirPath: String = "hdfs://localhost:8020/user/streaming"  //location of directory on HDFS
  private val NPARAMS = 2

  def main(args: Array[String]): Unit = {
    //parseArgs(args)
    println("SparkHDFSWordCountComparison : Main Called Successfully")

    println("Performing local word count")
    val fileContents = readFile(localFilePath.toString())          //reading the contents of the local file

    println("Performing local word count - File Content ->>"+fileContents)
    val localWordCount = runLocalWordCount(fileContents)            //performing wordcount

    println("SparkHDFSWordCountComparison : Main Called Successfully -> Local Word Count is ->>"+localWordCount)

    println("Performing local word count Completed !!")
    println("Creating Spark Context")

    val conf = new SparkConf().setMaster("local[2]").setAppName("SparkHDFSWordCountComparisonApp")
    val sc = new SparkContext(conf)
```

```
val rootLogger =Logger.getRootLogger()
  rootLogger.setLevel(Level.ERROR)

 println("Spark Context Created")
println("Writing local file to DFS")
   val dfsFilename = dfsDirPath + "/dfs_read_write_test"
   val fileRDD = sc.parallelize(fileContents)              //creating RDD of the local file
   fileRDD.saveAsTextFile(dfsFilename)                     //saving the above as the text file over
                                                        the directory on HDFS
   println("Writing local file to DFS Completed")

   println("Reading file from DFS and running Word Count")
   val readFileRDD = sc.textFile(dfsFilename)

//performing word count
   val dfsWordCount = readFileRDD
     .flatMap(_.split(" "))
     .flatMap(_.split("\t"))
     .filter(_.nonEmpty)
     .map(w => (w, 1))
     .countByKey()
     .values
     .sum

   sc.stop()                          //forcefully stopping the streaming

//comparing the wordcounts and printing the message accordingly
   if (localWordCount == dfsWordCount) {
     println(s"Success! Local Word Count ($localWordCount) " +
       s"and DFS Word Count ($dfsWordCount) agree.")
   } else {
     println(s"Failure! Local Word Count ($localWordCount) " +s "and DFS Word Count
($dfsWordCount) disagree.")
   }
  }

private def printUsage(): Unit = {
   val usage: String = "DFS Read-Write Test\n" +
     "\n" +
     "Usage: localFile dfsDir\n" +
     "\n" +
     "localFile - (string) local file to use in test\n" +
     "dfsDir - (string) DFS directory for read/write tests\n"

   println(usage)
  }
```

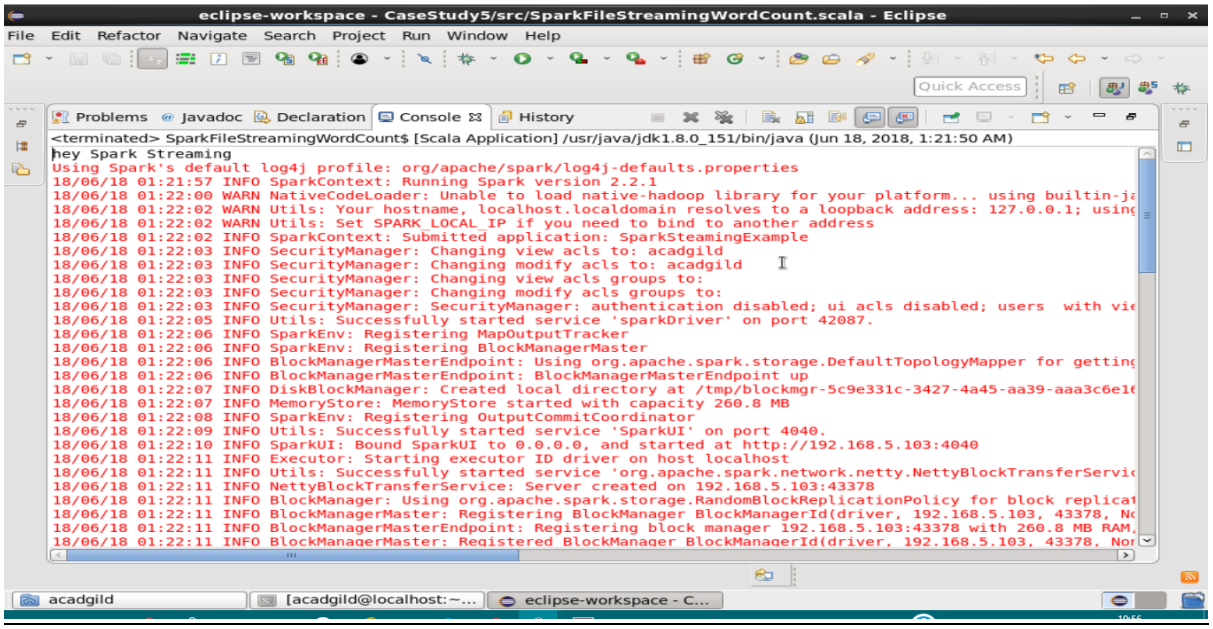
```
  private def readFile(filename: String): List[String] = {
    val lineIter: Iterator[String] = fromFile(filename).getLines()
    val lineList: List[String] = lineIter.toList
    lineList
  }

  def runLocalWordCount(fileContents: List[String]): Int = {
    fileContents.flatMap(_.split(" "))
      .flatMap(_.split("\t"))
      .filter(_.nonEmpty)
      .groupBy(w => w)
      .mapValues(_.size)
      .values
      .sum
  }
}
```

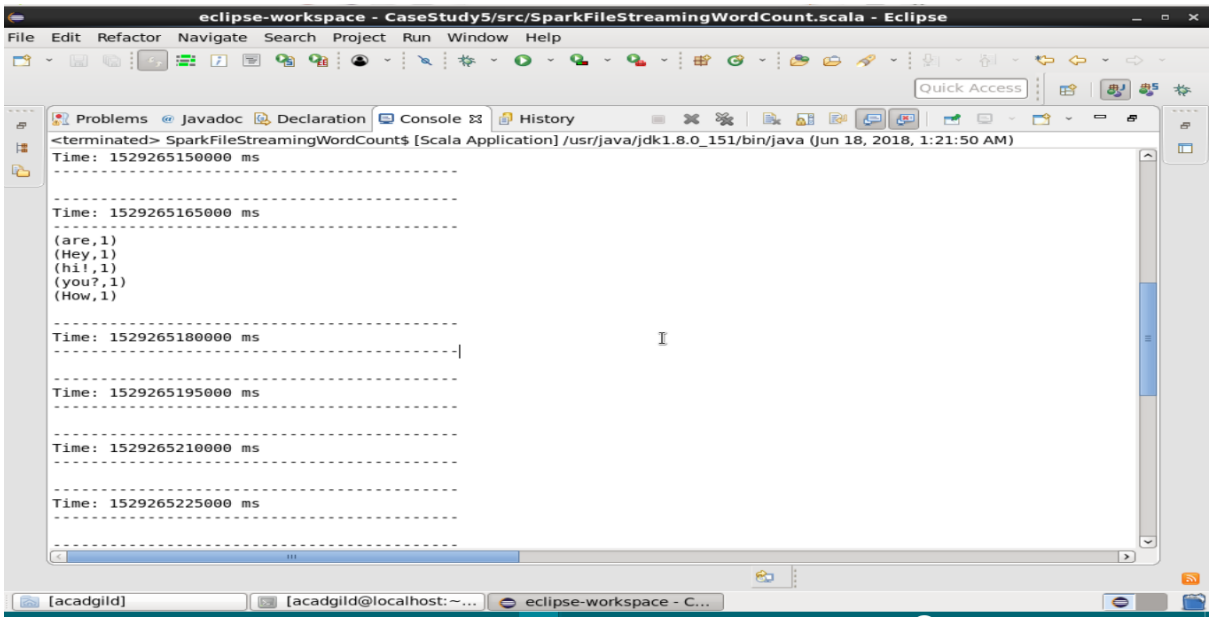
Screenshots

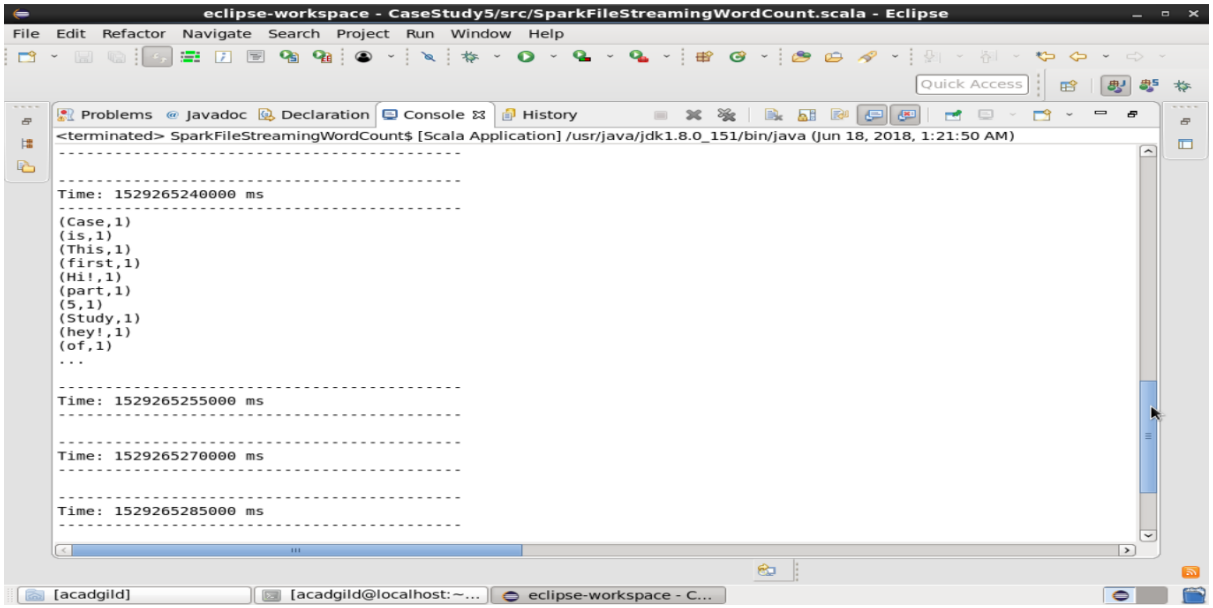
Source files

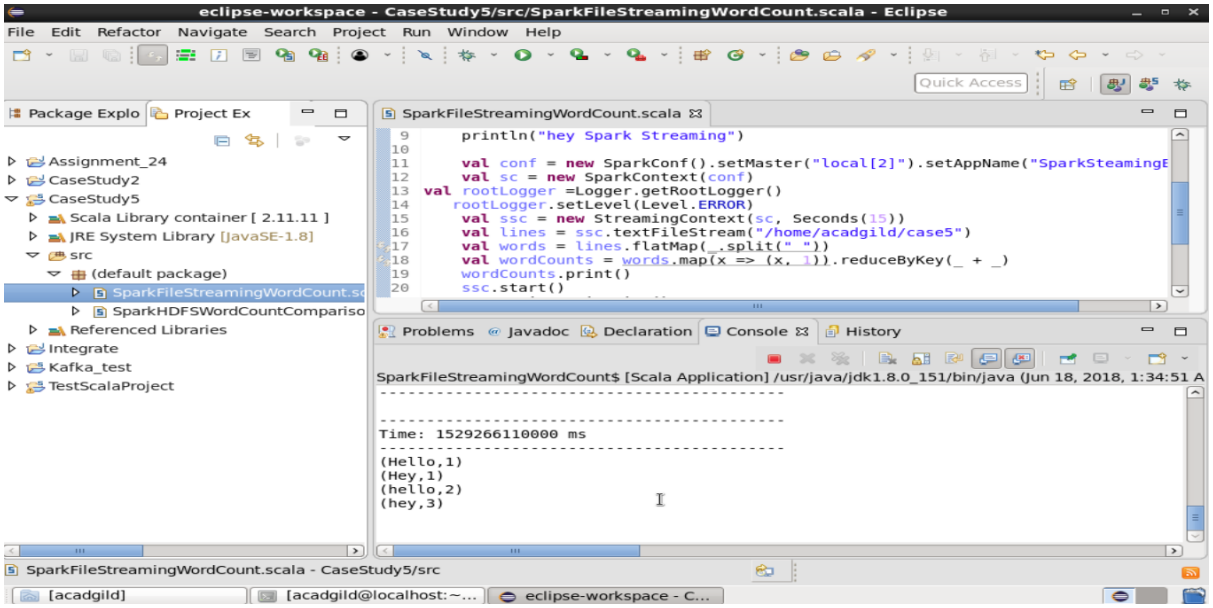


Task1 outputs

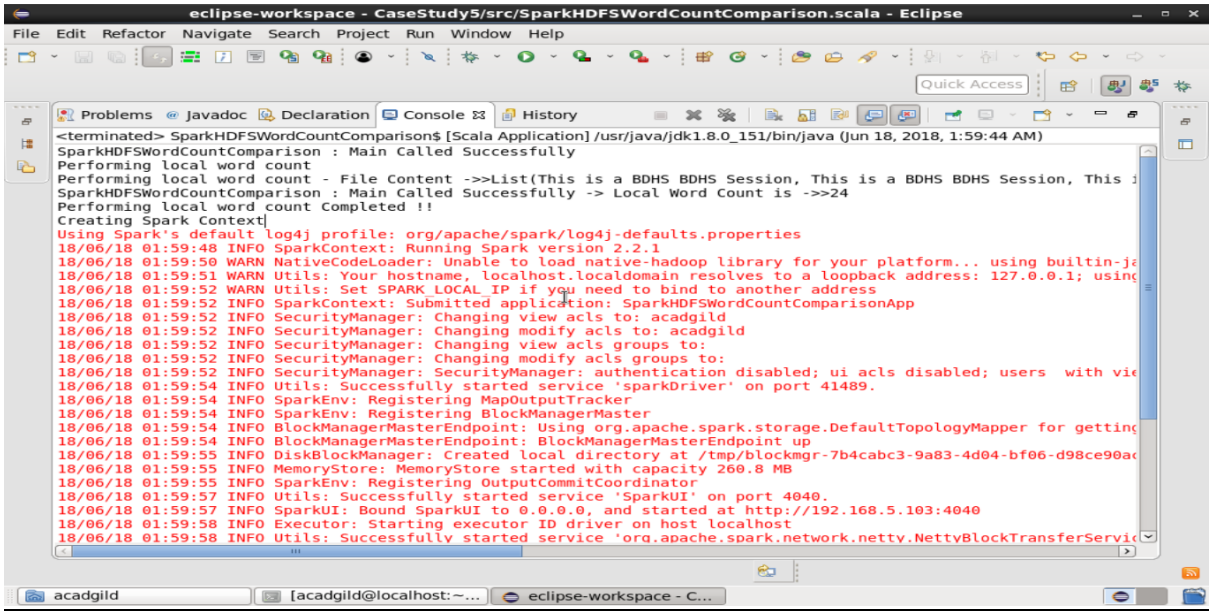


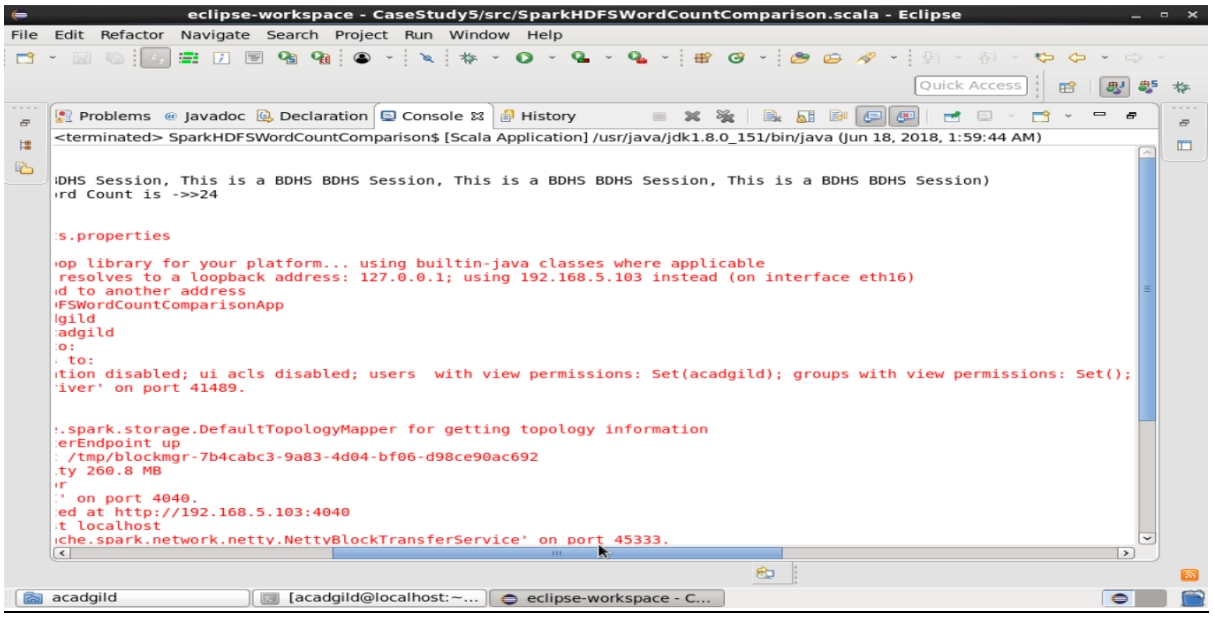


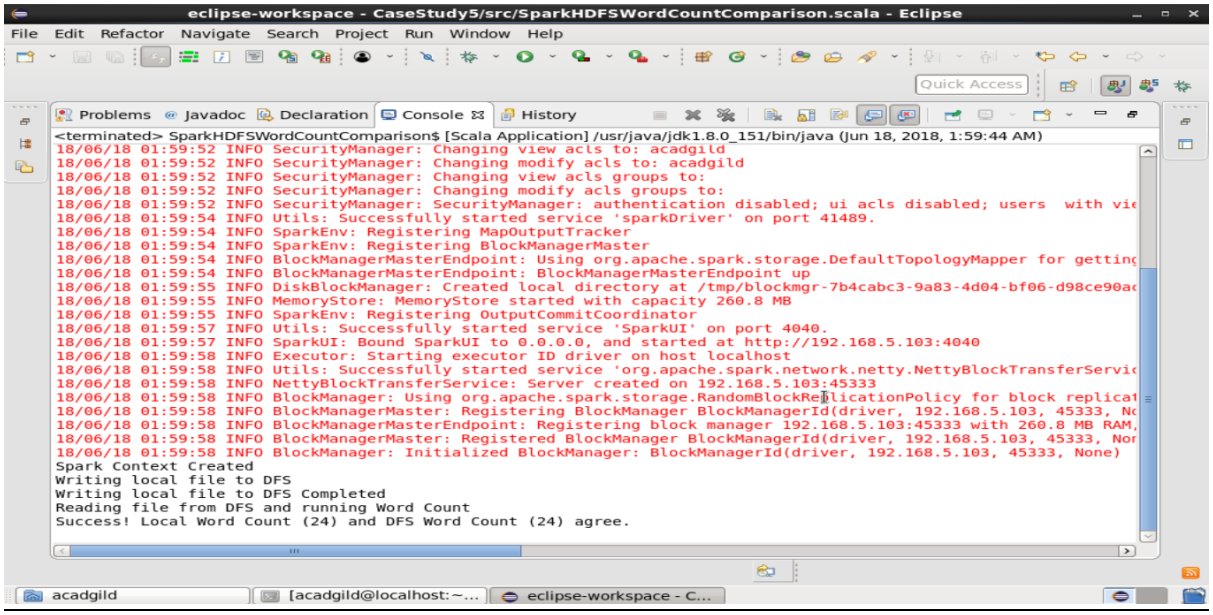

eclipse-workspace - CaseStudy5/src/SparkFileStreamingWordCount.scala - Eclipse
File Edit Refactor Navigate Search Project Run Window Help
Quick Access
Problems Javadoc Declaration Console History
<terminated> SparkFileStreamingWordCount$ [Scala Application] /usr/java/jdk1.8.0_151/bin/java (Jun 18, 2018, 1:21:50 AM)
Time: 1529265240000 ms
(Case,1)
(is,1)
(This,1)
(first,1)
(Hi!,1)
(part,1)
(5,1)
(Study,1)
(hey!,1)
(of,1)
...
Time: 1529265255000 ms
Time: 1529265270000 ms
Time: 1529265285000 ms
[acadgild]
[acadgild@localhost:~...
eclipse-workspace - C...


eclipse-workspace - CaseStudy5/src/SparkFileStreamingWordCount.scala - Eclipse
File Edit Refactor Navigate Search Project Run Window Help
Quick Access
Package Explo
Project Ex
Assignment_24
CaseStudy2
CaseStudy5
Scala Library container [2.11.11]
JRE System Library [JavaSE-1.8]
src
(default package)
SparkFileStreamingWordCount.sc
SparkHDFSWordCountCompariso
Referenced Libraries
Integrate
Kafka_test
TestScalaProject
SparkFileStreamingWordCount.scala
9 println("hey Spark Streaming")
10
11 val conf = new SparkConf().setMaster("local[2]").setAppName("SparkSteamingE
12 val sc = new SparkContext(conf)
13 val rootLogger =Logger.getRootLogger()
14 rootLogger.setLevel(Level.ERROR)
15 val ssc = new StreamingContext(sc, Seconds(15))
16 val lines = ssc.textFileStream("/home/acadgild/case5")
17 val words = lines.flatMap(_.split(" "))
18 val wordCounts = words.map(x => (x, 1)).reduceByKey(_ + _)
19 wordCounts.print()
20 ssc.start()
Problems Javadoc Declaration Console History
SparkFileStreamingWordCount$ [Scala Application] /usr/java/jdk1.8.0_151/bin/java (Jun 18, 2018, 1:34:51 A
Time: 1529266110000 ms
(Hello,1)
(Hey,1)
(hello,2)
(hey,3)
SparkFileStreamingWordCount.scala - CaseStudy5/src
[acadgild]
[acadgild@localhost:~...
eclipse-workspace - C...

Task2 outputs






eclipse-workspace - CaseStudy5/src/SparkHDFSWordCountComparison.scala - Eclipse
File Edit Refactor Navigate Search Project Run Window Help
Quick Access
Problems Javadoc Declaration Console History
<terminated> SparkHDFSWordCountComparison$ [Scala Application] /usr/java/jdk1.8.0_151/bin/java (Jun 18, 2018, 1:59:44 AM)
18/06/18 01:59:52 INFO SecurityManager: Changing view acls to: acadgild
18/06/18 01:59:52 INFO SecurityManager: Changing modify acls to: acadgild
18/06/18 01:59:52 INFO SecurityManager: Changing view acls groups to:
18/06/18 01:59:52 INFO SecurityManager: Changing modify acls groups to:
18/06/18 01:59:52 INFO SecurityManager: SecurityManager: authentication disabled; ui acls disabled; users with vie
18/06/18 01:59:54 INFO Utils: Successfully started service 'sparkDriver' on port 41489.
18/06/18 01:59:54 INFO SparkEnv: Registering MapOutputTracker
18/06/18 01:59:54 INFO SparkEnv: Registering BlockManagerMaster
18/06/18 01:59:54 INFO BlockManagerMasterEndpoint: Using org.apache.spark.storage.DefaultTopologyMapper for getting
18/06/18 01:59:54 INFO BlockManagerMasterEndpoint: BlockManagerMasterEndpoint up
18/06/18 01:59:55 INFO DiskBlockManager: Created local directory at /tmp/blockmgr-7b4cabc3-9a83-4d04-bf06-d98ce90ac
18/06/18 01:59:55 INFO MemoryStore: MemoryStore started with capacity 260.8 MB
18/06/18 01:59:55 INFO SparkEnv: Registering OutputCommitCoordinator
18/06/18 01:59:57 INFO Utils: Successfully started service 'SparkUI' on port 4040.
18/06/18 01:59:57 INFO SparkUI: Bound SparkUI to 0.0.0.0, and started at http://192.168.5.103:4040
18/06/18 01:59:58 INFO Executor: Starting executor ID driver on host localhost
18/06/18 01:59:58 INFO Utils: Successfully started service 'org.apache.spark.network.netty.NettyBlockTransferServic
18/06/18 01:59:58 INFO NettyBlockTransferService: Server created on 192.168.5.103:45333
18/06/18 01:59:58 INFO BlockManager: Using org.apache.spark.storage.RandomBlockReplicationPolicy for block replicat
18/06/18 01:59:58 INFO BlockManagerMaster: Registering BlockManager BlockManagerId(driver, 192.168.5.103, 45333, No
18/06/18 01:59:58 INFO BlockManagerMasterEndpoint: Registering block manager 192.168.5.103:45333 with 260.8 MB RAM,
18/06/18 01:59:58 INFO BlockManagerMaster: Registered BlockManager BlockManagerId(driver, 192.168.5.103, 45333, Nor
18/06/18 01:59:58 INFO BlockManager: Initialized BlockManager: BlockManagerId(driver, 192.168.5.103, 45333, None)
Spark Context Created
Writing local file to DFS
Writing local file to DFS Completed
Reading file from DFS and running Word Count
Success! Local Word Count (24) and DFS Word Count (24) agree.
acadgild
[acadgild@localhost:~...
eclipse-workspace - C...