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Big Data System Engineering with Scala
Spring 2023
Assignment No.7(Spark-CSV)

-List of Tasks Implemented

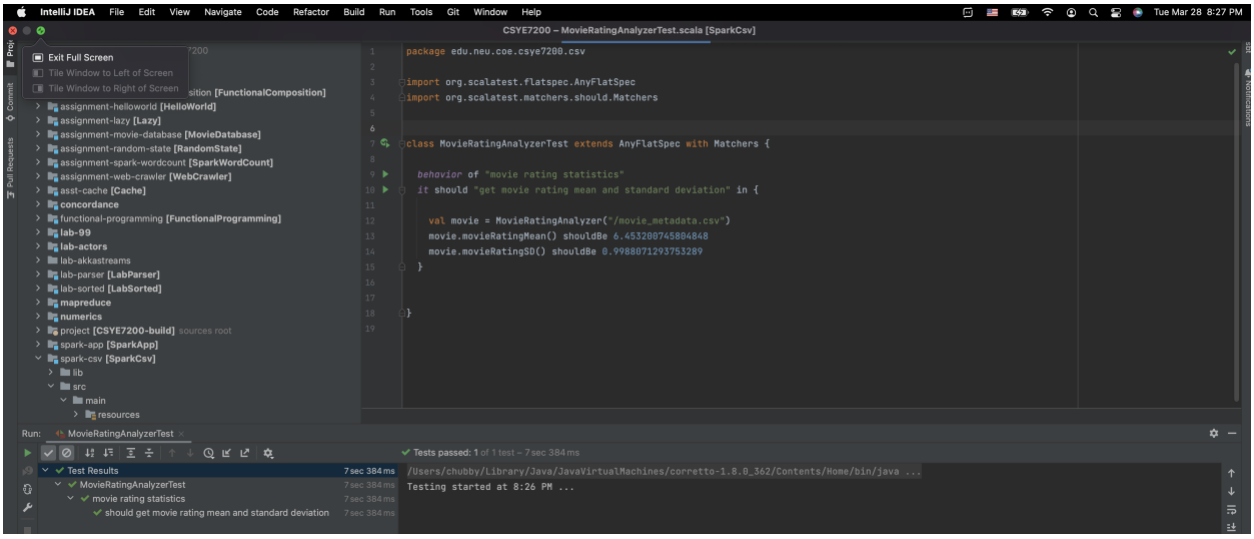
You are required to analyze a movie rating dataset. The data is stored in a CSV file (either use the one in the repository or download the latest from Kaggle). You need to read this file into spark and calculate the mean rating and standard deviation for all movies. There is no test case provided for you, so you need to write your own test cases to ensure that at least your program works well.

-Code

```scala
package edu.neu.coe.csye7200.csv

import org.apache.spark.sql.{DataFrame, SparkSession, functions}
case class MovieRatingAnalyzer(resource: String) {

  val spark: SparkSession = SparkSession
    .builder()
    .appName( name = "MovieRating")
    .master( master = "local[*]")
    .getOrCreate()

  spark.sparkContext.setLogLevel("ERROR")

  def apply(resource: String): MovieRatingAnalyzer = new MovieRatingAnalyzer(resource)

  private val df: DataFrame = spark.read.format( source = "csv").option("header", "true")
    .load(getClass.getResource(resource).getPath)
  df.show()

  def movieRatingMean(): Double = {
    val mean = df.select(functions.avg( columnName = "imdb_score"))
    mean.show()
    mean.first().getDouble(0)
  }

  def movieRatingSD(): Double = {
    val sd = df.select(functions.stddev( columnName = "imdb_score"))
    sd.show()
    sd.first().getDouble(0)
  }
}

object MovieRatingAnalyzer extends App {
  val movie = MovieRatingAnalyzer("/movie_metadata.csv")
  movie.movieRatingMean()
  movie.movieRatingSD()
}
```

```scala
package edu.neu.coe.csye7200.csv

import org.scalatest.flatspec.AnyFlatSpec
import org.scalatest.matchers.should.Matchers


class MovieRatingAnalyzerTest extends AnyFlatSpec with Matchers {

  behavior of "movie rating statistics"
  it should "get movie rating mean and standard deviation" in {

    val movie = MovieRatingAnalyzer("/movie_metadata.csv")
    movie.movieRatingMean() shouldBe 6.453200745804848
    movie.movieRatingSD() shouldBe 0.9988071293753289
  }


}
```

-Unit tests




```
2023-03-28 20:27:46,953 INFO  o.a.s.s.c.e.codegen.CodeGenerator  - Code generated in 34.635317 ms
+-----+----------------+--------------------+--------+--------------------+--------------------+--------------------+--------------------+--------+--------------------+----------------+------------
|color|    director_name|num_critic_for_reviews|duration|director_facebook_likes|actor_3_facebook_likes|      actor_2_name|actor_1_facebook_likes|   gross|              genres|      actor_1_name|         mov
+-----+----------------+--------------------+--------+--------------------+--------------------+--------------------+--------------------+--------+--------------------+----------------+------------
|Color|   James Cameron|               723|     178|                   0|                 855|   Joel David Moore|                1000|760505847|Action|Adventure|...|       CCH Pounder|
|Color|  Gore Verbinski|               302|     169|                 563|                1000|      Orlando Bloom|               40000|309404152|Action|Adventure|...|      Johnny Depp|Pirates of t
|Color|      Sam Mendes|               602|     148|                   0|                 161|       Rory Kinnear|               11000|200074175|Action|Adventure|...|   Christoph Waltz|
|Color|Christopher Nolan|               813|     164|                22000|               23000|     Christian Bale|               27000|448130642|      Action|Thriller|         Tom Hardy|The Dark Kni
| null|      Doug Walker|              null|    null|                 131|                null|         Rob Walker|                 131|     null|         Documentary|       Doug Walker|Star Wars: E
|Color|   Andrew Stanton|               462|     132|                 475|                 530|    Samantha Morton|                 640| 73058679|Action|Adventure|...|      Daryl Sabara|        John
|Color|       Sam Raimi|               392|     156|                   0|                4000|       James Franco|               24000|336530303|Action|Adventure|...|      J.K. Simmons|       Spide
|Color|     Nathan Greno|               324|     100|                  15|                 284|       Donna Murphy|                 799|200807262|Adventure|Animati...|      Brad Garrett|
|Color|      Joss Whedon|               635|     141|                   0|               19000|  Robert Downey Jr.|               26000|458991599|Action|Adventure|...|  Chris Hemsworth|Avengers: Ag
|Color|      David Yates|               375|     153|                 282|               18000|   Daniel Radcliffe|               25000|301956980|Adventure|Family|...|      Alan Rickman|Harry Potter
|Color|      Zack Snyder|               673|     183|                   0|                2000|       Lauren Cohan|               15000|330249062|Action|Adventure|...|      Henry Cavill|Batman v Sup
|Color|     Bryan Singer|               434|     169|                   0|                 903|      Marlon Brando|               18000|200069408|Action|Adventure|...|      Kevin Spacey|   Superman
|Color|     Marc Forster|               403|     106|                 395|                 393|     Mathieu Amalric|                 451|168368427|    Action|Adventure|Giancarlo Giannini|  Quantum of
|Color|  Gore Verbinski|               313|     151|                 563|                1000|      Orlando Bloom|               40000|423032628|Action|Adventure|...|      Johnny Depp|Pirates of t
|Color|  Gore Verbinski|               450|     150|                 563|                1000|        Ruth Wilson|               40000| 89289910|Action|Adventure|...|      Johnny Depp|    The Lone
|Color|      Zack Snyder|               733|     143|                   0|                 748| Christopher Meloni|               15000|291021565|Action|Adventure|...|      Henry Cavill|       Man o
|Color|  Andrew Adamson|               258|     150|                  80|                 201|Pierfrancesco Favino|               22000|141614023|Action|Adventure|...|   Peter Dinklage|The Chronicl
|Color|      Joss Whedon|               703|     173|                   0|               19000|  Robert Downey Jr.|               26000|623279547|Action|Adventure|...|  Chris Hemsworth|       The A
|Color|     Rob Marshall|               448|     136|                 252|                1000|        Sam Claflin|               40000|241063875|Action|Adventure|...|      Johnny Depp|Pirates of t
|Color| Barry Sonnenfeld|               451|     106|                 188|                 718|  Michael Stuhlbarg|               10000|179020854|Action|Adventure|...|       Will Smith|     Men in
+-----+----------------+--------------------+--------+--------------------+--------------------+--------------------+--------------------+--------+--------------------+----------------+------------
```

```
2023-03-28 20:27:47,424 INFO  o.a.s.s.c.e.codegen.CodeGenerator  - Code generated in 5.482931 ms
+------------------+
|  avg(imdb_score)|
+------------------+
|6.453200745804848|
+------------------+
```

```
2023-03-28 20:27:47,759 INFO  o.a.spark.scheduler.DAGScheduler  - Job 4 finished: show at MovieRatingAnalyzer.scala:28, took 0.080085 s
+----------------------+
|stddev_samp(imdb_score)|
+----------------------+
|     0.9988071293753289|
+----------------------+
```