

lab-2-22mcb1002

April 10, 2023

1 Spark RDD and Runtime Calculation

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[1]: !apt-get install openjdk-8-jdk-headless -qq > /dev/null
!wget -q https://downloads.apache.org/spark/spark-3.2.3/spark-3.2.3-bin-hadoop3.
    ↪2.tgz
!tar -xvf spark-3.2.3-bin-hadoop3.2.tgz
!pip install -q findspark
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spark-3.2.3-bin-hadoop3.2/
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vaModelSelectionViaTrainValidationSplitExample.java
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vaPipelineExample.java
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vaVectorIndexerExample.java
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spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/ml/JavaWord2VecExample.java
spark-3.2.3-bin-
hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/
spark-3.2.3-bin-
hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaALS.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaAssociationRulesExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaBinaryClassificationMetricsExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaBisectingKMeansExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaChiSqSelectorExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaCorrelationsExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaDecisionTreeClassificationExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaDecisionTreeRegressionExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaElementwiseProductExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaGaussianMixtureExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaGradientBoostingClassificationExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaGradientBoostingRegressionExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaHypothesisTestingExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaHypothesisTestingKolmogorovSmirnovTestExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaIsotonicRegressionExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaKMeansExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaKernelDensityEstimationExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaLBFGSExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib/JavaLatentDirichletAllocationExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib

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/JavaLogisticRegressionWithLBFGSEExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaMultiLabelClassificationMetricsExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaMulticlassClassificationMetricsExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaNaiveBayesExample.java
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/JavaPCAExample.java
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/JavaPowerIterationClusteringExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaPrefixSpanExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaRandomForestClassificationExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaRandomForestRegressionExample.java
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/JavaRankingMetricsExample.java
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/JavaRecommendationExample.java
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/JavaSVDExample.java
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/JavaSVMWithSGDEXample.java
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/JavaSimpleFPGrowth.java
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/JavaStratifiedSamplingExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaStreamingTestExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/mllib
/JavaSummaryStatisticsExample.java
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avaSQLDataSourceExample.java
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avaSparkSQLExample.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/sql/J
avaUserDefinedScalar.java
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avaUserDefinedTypedAggregation.java
spark-3.2.3-bin-hadoop3.2/examples/src/main/java/org/apache/spark/examples/sql/J
avaUserDefinedUntypedAggregation.java
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hadoop3.2/examples/src/main/java/org/apache/spark/examples/sql/hive/
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ive/JavaSparkHiveExample.java

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treaming/JavaStructuredComplexSessionization.java
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treaming/JavaStructuredKafkaWordCount.java
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treaming/JavaStructuredKerberizedKafkaWordCount.java
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treaming/JavaStructuredNetworkWordCount.java
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treaming/JavaStructuredNetworkWordCountWindowed.java
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treaming/JavaStructuredSessionization.java
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ming/JavaCustomReceiver.java
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ming/JavaDirectKafkaWordCount.java
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ming/JavaNetworkWordCount.java
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ming/JavaQueueStream.java
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ming/JavaRecord.java
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ming/JavaRecoverableNetworkWordCount.java
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ming/JavaSqlNetworkWordCount.java
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ming/JavaStatefulNetworkWordCount.java
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spark-3.2.3-bin-hadoop3.2/examples/src/main/python/avro_inputformat.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/kmeans.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/logistic_regression.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/ml/
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/ml/aft_survival_regression.py
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spark-3.2.3-bin-
hadoop3.2/examples/src/main/python/ml/bucketed_random_projection_lsh_example.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/ml/bucketizer_example.py

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spark-3.2.3-bin-hadoop3.2/examples/src/main/python/ml/chi_square_test_example.py
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hadoop3.2/examples/src/main/python/ml/logistic_regression_with_elastic_net.py
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spark-3.2.3-bin-hadoop3.2/examples/src/main/python/ml/min_max_scaler_example.py
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hadoop3.2/examples/src/main/python/ml/multilayer_perceptron_classification.py
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etrics_example.py
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spark-3.2.3-bin-hadoop3.2/examples/src/main/python/mllib/correlations_example.py

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hadoop3.2/examples/src/main/python/mllib/multi_label_metrics_example.py
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hadoop3.2/examples/src/main/python/mllib/random_rdd_generation.py

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spark-3.2.3-bin-hadoop3.2/examples/src/main/python/sql/datasource.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/sql/hive.py
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ork_wordcount_windowed.py
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spark-3.2.3-bin-
hadoop3.2/examples/src/main/python/streaming/network_wordjoinsentiments.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/streaming/queue_stream.py

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spark-3.2.3-bin-
hadoop3.2/examples/src/main/python/streaming/recoverable_network_wordcount.py
spark-3.2.3-bin-
hadoop3.2/examples/src/main/python/streaming/sql_network_wordcount.py
spark-3.2.3-bin-
hadoop3.2/examples/src/main/python/streaming/stateful_network_wordcount.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/transitive_closure.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/python/wordcount.py
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/RSparkSQLExample.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/data-manipulation.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/dataframe.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/als.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/bisectingKmeans.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/decisionTree.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/fmClassifier.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/fmRegressor.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/fpm.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/gaussianMixture.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/gbt.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/glm.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/isoreg.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/kmeans.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/kstest.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/lda.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/lm_with_elastic_net.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/logit.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/ml.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/mlp.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/naiveBayes.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/powerIterationClustering.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/prefixSpan.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/randomForest.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/survreg.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/ml/svmLinear.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/r/streaming/
spark-3.2.3-bin-
hadoop3.2/examples/src/main/r/streaming/structured_network_wordcount.R
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/META-INF/
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/META-INF/services/
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/META-
INF/services/org.apache.spark.sql.SparkSessionExtensionsProvider
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/META-
INF/services/org.apache.spark.sql.jdbc.JdbcConnectionProvider
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/dir1/
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/dir1/dir2/

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spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/dir1/dir2/file2.parquet
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/dir1/file1.parquet
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/dir1/file3.json
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/employees.json
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/full_user.avsc
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/kv1.txt
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/people.csv
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/people.json
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/people.txt
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/user.avsc
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/users.avro
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/users.orc
spark-3.2.3-bin-hadoop3.2/examples/src/main/resources/users.parquet
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/Accu
mulatorMetricsTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/BroadcastTest.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/DFSRe
adWriteTest.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/Driv
erSubmissionTest.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/Exce
ptionHandlingTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/GroupByTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/HdfsTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/LocalALS.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/LocalFileLR.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/LocalKMeans.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/LocalLR.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/LocalPi.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/LogQuery.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/Mult
iBroadcastTest.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/Simp
leSkewedGroupByTest.scala


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spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SkewedGroupByTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkALS.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkHdfsLR.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkKMeans.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkLR.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkPageRank.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkPi.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkRemoteFileTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/SparkTC.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/extensions/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/extensions/AgeExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/extensions/SessionExtensionsWithLoader.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/extensions/SessionExtensionsWithoutLoader.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/extensions/SparkSessionExtensionsTest.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/AggregateMessagesExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/Analytics.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/ComprehensiveExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/ConnectedComponentsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/LiveJournalPageRank.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/PageRankExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/SSSPExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/SynthBenchmark.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/graphx/TriangleCountingExample.scala

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spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/A
FTSurvivalRegressionExample.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/ALSEExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/B
inarizerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/B
isectingKMeansExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/B
ucketedRandomProjectionLSHExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/B
ucketizerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/C
hiSqSelectorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/C
hiSquareTestExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/C
orrelationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/C
ountVectorizerExample.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/DCTExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/D
ataFrameExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/D
ecisionTreeClassificationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/D
ecisionTreeExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/D
ecisionTreeRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/D
eveloperApiExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/E
lementwiseProductExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/E
stimatorTransformerParamExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/F
MClassifierExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/F
MRegressorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/F
PGrowthExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/F
eatureHasherExample.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/GBTEExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/G

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aussianMixtureExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/GeneralizedLinearRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/GradientBoostedTreeClassifierExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/GradientBoostedTreeRegressorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/ImputerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/IndexToStringExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/InteractionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/IsotonicRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/KMeansExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LDAExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LinearRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LinearRegressionWithElasticNetExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LinearSVCExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LogisticRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LogisticRegressionSummaryExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/LogisticRegressionWithElasticNetExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/MaxAbsScalerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/MinHashLSHExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/MinMaxScalerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/ModelSelectionViaCrossValidationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/ModelSelectionViaTrainValidationSplitExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/MulticlassLogisticRegressionWithElasticNetExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/MultilayerPerceptronClassifierExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/NGramExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/N

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aiveBayesExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/NormalizerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/OneHotEncoderExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/OneVsRestExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/PCAExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/PipelineExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/PolynomialExpansionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/PowerIterationClusteringExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/PrefixSpanExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/QuantileDiscretizerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/RandomFormulaExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/RandomForestClassifierExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/RandomForestExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/RandomForestRegressorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/RobustScalerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/SQLTransformerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/StandardScalerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/StopWordsRemoverExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/StringIndexerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/SummaryExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/TfidfExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/TOKENIZERExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/UnaryTransformerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/UnivariateFeatureSelectorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/V

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arianceThresholdSelectorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/V
ectorAssemblerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/V
ectorIndexerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/V
ectorSizeHintExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/V
ectorSlicerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/ml/W
ord2VecExample.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/AbstractParams.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/AssociationRulesExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/BinaryClassification.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/BinaryClassificationMetricsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/BisectingKMeansExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/ChiSqSelectorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/Correlations.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/CorrelationsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/CosineSimilarity.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/DecisionTreeClassificationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/DecisionTreeRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/DecisionTreeRunner.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/DenseKMeans.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/ElementwiseProductExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/FPGrowthExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/GaussianMixtureExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli
b/GradientBoostedTreesRunner.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mlli

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b/GradientBoostingClassificationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/GradientBoostingRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/HypothesisTestingExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/HypothesisTestingKolmogorovSmirnovTestExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/IsotonicRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/KMeansExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/KernelDensityEstimationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/LBFGSExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/LDAExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/LatentDirichletAllocationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/LogisticRegressionWithLBFGSExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/MovieLensALS.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/MultiLabelMetricsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/MulticlassMetricsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/MultivariateSummarizer.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/NaiveBayesExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/NormalizerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/PCAOnRowMatrixExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/PCAOnSourceVectorExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/PMMLModelExportExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/PowerIterationClusteringExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/PrefixSpanExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/RandomForestClassificationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/RandomForestRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib

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b/RandomRDDGeneration.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
RankingMetricsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
RecommendationExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
SVDExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
SVMWithSGDEXample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
SampledRDDs.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
SimpleFPGrowth.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
SparseNaiveBayes.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
StandardScalerExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
StratifiedSamplingExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
StreamingKMeansExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
StreamingLinearRegressionExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
StreamingLogisticRegression.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
StreamingTestExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
SummaryStatisticsExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
TFIDFExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
TallSkinnyPCA.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
TallSkinnySVD.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/mllib/
Word2VecExample.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/pythonconverters/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/pyth
onconverters/AvroConverters.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
RDDRelation.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
SQLDataSourceExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
SimpleTypedAggregator.scala

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spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
SparkSQLExample.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
UserDefinedScalar.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
UserDefinedTypedAggregation.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
UserDefinedUntypedAggregation.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/hive/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
hive/SparkHiveExample.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/jdbc/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
jdbc/ExampleJdbcConnectionProvider.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/streaming/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
streaming/StructuredComplexSessionization.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
streaming/StructuredKafkaWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
streaming/StructuredKerberizedKafkaWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
streaming/StructuredNetworkWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
streaming/StructuredNetworkWordCountWindowed.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/sql/
streaming/StructuredSessionization.scala
spark-3.2.3-bin-
hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/CustomReceiver.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/DirectKafkaWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/DirectKerberizedKafkaWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/HdfsWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/NetworkWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/QueueStream.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/RawNetworkGrep.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/stre
aming/RecoverableNetworkWordCount.scala

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spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/SqlNetworkWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/StatefulNetworkWordCount.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/StreamingExamples.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/clickstream/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/clickstream/PageViewGenerator.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scala/org/apache/spark/examples/streaming/clickstream/PageViewStream.scala
spark-3.2.3-bin-hadoop3.2/examples/src/main/scripts/
spark-3.2.3-bin-hadoop3.2/examples/src/main/scripts/getGpusResources.sh
spark-3.2.3-bin-hadoop3.2/jars/
spark-3.2.3-bin-hadoop3.2/jars/HikariCP-2.5.1.jar
spark-3.2.3-bin-hadoop3.2/jars/JLargeArrays-1.5.jar
spark-3.2.3-bin-hadoop3.2/jars/JTransforms-3.1.jar
spark-3.2.3-bin-hadoop3.2/jars/RoaringBitmap-0.9.0.jar
spark-3.2.3-bin-hadoop3.2/jars/ST4-4.0.4.jar
spark-3.2.3-bin-hadoop3.2/jars/activation-1.1.1.jar
spark-3.2.3-bin-hadoop3.2/jars/aircompressor-0.21.jar
spark-3.2.3-bin-hadoop3.2/jars/algebra_2.12-2.0.1.jar
spark-3.2.3-bin-hadoop3.2/jars/annotations-17.0.0.jar
spark-3.2.3-bin-hadoop3.2/jars/antlr-runtime-3.5.2.jar
spark-3.2.3-bin-hadoop3.2/jars/antlr4-runtime-4.8.jar
spark-3.2.3-bin-hadoop3.2/jars/aopalliance-repackaged-2.6.1.jar
spark-3.2.3-bin-hadoop3.2/jars/arpack-2.2.1.jar
spark-3.2.3-bin-hadoop3.2/jars/arpack_combined_all-0.1.jar
spark-3.2.3-bin-hadoop3.2/jars/arrow-format-2.0.0.jar
spark-3.2.3-bin-hadoop3.2/jars/arrow-memory-core-2.0.0.jar
spark-3.2.3-bin-hadoop3.2/jars/arrow-memory-netty-2.0.0.jar
spark-3.2.3-bin-hadoop3.2/jars/arrow-vector-2.0.0.jar
spark-3.2.3-bin-hadoop3.2/jars/audience-annotations-0.5.0.jar
spark-3.2.3-bin-hadoop3.2/jars/automaton-1.11-8.jar
spark-3.2.3-bin-hadoop3.2/jars/avro-1.10.2.jar
spark-3.2.3-bin-hadoop3.2/jars/avro-ipc-1.10.2.jar
spark-3.2.3-bin-hadoop3.2/jars/avro-mapred-1.10.2.jar
spark-3.2.3-bin-hadoop3.2/jars/blas-2.2.1.jar
spark-3.2.3-bin-hadoop3.2/jars/bonecp-0.8.0.RELEASE.jar
spark-3.2.3-bin-hadoop3.2/jars/breeze-macros_2.12-1.2.jar
spark-3.2.3-bin-hadoop3.2/jars/breeze_2.12-1.2.jar
spark-3.2.3-bin-hadoop3.2/jars/cats-kernel_2.12-2.1.1.jar
spark-3.2.3-bin-hadoop3.2/jars/chill-java-0.10.0.jar
spark-3.2.3-bin-hadoop3.2/jars/chill_2.12-0.10.0.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-cli-1.2.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-codec-1.15.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-collections-3.2.2.jar

spark-3.2.3-bin-hadoop3.2/jars/commons-compiler-3.0.16.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-compress-1.21.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-crypto-1.1.0.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-dbcp-1.4.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-io-2.8.0.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-lang-2.6.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-lang3-3.12.0.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-logging-1.1.3.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-math3-3.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-net-3.1.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-pool-1.5.4.jar
spark-3.2.3-bin-hadoop3.2/jars/commons-text-1.10.0.jar
spark-3.2.3-bin-hadoop3.2/jars/compress-lzf-1.0.3.jar
spark-3.2.3-bin-hadoop3.2/jars/core-1.1.2.jar
spark-3.2.3-bin-hadoop3.2/jars/curator-client-2.13.0.jar
spark-3.2.3-bin-hadoop3.2/jars/curator-framework-2.13.0.jar
spark-3.2.3-bin-hadoop3.2/jars/curator-recipes-2.13.0.jar
spark-3.2.3-bin-hadoop3.2/jars/datanucleus-api-jdo-4.2.4.jar
spark-3.2.3-bin-hadoop3.2/jars/datanucleus-core-4.1.17.jar
spark-3.2.3-bin-hadoop3.2/jars/datanucleus-rdbms-4.1.19.jar
spark-3.2.3-bin-hadoop3.2/jars/derby-10.14.2.0.jar
spark-3.2.3-bin-hadoop3.2/jars/dropwizard-metrics-hadoop-
metrics2-reporter-0.1.2.jar
spark-3.2.3-bin-hadoop3.2/jars/flatbuffers-java-1.9.0.jar
spark-3.2.3-bin-hadoop3.2/jars/generex-1.0.2.jar
spark-3.2.3-bin-hadoop3.2/jars/gson-2.2.4.jar
spark-3.2.3-bin-hadoop3.2/jars/guava-14.0.1.jar
spark-3.2.3-bin-hadoop3.2/jars/hadoop-client-api-3.3.1.jar
spark-3.2.3-bin-hadoop3.2/jars/hadoop-client-runtime-3.3.1.jar
spark-3.2.3-bin-hadoop3.2/jars/hadoop-shaded-guava-1.1.1.jar
spark-3.2.3-bin-hadoop3.2/jars/hadoop-yarn-server-web-proxy-3.3.1.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-beeline-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-cli-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-common-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-exec-2.3.9-core.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-jdbc-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-llap-common-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-metastore-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-serde-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-service-rpc-3.1.2.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-shims-0.23-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-shims-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-shims-common-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-shims-scheduler-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-storage-api-2.7.2.jar
spark-3.2.3-bin-hadoop3.2/jars/hive-vector-code-gen-2.3.9.jar
spark-3.2.3-bin-hadoop3.2/jars/hk2-api-2.6.1.jar
spark-3.2.3-bin-hadoop3.2/jars/hk2-locator-2.6.1.jar

spark-3.2.3-bin-hadoop3.2/jars/hk2-utils-2.6.1.jar
spark-3.2.3-bin-hadoop3.2/jars/htrace-core4-4.1.0-incubating.jar
spark-3.2.3-bin-hadoop3.2/jars/httpclient-4.5.13.jar
spark-3.2.3-bin-hadoop3.2/jars/httpcore-4.4.14.jar
spark-3.2.3-bin-hadoop3.2/jars/istack-commons-runtime-3.0.8.jar
spark-3.2.3-bin-hadoop3.2/jars/ivy-2.5.0.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-annotations-2.12.3.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-core-2.12.3.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-core-asl-1.9.13.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-databind-2.12.3.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-dataformat-yaml-2.12.3.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-datatype-jsr310-2.11.2.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-mapper-asl-1.9.13.jar
spark-3.2.3-bin-hadoop3.2/jars/jackson-module-scala_2.12-2.12.3.jar
spark-3.2.3-bin-hadoop3.2/jars/jakarta.annotation-api-1.3.5.jar
spark-3.2.3-bin-hadoop3.2/jars/jakarta.inject-2.6.1.jar
spark-3.2.3-bin-hadoop3.2/jars/jakarta.servlet-api-4.0.3.jar
spark-3.2.3-bin-hadoop3.2/jars/jakarta.validation-api-2.0.2.jar
spark-3.2.3-bin-hadoop3.2/jars/jakarta.ws.rs-api-2.1.6.jar
spark-3.2.3-bin-hadoop3.2/jars/jakarta.xml.bind-api-2.3.2.jar
spark-3.2.3-bin-hadoop3.2/jars/janino-3.0.16.jar
spark-3.2.3-bin-hadoop3.2/jars/javassist-3.25.0-GA.jar
spark-3.2.3-bin-hadoop3.2/jars/javax.jdo-3.2.0-m3.jar
spark-3.2.3-bin-hadoop3.2/jars/javolution-5.5.1.jar
spark-3.2.3-bin-hadoop3.2/jars/jaxb-api-2.2.11.jar
spark-3.2.3-bin-hadoop3.2/jars/jaxb-runtime-2.3.2.jar
spark-3.2.3-bin-hadoop3.2/jars/jcl-over-slf4j-1.7.30.jar
spark-3.2.3-bin-hadoop3.2/jars/jdo-api-3.0.1.jar
spark-3.2.3-bin-hadoop3.2/jars/jersey-client-2.34.jar
spark-3.2.3-bin-hadoop3.2/jars/jersey-common-2.34.jar
spark-3.2.3-bin-hadoop3.2/jars/jersey-container-servlet-2.34.jar
spark-3.2.3-bin-hadoop3.2/jars/jersey-container-servlet-core-2.34.jar
spark-3.2.3-bin-hadoop3.2/jars/jersey-hk2-2.34.jar
spark-3.2.3-bin-hadoop3.2/jars/jersey-server-2.34.jar
spark-3.2.3-bin-hadoop3.2/jars/jline-2.14.6.jar
spark-3.2.3-bin-hadoop3.2/jars/joda-time-2.10.10.jar
spark-3.2.3-bin-hadoop3.2/jars/jodd-core-3.5.2.jar
spark-3.2.3-bin-hadoop3.2/jars/jpam-1.1.jar
spark-3.2.3-bin-hadoop3.2/jars/json-1.8.jar
spark-3.2.3-bin-hadoop3.2/jars/json4s-ast_2.12-3.7.0-M11.jar
spark-3.2.3-bin-hadoop3.2/jars/json4s-core_2.12-3.7.0-M11.jar
spark-3.2.3-bin-hadoop3.2/jars/json4s-jackson_2.12-3.7.0-M11.jar
spark-3.2.3-bin-hadoop3.2/jars/json4s-scalap_2.12-3.7.0-M11.jar
spark-3.2.3-bin-hadoop3.2/jars/jsr305-3.0.0.jar
spark-3.2.3-bin-hadoop3.2/jars/jta-1.1.jar
spark-3.2.3-bin-hadoop3.2/jars/jul-to-slf4j-1.7.30.jar
spark-3.2.3-bin-hadoop3.2/jars/kryo-shaded-4.0.2.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-client-5.4.1.jar

spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-admissionregistration-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-apiextensions-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-apps-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-autoscaling-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-batch-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-certificates-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-common-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-coordination-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-core-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-discovery-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-events-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-extensions-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-flowcontrol-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-metrics-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-networking-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-node-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-policy-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-rbac-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-scheduling-5.4.1.jar
spark-3.2.3-bin-hadoop3.2/jars/kubernetes-model-storageclass-5.4.1.jar
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spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/typedef/
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/typedef/__init__.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/typedef/string_typehints.py

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spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/typedef/typehints.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/usage_logging/
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/usage_logging/__init__.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/usage_logging/usage_logger.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/utils.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/pandas/window.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/profiler.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/profiler.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/py.typed
spark-3.2.3-bin-hadoop3.2/python/pyspark/python/
spark-3.2.3-bin-hadoop3.2/python/pyspark/python/pyspark/
spark-3.2.3-bin-hadoop3.2/python/pyspark/python/pyspark/shell.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/rddsampler.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/resource/__init__.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/resultiterable.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/_typing.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/avro/
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/avro/__init__.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/conf.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/conf.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/context.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/context.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/dataframe.py


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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/dataframe.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/group.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/__init__.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/_typing/__init__.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/_typing/protocols/series.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/conversion.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/conversion.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/map_ops.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/types.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/pandas/utils.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/readwriter.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/session.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/__init__.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_arrow.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_column.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_conf.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_pandas_grouped_map.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_pandas_map.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_pandas_udf.py
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hadoop3.2/python/pyspark/sql/tests/test_pandas_udf_grouped_agg.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_pandas_udf_scalar.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_pandas_udf_typehints.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_pandas_udf_window.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/tests/test_readwriter.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/types.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/udf.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/utils.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/sql/window.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/status.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/storagelevel.pyi
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spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/__init__.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/context.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/dstream.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/kinesis.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/kinesis.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/listener.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/listener.pyi
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/tests/
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/tests/__init__.py
spark-3.2.3-bin-hadoop3.2/python/pyspark/streaming/tests/test_context.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/testing/__init__.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/testing/mlutils.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/tests/test_profiler.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark/tests/test_serializers.py
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spark-3.2.3-bin-hadoop3.2/python/pyspark.egg-info/
spark-3.2.3-bin-hadoop3.2/python/pyspark.egg-info/PKG-INFO
spark-3.2.3-bin-hadoop3.2/python/pyspark.egg-info/SOURCES.txt
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spark-3.2.3-bin-hadoop3.2/python/run-tests-with-coverage
spark-3.2.3-bin-hadoop3.2/python/run-tests.py
spark-3.2.3-bin-hadoop3.2/python/setup.cfg
spark-3.2.3-bin-hadoop3.2/python/setup.py
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spark-3.2.3-bin-hadoop3.2/python/test_coverage/conf/
spark-3.2.3-bin-hadoop3.2/python/test_coverage/conf/spark-defaults.conf
spark-3.2.3-bin-hadoop3.2/python/test_coverage/coverage_daemon.py
spark-3.2.3-bin-hadoop3.2/python/test_coverage/sitecustomize.py
spark-3.2.3-bin-hadoop3.2/python/test_support/
spark-3.2.3-bin-hadoop3.2/python/test_support/SimpleHTTPServer.py
spark-3.2.3-bin-hadoop3.2/python/test_support/hello/
spark-3.2.3-bin-hadoop3.2/python/test_support/hello/hello.txt

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spark-3.2.3-bin-hadoop3.2/python/test_support/hello/sub_hello/
spark-3.2.3-bin-hadoop3.2/python/test_support/hello/sub_hello/sub_hello.txt
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/ages.csv
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/ages_newlines.csv
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/orc_partitioned/
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/orc_partitioned/_SUCCESS
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/orc_partitioned/b=0/
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/orc_partitioned/b=0/c=0/
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/orc_partitioned/b=0/c=0/.part-
r-00000-829af031-b970-49d6-ad39-30460a0be2c8.orc.crc
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/orc_partitioned/b=0/c=0/part-r
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r-00000-829af031-b970-49d6-ad39-30460a0be2c8.orc.crc
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month=10/day=25/.part-r-00004.gz.parquet.crc
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month=10/day=25/part-r-00002.gz.parquet
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/parquet_partitioned/year=2015/
month=10/day=25/part-r-00004.gz.parquet
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spark-3.2.3-bin-hadoop3.2/python/test_support/sql/parquet_partitioned/year=2015/
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month=10/day=26/part-r-00005.gz.parquet
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spark-3.2.3-bin-
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spark-3.2.3-bin-hadoop3.2/python/test_support/sql/parquet_partitioned/year=2015/
month=9/day=1/.part-r-00007.gz.parquet.crc
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/parquet_partitioned/year=2015/
month=9/day=1/part-r-00007.gz.parquet
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/people.json
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/people1.json
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/people_array.json
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/people_array_utf16le.json
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/streaming/
spark-3.2.3-bin-hadoop3.2/python/test_support/sql/streaming/text-test.txt
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spark-3.2.3-bin-hadoop3.2/sbin/
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spark-3.2.3-bin-hadoop3.2/sbin/decommission-worker.sh
spark-3.2.3-bin-hadoop3.2/sbin/slaves.sh
spark-3.2.3-bin-hadoop3.2/sbin/spark-config.sh
spark-3.2.3-bin-hadoop3.2/sbin/spark-daemon.sh
spark-3.2.3-bin-hadoop3.2/sbin/spark-daemons.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-all.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-history-server.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-master.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-mesos-dispatcher.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-mesos-shuffle-service.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-slave.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-slaves.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-thriftserver.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-worker.sh
spark-3.2.3-bin-hadoop3.2/sbin/start-workers.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-all.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-history-server.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-master.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-mesos-dispatcher.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-mesos-shuffle-service.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-slave.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-slaves.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-thriftserver.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-worker.sh
spark-3.2.3-bin-hadoop3.2/sbin/stop-workers.sh

```
spark-3.2.3-bin-hadoop3.2/sbin/workers.sh
spark-3.2.3-bin-hadoop3.2/yarn/
spark-3.2.3-bin-hadoop3.2/yarn/spark-3.2.3-yarn-shuffle.jar
```

```
[2]: import os
os.environ["JAVA_HOME"] = "/usr/lib/jvm/java-8-openjdk-amd64"
os.environ["SPARK_HOME"] = "/content/spark-3.2.3-bin-hadoop3.2"
```

```
[3]: import findspark
findspark.init()
from pyspark.sql import SparkSession
```

```
[4]: import pyspark
from pyspark.context import SparkContext
from pyspark import SparkConf
```

```
[8]: from time import time
from pyspark import SparkContext
for j in range(1,10):
    sc = SparkContext(master="local[%d]"%(j))
    t0=time()
    for i in range(10):
        sc.parallelize([1,2]*1000000).reduce(lambda x,y:x+y)
    print("%2d executors, time=%4.3f"%(j,time()-t0))
    sc.stop()
```

```
1 executors, time=13.709
2 executors, time=11.857
3 executors, time=11.765
4 executors, time=12.048
5 executors, time=13.874
6 executors, time=12.797
7 executors, time=12.482
8 executors, time=12.633
9 executors, time=12.898
```