

# Spark by {Examples} (https://sparkbyexamples.com/)

## Spark Tutorial

[Spark – Installation on Windows \(https://sparkbyexamples.com/spark/apache-spark-installation-on-windows/\)](https://sparkbyexamples.com/spark/apache-spark-installation-on-windows/)

[Spark – Installation on Linux | Ubuntu \(https://sparkbyexamples.com/spark/spark-installation-on-linux-ubuntu/\)](https://sparkbyexamples.com/spark/spark-installation-on-linux-ubuntu/)

[Spark – Cluster Setup with Hadoop Yarn \(https://sparkbyexamples.com/spark/spark-setup-on-hadoop-yarn/\)](https://sparkbyexamples.com/spark/spark-setup-on-hadoop-yarn/)

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[Spark – Setup with Scala and IntelliJ \(https://sparkbyexamples.com/spark/spark-setup-run-with-scala-intellij/\)](https://sparkbyexamples.com/spark/spark-setup-run-with-scala-intellij/)

[Spark – How to Run Examples From this Site on IntelliJ IDEA \(https://sparkbyexamples.com/spark/how-to-run-spark-examples-from-intellij/\)](https://sparkbyexamples.com/spark/how-to-run-spark-examples-from-intellij/)

[Spark – SparkSession \(https://sparkbyexamples.com/spark/sparksession-explained-with-examples/\)](https://sparkbyexamples.com/spark/sparksession-explained-with-examples/)

[Spark – SparkContext \(https://sparkbyexamples.com/spark/spark-sparkcontext/\)](https://sparkbyexamples.com/spark/spark-sparkcontext/)

## Spark RDD Tutorial

[Spark RDD – Parallelize \(https://sparkbyexamples.com/apache-spark-rdd/how-to-create-an-rdd-using-parallelize/\)](https://sparkbyexamples.com/apache-spark-rdd/how-to-create-an-rdd-using-parallelize/)

[Spark RDD – Read text file \(https://sparkbyexamples.com/apache-spark-rdd/spark-read-multiple-text-files-into-a-single-rdd/\)](https://sparkbyexamples.com/apache-spark-rdd/spark-read-multiple-text-files-into-a-single-rdd/)

[PySpark \(https://sparkbyexamples.com/pyspark-tutorial/\)](https://sparkbyexamples.com/pyspark-tutorial/)

[Hive \(https://sparkbyexamples.com/apache-hive-tutorial/\)](https://sparkbyexamples.com/apache-hive-tutorial/)

[HBase \(https://sparkbyexamples.com/apache-hbase-tutorial/\)](https://sparkbyexamples.com/apache-hbase-tutorial/)

[Kafka \(https://sparkbyexamples.com/apache-kafka-tutorials-with-examples/\)](https://sparkbyexamples.com/apache-kafka-tutorials-with-examples/)

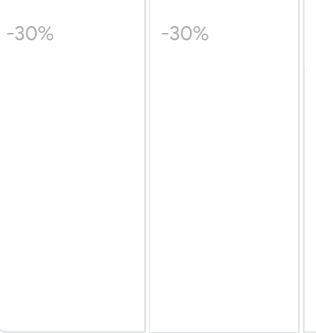
[FAQ's \(https://sparkbyexamples.com/spark-faq-questions/\)](https://sparkbyexamples.com/spark-faq-questions/)

[More \(https://sparkbyexamples.com/\)](https://sparkbyexamples.com/)

## Spark Merge Two DataFrames with Different Columns or Schema

- [NNK \(https://sparkbyexamples.com/author/admin/\)](https://sparkbyexamples.com/author/admin/)
- [Apache Spark \(https://sparkbyexamples.com/category/spark/\)](https://sparkbyexamples.com/category/spark/)
- [PySpark \(https://sparkbyexamples.com/category/pyspark/\)](https://sparkbyexamples.com/category/pyspark/)

In Spark or PySpark let's see how to merge/union two DataFrames with a different number of columns (different schema). In Spark 3.1, you can easily achieve this using unionByName() transformation by passing allowMissingColumns with the value true. In order version, this property is not available



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[Spark RDD – Create RDD  
\(https://sparkbyexamples.com/apache-spark-rdd/different-ways-to-create-spark-rdd/\)](https://sparkbyexamples.com/apache-spark-rdd/different-ways-to-create-spark-rdd/)

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[Spark RDD – Create Empty RDD  
\(https://sparkbyexamples.com/apache-spark-rdd/spark-how-to-create-an-empty-rdd/\)](https://sparkbyexamples.com/apache-spark-rdd/spark-how-to-create-an-empty-rdd/)

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[Spark RDD – Transformations  
\(https://sparkbyexamples.com/apache-spark-rdd/spark-rdd-transformations/\)](https://sparkbyexamples.com/apache-spark-rdd/spark-rdd-transformations/)

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[Spark RDD – Actions  
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[Spark RDD – Pair Functions  
\(https://sparkbyexamples.com/apache-spark-rdd/spark-pair-rdd-functions/\)](https://sparkbyexamples.com/apache-spark-rdd/spark-pair-rdd-functions/)

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[Spark RDD – Repartition and Coalesce  
\(https://sparkbyexamples.com/spark/spark-repartition-vs-coalesce/\)](https://sparkbyexamples.com/spark/spark-repartition-vs-coalesce/)

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[Spark RDD – Shuffle Partitions  
\(https://sparkbyexamples.com/spark/spark-shuffle-partitions/\)](https://sparkbyexamples.com/spark/spark-shuffle-partitions/)

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[Spark RDD – Cache vs Persist  
\(https://sparkbyexamples.com/spark/spark-difference-between-cache-and-persist/\)](https://sparkbyexamples.com/spark/spark-difference-between-cache-and-persist/)

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[Spark RDD – Persistence Storage Levels  
\(https://sparkbyexamples.com/spark/spark-persistence-storage-levels/\)](https://sparkbyexamples.com/spark/spark-persistence-storage-levels/)

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[Spark RDD – Broadcast Variables  
\(https://sparkbyexamples.com/spark/spark-broadcast-variables/\)](https://sparkbyexamples.com/spark/spark-broadcast-variables/)

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[Spark RDD – Accumulator Variables  
\(https://sparkbyexamples.com/spark/spark-accumulators/\)](https://sparkbyexamples.com/spark/spark-accumulators/)

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[Spark RDD – Convert RDD to DataFrame  
\(https://sparkbyexamples.com/\)](https://sparkbyexamples.com/)

```
//Scala
merged_df = df1.unionByName(df2)

#PySpark
merged_df = df1.unionByName(df2)
```

The difference between `unionByName()` function and `union()` is that this function resolves columns by name (not by position). In other words, `unionByName()` is used to merge two DataFrame's by column names instead of by position.

In case if you are using older than Spark 3.1 version, use below approach to merge DataFrame's with different column names.

- [Spark Merge DataFrames with Different Columns \(Scala Example\)](#)
- [PySpark Merge DataFrames with Different Columns \(Python Example\)](#)

## Spark Merge Two DataFrames with Different Columns

In this section I will cover Spark with Scala example of how to merge two different DataFrames, first let's create DataFrames with different number of columns. DataFrame `df1` missing column `state` and `salary` and `df2` missing column `age`.

[apache-spark-rdd/convert-spark-rdd-to-dataframe-dataset/](#)

## Spark SQL Tutorial

[Spark SQL – Create DataFrame](#)

(<https://sparkbyexamples.com/spark/different-ways-to-create-a-spark-dataframe/>).

[Spark SQL – Select Columns](#)

(<https://sparkbyexamples.com/spark/spark-select-columns-from-dataframe/>).

[Spark SQL – Add and Update Column \(withColumn\)](#)

(<https://sparkbyexamples.com/spark/spark-dataframe-withcolumn/>).

[Spark SQL – Rename Nested Column](#)

(<https://sparkbyexamples.com/spark/rename-a-column-on-spark-dataframes/>).

[Spark SQL – Drop column](#)

(<https://sparkbyexamples.com/spark/spark-drop-column-from-dataframe-dataset/>).

[Spark SQL – Where | Filter](#)

(<https://sparkbyexamples.com/spark/spark-dataframe-where-filter/>).

[Spark SQL – When Otherwise](#)

(<https://sparkbyexamples.com/spark/spark-case-when-otherwise-example/>).

[Spark SQL – Collect data to Driver](#)

(<https://sparkbyexamples.com/spark/spark-dataframe-collect/>).

[Spark SQL – Distinct](#)

(<https://sparkbyexamples.com/spark/spark-remove-duplicate-rows/>).

[Spark SQL- Pivot Table DataFrame](#)

(<https://sparkbyexamples.com/spark/how-to-pivot-table-and-unpivot-a-spark-dataframe/>).

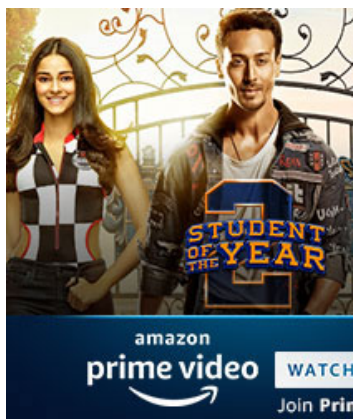
[Spark SQL – Data Types](#)

(<https://sparkbyexamples.com/spark/spark-sql-dataframe-data-types/>).

```
//Create DataFrame df1 with columns
val data = Seq(("James","Sales",
                ("Robert","Sales"),
                ("John","Marketing"),
                ("Micheal","Sales"),
                ("Jen","Finance"))
import spark.implicits._
val df1 = data.toDF("name","dept","emp_id")
df1.printSchema()
```

```
//root
// |-- name: string (nullable = true)
// |-- dept: string (nullable = true)
// |-- age: long (nullable = true)
```

### Second DataFrame



```
//Create DataFrame df1 with columns
val data2=Seq(("James","Sales",
                ("Jen","Finance"),
                ("John","Marketing"),
                ("Micheal","Sales"),
                ("Jen","Finance"))
val df2 = data2.toDF("name","dept","emp_id")
df2.printSchema()
```

```
//root
// |-- name: string (nullable = true)
// |-- dept: string (nullable = true)
// |-- state: string (nullable = true)
// |-- salary: long (nullable = true)
```

Now create a new DataFrames from existing after adding missing columns.

newly added columns contains null values and we [add constant column](#)

using [lit\(\) function](#)

(<https://sparkbyexamples.com/spark/using-lit-and-typedlit-to-add-a-literal-or-constant-to-spark-dataframe/>).

[Spark SQL – StructType | StructField](#)  
(<https://sparkbyexamples.com/spark/spark-sql-structtype-on-dataframe/>).

[Spark SQL – Schema](#)  
(<https://sparkbyexamples.com/spark/spark-schema-explained-with-examples/>).

[Spark SQL – Groupby](#)  
(<https://sparkbyexamples.com/spark/using-groupby-on-dataframe/>).

[Spark SQL – Sort DataFrame](#)  
(<https://sparkbyexamples.com/spark/spark-how-to-sort-dataframe-column-explained/>).

[Spark SQL – Join Types](#)  
(<https://sparkbyexamples.com/spark/spark-sql-dataframe-join/>).

[Spark SQL – Union and UnionAll](#)  
(<https://sparkbyexamples.com/spark/spark-dataframe-union-and-union-all/>).

[Spark SQL – map\(\) vs mapPartitions\(\)](#)  
(<https://sparkbyexamples.com/spark/spark-map-vs-mappartitions-transformation/>).

[Spark SQL – foreach\(\) vs foreachPartition\(\)](#)  
(<https://sparkbyexamples.com/spark/spark-foreachpartition-vs-foreach-explained/>).

[Spark SQL – map\(\) vs flatMap\(\)](#)  
(<https://sparkbyexamples.com/spark/spark-map-vs-flatmap-with-examples/>).

[Spark SQL – Persist and Cache](#)  
(<https://sparkbyexamples.com/spark/spark-dataframe-cache-and-persist-explained/>).

[Spark SQL – UDF \(User Defined Functions\)](#)  
(<https://sparkbyexamples.com/spark/spark-sql-udf/>).

[Spark SQL – Array \(ArrayType\) Column](#)  
(<https://sparkbyexamples.com/spark/spark-array-arraytype-dataframe-column/>).

```
val merged_cols = df1.columns.toSeq ++ df2.columns.toSeq
import org.apache.spark.sql.functions._
def getNewColumns(column: Set[String]): List[String] = {
  merged_cols.toList.map(x => {
    case x if column.contains(x) => x
    case _ => lit(null).as(x)
  })
}
```

```
val new_df1=df1.select(getNewColumns(df1.columns))
val new_df2=df2.select(getNewColumns(df2.columns))
```

Finally merge two DataFrame's by using column names

```
//Finally join two dataframe's by using column names
val merged_df=new_df1.unionByName(new_df2)
merged_df.show()
```

```
//+-----+-----+-----+-----+
//|  name|      dept|  age|state|
//+-----+-----+-----+-----+
//| James|    Sales|   34|null|
//|Michael|    Sales|   56|null|
//| Robert|    Sales|   30|null|
//|  Maria|  Finance|   24|null|
//| James|    Sales|null|  NY|
//|  Maria|  Finance|null|  CA|
//|    Jen|  Finance|null|  NY|
//|   Jeff|Marketing|null|  CA|
//+-----+-----+-----+-----+
```

## PySpark Merge Two DataFrames with Different Columns

In PySpark to merge two DataFrames with different columns, will use the similar approach explain above and uses unionByName() transformation. First let's create DataFrame's with different number of columns.

[Spark SQL – Map \(MapType\) column](https://sparkbyexamples.com/spark/spark-dataframe-map-maptype-column/)  
(<https://sparkbyexamples.com/spark/spark-dataframe-map-maptype-column/>).

[Spark SQL – Flatten Nested Struct Column](https://sparkbyexamples.com/spark/spark-flatten-nested-struct-column/)  
(<https://sparkbyexamples.com/spark/spark-flatten-nested-struct-column/>).

[Spark SQL – Flatten Nested Array Column](https://sparkbyexamples.com/spark/spark-flatten-nested-array-column-to-single-column/)  
(<https://sparkbyexamples.com/spark/spark-flatten-nested-array-column-to-single-column/>).

[Spark SQL – Explode Array & Map Columns](https://sparkbyexamples.com/spark/explode-spark-array-and-map-dataframe-column/)  
(<https://sparkbyexamples.com/spark/explode-spark-array-and-map-dataframe-column/>).

[Spark SQL – Sampling](https://sparkbyexamples.com/spark/spark-sampling-with-examples/)  
(<https://sparkbyexamples.com/spark/spark-sampling-with-examples/>).

[Spark SQL – Partitioning](https://sparkbyexamples.com/spark/spark-partitioning-understanding/)  
(<https://sparkbyexamples.com/spark/spark-partitioning-understanding/>).

## Spark SQL Functions

[Spark SQL String Functions](https://sparkbyexamples.com/spark/usage-of-spark-sql-string-functions/)  
(<https://sparkbyexamples.com/spark/usage-of-spark-sql-string-functions/>).

[Spark SQL Date and Timestamp Functions](https://sparkbyexamples.com/spark/spark-sql-date-and-time-functions/)  
(<https://sparkbyexamples.com/spark/spark-sql-date-and-time-functions/>).

[Spark SQL Array Functions](https://sparkbyexamples.com/spark/spark-sql-array-functions/)  
(<https://sparkbyexamples.com/spark/spark-sql-array-functions/>).

[Spark SQL Map Functions](https://sparkbyexamples.com/spark/spark-sql-map-functions/)  
(<https://sparkbyexamples.com/spark/spark-sql-map-functions/>).

[Spark SQL Sort Functions](https://sparkbyexamples.com/spark/spark-sql-sort-functions/)  
(<https://sparkbyexamples.com/spark/spark-sql-sort-functions/>).

[Spark SQL Aggregate Functions](https://sparkbyexamples.com/spark/spark-sql-aggregate-functions/)  
(<https://sparkbyexamples.com/spark/spark-sql-aggregate-functions/>).

```
from pyspark.sql import SparkSession
spark = SparkSession.builder.appName('SparkSQL').getOrCreate()

#Create DataFrame df1 with columns 'name', 'dept', 'age'
data = [("James", "Sales", 34), ("Robert", "Sales", 30), ("Maria", "Finance", 30)]
columns= ["name", "dept", "age"]
df1 = spark.createDataFrame(data, columns)
df1.printSchema()

#Create DataFrame df2 with columns 'name', 'dept', 'state', 'salary'
data2=[("James", "Sales", "NY", 9000), ("Jen", "Finance", "NY", 7900)]
columns2= ["name", "dept", "state", "salary"]
df2 = spark.createDataFrame(data2, columns2)
df2.printSchema()
```

Now add missing columns 'state' and 'salary' to df1 and 'age' to df2 with null values.

```
#Add missing columns 'state' & 'salary' to df1
from pyspark.sql.functions import col, lit
for column in ["state", "salary"]:
    df1 = df1.withColumn(column, lit(None))

#Add missing column 'age' to df2
for column in ["age"]:
    df2 = df2.withColumn(column, lit(None))
```

Now merge/union the DataFrames using `unionByName()`. The difference between `unionByName()` function and `union()` is that this function resolves columns by name (not by position). In other words, `unionByName()` is used to merge two DataFrame's by column names instead of by position.

[spark/spark-sql-aggregate-functions/](#)

[Spark SQL Window Functions \(https://sparkbyexamples.com/spark/spark-sql-window-functions/\)](#)

[Spark SQL JSON Functions \(https://sparkbyexamples.com/spark/spark-most-used-json-functions-with-examples/\)](#)

## Spark Data Source API

[Spark – Read & Write CSV file \(https://sparkbyexamples.com/spark/spark-read-csv-file-into-dataframe/\)](#)

[Spark – Read and Write JSON file \(https://sparkbyexamples.com/spark/spark-read-and-write-json-file/\)](#)

[Spark – Read & Write Parquet file \(https://sparkbyexamples.com/spark/spark-read-write-dataframe-parquet-example/\)](#)

[Spark – Read & Write XML file \(https://sparkbyexamples.com/spark/spark-read-write-xml/\)](#)

[Spark – Read & Write Avro files \(https://sparkbyexamples.com/spark/read-write-avro-file-spark-dataframe/\)](#)

[Spark – Read & Write Avro files \(Spark version 2.3.x or earlier\) \(https://sparkbyexamples.com/spark/using-avro-data-files-from-spark-sql-2-3-x/\)](#)

[Spark – Read & Write HBase using “hbase-spark” Connector \(https://sparkbyexamples.com/spark/spark-read-write-using-hbase-spark-connector/\)](#)

[Spark – Read & Write from HBase using Hortonworks \(https://sparkbyexamples.com/spark/create-spark-dataframe-from-hbase-using-hortonworks/\)](#)

[Spark – Read & Write ORC file \(https://sparkbyexamples.com/spark/spark-read-orc-file-into-dataframe/\)](#)


```
#Finally join two dataframe's d
merged_df=df1.unionByName(df2)
merged_df.show()
```


## Conclusion


In this article, you have learned with spark & PySpark examples of how to merge two DataFrames with different columns can be done by adding missing columns to the DataFrame's and finally union them using unionByName().


Happy Learning !!


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spark/spark-read-binary-file-  
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## **Spark Streaming & Kafka**

[Spark Streaming –  
OutputModes  
\(https://sparkbyexamples.com/  
spark/spark-streaming-  
outputmode/\).](https://sparkbyexamples.com/spark/spark-streaming-outputmode/)

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[Spark Streaming – Reading  
Files From Directory  
\(https://sparkbyexamples.com/  
spark/spark-streaming-read-  
json-files-from-directory/\).](https://sparkbyexamples.com/spark/spark-streaming-read-json-files-from-directory/)

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[Spark Streaming – Reading  
Data From TCP Socket  
\(https://sparkbyexamples.com/  
spark/spark-streaming-from-  
tcp-socket/\).](https://sparkbyexamples.com/spark/spark-streaming-from-tcp-socket/)

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[Spark Streaming – Processing  
Kafka Messages in JSON  
Format  
\(https://sparkbyexamples.com/  
spark/spark-streaming-with-  
kafka/\).](https://sparkbyexamples.com/spark/spark-streaming-with-kafka/)

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[Spark Streaming – Processing  
Kafka messages in AVRO  
Format  
\(https://sparkbyexamples.com/  
spark/spark-streaming-  
consume-and-produce-kafka-  
messages-in-avro-format/\).](https://sparkbyexamples.com/spark/spark-streaming-consume-and-produce-kafka-messages-in-avro-format/)

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[Spark SQL Batch – Consume  
& Produce Kafka Message  
\(https://sparkbyexamples.com/  
spark/spark-batch-processing-  
produce-consume-kafka-  
topic/\).](https://sparkbyexamples.com/spark/spark-batch-processing-produce-consume-kafka-topic/)

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## **PySpark Tutorial**

[PySpark Tutorial For  
Beginners  
\(https://sparkbyexamples.com/  
pyspark-tutorial/\).](https://sparkbyexamples.com/pyspark-tutorial/)

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[PySpark – Features  
\(https://sparkbyexamples.com/  
pyspark-tutorial/#features\)](https://sparkbyexamples.com/pyspark-tutorial/#features)

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[PySpark – Advantages  
\(https://sparkbyexamples.com/  
pyspark-tutorial/#advantages\)](https://sparkbyexamples.com/pyspark-tutorial/#advantages)

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[PySpark – Modules &  
Packages](#)



<https://sparkbyexamples.com/pyspark-tutorial/#modules-packages>

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[PySpark – Cluster Managers](https://sparkbyexamples.com/pyspark-tutorial/#cluster-manager)  
(<https://sparkbyexamples.com/pyspark-tutorial/#cluster-manager>)

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[PySpark – Install on Windows](https://sparkbyexamples.com/pyspark-tutorial/#pyspark-installation)  
(<https://sparkbyexamples.com/pyspark-tutorial/#pyspark-installation>)

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(<https://sparkbyexamples.com/spark/spark-web-ui-understanding/>)

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[PySpark – SparkSession](https://sparkbyexamples.com/pyspark/pyspark-what-is-sparksession/)  
(<https://sparkbyexamples.com/pyspark/pyspark-what-is-sparksession/>)

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[PySpark – RDD](https://sparkbyexamples.com/pyspark-rdd)  
(<https://sparkbyexamples.com/pyspark-rdd>)

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[PySpark – Parallelize](https://sparkbyexamples.com/pyspark/pyspark-parallelize-create-rdd/)  
(<https://sparkbyexamples.com/pyspark/pyspark-parallelize-create-rdd/>)

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[PySpark – repartition\(\) vs coalesce\(\)](https://sparkbyexamples.com/pyspark/pyspark-repartition-vs-coalesce/)  
(<https://sparkbyexamples.com/pyspark/pyspark-repartition-vs-coalesce/>)

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[PySpark – Broadcast Variables](https://sparkbyexamples.com/pyspark/pyspark-broadcast-variables/)  
(<https://sparkbyexamples.com/pyspark/pyspark-broadcast-variables/>)

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[PySpark – Accumulator](https://sparkbyexamples.com/pyspark/pyspark-accumulator-with-example/)  
(<https://sparkbyexamples.com/pyspark/pyspark-accumulator-with-example/>)

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## **PySpark DataFrame**

[PySpark – Create a DataFrame](https://sparkbyexamples.com/pyspark/different-ways-to-create-dataframe-in-pyspark/)  
(<https://sparkbyexamples.com/pyspark/different-ways-to-create-dataframe-in-pyspark/>)

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[PySpark – Create an empty DataFrame](https://sparkbyexamples.com/pyspark/pyspark-create-an-empty-dataframe/)  
(<https://sparkbyexamples.com/pyspark/pyspark-create-an-empty-dataframe/>)

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[PySpark – Convert RDD to DataFrame](#)



[\(https://sparkbyexamples.com/pyspark/convert-pyspark-rdd-to-dataframe/\)](https://sparkbyexamples.com/pyspark/convert-pyspark-rdd-to-dataframe/).

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### [PySpark – Convert DataFrame to Pandas](#)

[\(https://sparkbyexamples.com/pyspark/convert-pyspark-dataframe-to-pandas/\)](https://sparkbyexamples.com/pyspark/convert-pyspark-dataframe-to-pandas/).

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### [PySpark – show\(\)](#)

[\(https://sparkbyexamples.com/pyspark/pyspark-show-display-dataframe-contents-in-table/\)](https://sparkbyexamples.com/pyspark/pyspark-show-display-dataframe-contents-in-table/).

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### [PySpark – StructType & StructField](#)

[\(https://sparkbyexamples.com/pyspark/pyspark-structtype-and-structfield/\)](https://sparkbyexamples.com/pyspark/pyspark-structtype-and-structfield/).

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### [PySpark – Row Class](#)

[\(https://sparkbyexamples.com/pyspark/pyspark-row-using-rdd-dataframe/\)](https://sparkbyexamples.com/pyspark/pyspark-row-using-rdd-dataframe/).

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### [PySpark – Column Class](#)

[\(https://sparkbyexamples.com/pyspark/pyspark-column-functions/\)](https://sparkbyexamples.com/pyspark/pyspark-column-functions/).

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### [PySpark – select\(\)](#)

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