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PySpark Tutorial

PySpark (https://sparkbyexamples.com/pyspark-

PySpark Tutorial For

Beginners

(https://sparkbyexamples.com/utorial/) pyspark-tutorial/)

PySpark - Features

(https://sparkbyexamples.com/ Hive (https://sparkbyexamples.com/apachePerisonali

pyspark-tutorial/#features)

PySpark - Advantages

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pyspark-tutorial/#advantages)

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PySpark - Modules &

Packages

(https://sparkbyexamples.com/

pyspark-tutorial/#modules-

packages)

hbase-tutorial/)

PySpark - Cluster Managers

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manager)

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(https://sparkbyexamples.com/ Kafka (https://sparkbyexamples.com/author/admin/)

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(https://sparkbyexamples.com/category/pyspark/)

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(https://sparkbyexamples.com/

PySpark - Web/Application UI

(https://sparkbyexamples.com/

pyspark-tutorial/#pyspark-

installation)

PySpark map (map()) is an RDD

transformation that is used to apply the

every element of RDD/DataFrame and

returns a new RDD. In this article, you

example and how to use it with com/)

PySpark - SparkSession (https://sparkbyexamples.com/ More

spark/spark-web-ui-

understanding/)

pyspark/pyspark-what-is-

sparksession/)

PySpark - RDD

(https://sparkbyexamples.com/

pyspark-rdd)

PySpark - Parallelize

(https://sparkbyexamples.com/

pyspark/pyspark-parallelize-

create-rdd/)

PySpark - repartition() vs coalesce()

(https://sparkbyexamples.com/

pyspark/pyspark-repartition-

vs-coalesce/)

PySpark - Broadcast

<u>Variables</u>

(https://sparkbyexamples.com/ pyspark/pyspark-broadcast-

variables/)

transformation function (lambda) on

will learn the syntax and usage of the

RDD map() transformation with an

DataFrame.

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RDD map() transformation is used to apply any complex operations like adding a column, updating a column, transforming the data e.t.c, the output

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

PySpark DataFrame

<u>PySpark – Create a</u>
<u>DataFrame</u>
(https://sparkbyexamples.com/

pyspark/different-ways-tocreate-dataframe-in-pyspark/)

<u>PySpark – Create an empty</u>
<u>DataFrame</u>
(https://sparkbyexamples.com/pyspark/pyspark-create-an-

empty-dataframe/)

PySpark – Convert RDD to
DataFrame
(https://sparkbyexamples.com/pyspark/convert-pyspark-rdd-to-dataframe/)

<u>PySpark – Convert DataFrame</u> <u>to Pandas</u> (<u>https://sparkbyexamples.com/pyspark/convert-pyspark-dataframe-to-pandas/</u>)

<u>PySpark – show()</u>
(https://sparkbyexamples.com/
<u>pyspark/pyspark-show-display-</u>
dataframe-contents-in-table/)

<u>PySpark – StructType &</u>
<u>StructField</u>
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<u>PySpark – Column Class</u> (https://sparkbyexamples.com/ <u>pyspark/pyspark-column-</u> functions/)

<u>PySpark – select()</u>
(https://sparkbyexamples.com/
pyspark/select-columns-frompyspark-dataframe/)</u>

<u>PySpark – collect()</u>
(https://sparkbyexamples.com/
pyspark/pyspark-collect/)

<u>PySpark – withColumn()</u> (https://sparkbyexamples.com/ pyspark/pyspark-withcolumn/)</u> of map transformations would always have the same number of records as input.

- Note1: DataFrame doesn't have map() transformation to use with DataFrame hence you need to DataFrame to RDD first.
- Note2: If you have a heavy initialization use PySpark mapPartitions() transformation instead of map(), as with mapPartitions() heavy initialization executes only once for each partition instead of every record.

Related: Spark map() vs mapPartitions() Explained with Examples (https://sparkbyexamples.com/spark/spark-map-vs-mappartitions-transformation/)

First, let's create an RDD from the list.

map() Syntax

```
map(f, preservesPartitioning=Fa
```

PySpark map() Example with RDD

In this PySpark map() example, we are adding a new element with value 1 for each element, the result of the RDD is PairRDDFunctions which contains key-value pairs, word of type String as Key and 1 of type Int as value.

PySpark –
withColumnRenamed()
(https://sparkbyexamples.com/
pyspark/pyspark-renamedataframe-column/)

<u>PySpark – where() & filter()</u> (https://sparkbyexamples.com/ pyspark/pyspark-where-filter/)

PySpark – drop() & dropDuplicates(). (https://sparkbyexamples.com/pyspark/pyspark-distinct-to-drop-duplicates/).

<u>PySpark – orderBy() and sort()</u> (https://sparkbyexamples.com/ <u>pyspark/pyspark-orderby-and-</u> sort-explained/)

<u>PySpark – groupBy()</u>
(https://sparkbyexamples.com/
pyspark/pyspark-groupbyexplained-with-example/)</u>

<u>PySpark – join()</u>
(https://sparkbyexamples.com/
pyspark/pyspark-joinexplained-with-examples/)</u>

<u>PySpark – union() & unionAll()</u> (https://sparkbyexamples.com/ <u>pyspark/pyspark-union-and-unionall/)</u>

<u>PySpark – unionByName()</u>
(https://sparkbyexamples.com/
spark/spark-merge-twodataframes-with-differentcolumns/)

PySpark – UDF (User Defined Function)
(https://sparkbyexamples.com/pyspark/pyspark-udf-user-defined-function/)

<u>PySpark – map()</u>
(https://sparkbyexamples.com/
<u>pyspark/pyspark-map-</u>
<u>transformation/)</u>

<u>PySpark – flatMap()</u>
(<u>https://sparkbyexamples.com/pyspark/pyspark-flatmap-</u>
transformation/)

pyspark – foreach() (https://sparkbyexamples.com/ pyspark/pyspark-loop-iteratethrough-rows-indataframe/#use-foreach-loopthrough-dataframe)

<u>PySpark – sample() vs</u> <u>sampleBy()</u>

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```
rdd2=rdd.map(lambda x: (x,1))
for element in rdd2.collect():
    print(element)
```

This yields below output.

```
('Project', 1)
('Gutenberg's', 1)
('Alice's', 1)
('Adventures', 1)
('in', 1)
('Wonderland', 1)
('Project', 1)
('Gutenberg's', 1)
('Adventures', 1)
('in', 1)
('Wonderland', 1)
('Project', 1)
('Gutenberg's', 1)
```

PySpark map() Example with DataFrame

PySpark DataFrame doesn't have map() transformation to apply the lambda function, when you wanted to apply the custom transformation, you need to convert the DataFrame to RDD and apply the map() transformation. Let's use another dataset to explain this.

(https://sparkbyexamples.com/ pyspark/pyspark-samplingexample/)

PySpark – fillna() & fill() (https://sparkbyexamples.com/ pyspark/pyspark-fillna-fillreplace-null-values/)

<u>PySpark – pivot() (Row to</u> Column)

(https://sparkbyexamples.com/ pyspark/pyspark-pivot-andunpivot-dataframe/)

<u>PySpark – partitionBy()</u>
(https://sparkbyexamples.com/
pyspark/pyspark-partitionbyexample/)

<u>PySpark – ArrayType Column</u> (<u>Array)</u>

(https://sparkbyexamples.com/ pyspark/pyspark-arraytypecolumn-with-examples/)

PySpark — MapType (Map/Dict) (https://sparkbyexamples.com/ pyspark/pyspark-maptype-dictexamples/)

PySpark SQL Functions

<u>PySpark – Aggregate Functions</u> (https://sparkbyexamples.com/py spark/pyspark-aggregatefunctions/)

<u>PySpark – Window Functions</u> (https://sparkbyexamples.com/py spark/pyspark-windowfunctions/)

<u>PySpark – Date and Timestamp</u> <u>Functions</u>

(https://sparkbyexamples.com/py spark/pyspark-sql-date-andtimestamp-functions/)

<u>PySpark – JSON Functions</u> (<u>https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/</u>)

PySpark Datasources

<u>PySpark – Read & Write CSV</u> <u>File</u>

(https://sparkbyexamples.com/ pyspark/pyspark-read-csv-fileinto-dataframe/)

<u>PySpark – Read & Write</u> <u>Parquet File</u> (https://sparkbyexamples.com/

Note that abovel have used index to get the column values, alternatively, you can also refer to the DataFrame column names while iterating.

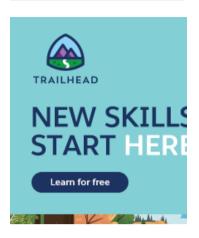
```
# Referring Column Names
rdd2=df.rdd.map(lambda x:
   (x["firstname"]+","+x["last"
   )
```

Another alternative

<u>pyspark/pyspark-read-and-write-parquet-file/)</u>

<u>PySpark – Read & Write JSON</u> file

(https://sparkbyexamples.com/ pyspark/pyspark-read-jsonfile-into-dataframe/)



PySpark Built-In Functions

<u>PySpark – when()</u> (https://sparkbyexamples.com/py spark/pyspark-when-otherwise/)</u>

PySpark – expr(). (https://sparkbyexamples.com/pyspark/pyspark-sql-expr-expression-function/).

PySpark – lit() (https://sparkbyexamples.com/py spark/pyspark-lit-add-literalconstant/)

PySpark – split() (https://sparkbyexamples.com/py spark/pyspark-convert-string-toarray-column/)

PySpark – concat_ws() (https://sparkbyexamples.com/py spark/pyspark-convert-arraycolumn-to-string-column/)

<u>Pyspark – substring()</u>
(https://sparkbyexamples.com/pyspark/pyspark-substring-from-a-column/)</u>

PySpark – translate() (https://sparkbyexamples.com/py spark/pyspark-replace-columnvalues/#translate-replacecharacter-by-character)

<u>PySpark – regexp_replace()</u> (<u>https://sparkbyexamples.com/pyspark/pyspark-replace-column-</u> You can also create a custom function to perform an operation. Below func1() function executes for every DataFrame row from the lambda function.

```
# By Calling function
def func1(x):
    firstName=x.firstname
    lastName=x.lastname
    name=firstName+","+lastName
    gender=x.gender.lower()
    salary=x.salary*2
    return (name,gender,salary)

rdd2=df.rdd.map(lambda x: func1
```

Complete PySpark map() example

Below is complete example of PySpark map() transformation.

<u>values/#regexp_replace-replace-string-columns)</u>

PySpark – overlay()
(https://sparkbyexamples.com/py
spark/pyspark-replace-columnvalues/#overlay-function)

PySpark – to_timestamp().
(https://sparkbyexamples.com/spark/pyspark-to_timestamp-convert-string-to-timestamp-type/).

<u>PySpark - to_date()</u>
(https://sparkbyexamples.com/pyspark/pyspark-to_date-convert-timestamp-to-date/)

PySpark – date_format() (https://sparkbyexamples.com/pyspark/pyspark-date_format-convert-date-to-string-format/)

PySpark – datediff() (https://sparkbyexamples.com/py spark/pyspark-differencebetween-two-dates-daysmonths-years/#datediff)

PySpark – months_between()
(https://sparkbyexamples.com/py
spark/pyspark-differencebetween-two-dates-daysmonthsyears/#months_between())

<u>PySpark - explode()</u>
(https://sparkbyexamples.com/py
spark/pyspark-explode-nestedarray-into-rows/)</u>

<u>PySpark – array_contains()</u>
(https://sparkbyexamples.com/py
spark/pyspark-arraytype-column-with-examples/#array_contains)

<u>PySpark – array()</u>
(https://sparkbyexamples.com/pyspark/pyspark-arraytype-columnwith-examples/#array)</u>

PySpark - collect_list() (https://sparkbyexamples.com/py spark/pyspark-aggregatefunctions/#collect-list)

<u>PySpark – collect_set()</u>
(https://sparkbyexamples.com/pyspark/pyspark-aggregate-functions/#collect-set)</u>

PySpark - create_map()
(https://sparkbyexamples.com/py
spark/pyspark-convertdataframe-columns-to-maptypedict/)

```
from pyspark.sql import SparkSe
spark = SparkSession.builder.ap
data = ["Project",
"Gutenberg's",
"Alice's".
"Adventures",
"in",
"Wonderland",
"Project",
"Gutenberg's",
"Adventures",
"in".
"Wonderland",
"Project".
"Gutenberg's"]
rdd=spark.sparkContext.parallel
rdd2=rdd.map(lambda x: (x,1))
for element in rdd2.collect():
    print(element)
data = [('James', 'Smith', 'M', 30
  ('Anna', 'Rose', 'F', 41),
  ('Robert', 'Williams', 'M', 62),
1
columns = ["firstname","lastnam
df = spark.createDataFrame(data
df.show()
rdd2=df.rdd.map(lambda x:
    (x[0]+","+x[1],x[2],x[3]*2)
df2=rdd2.toDF(["name", "gender",
df2.show()
#Referring Column Names
rdd2=df.rdd.map(lambda x:
    (x["firstname"]+","+x["last
    )
#Referring Column Names
rdd2=df.rdd.map(lambda x:
    (x.firstname+","+x.lastname
    )
def func1(x):
    firstName=x.firstname
    lastName=x.lastname
    name=firstName+","+lastName
    gender=x.gender.lower()
    salary=x.salary*2
    return (name,gender,salary)
```

PySpark - map_keys()
(https://sparkbyexamples.com/py
spark/pyspark-maptype-dictexamples/#map_keys)

PySpark – map_values() (https://sparkbyexamples.com/py spark/pyspark-maptype-dictexamples/#map_values)

PySpark – struct() (https://sparkbyexamples.com/py spark/pyspark-structtype-andstructfield/#update-structfunction)

<u>PySpark – countDistinct()</u>
(https://sparkbyexamples.com/pyspark/pyspark-count-distinct-from-dataframe/)</u>

PySpark – sum(), avg() (https://sparkbyexamples.com/py spark/pyspark-dataframegroupby-and-sort-bydescending-order/)

PySpark – row_number() (https://sparkbyexamples.com/py spark/pyspark-windowfunctions/#row_number)

PySpark - rank() (https://sparkbyexamples.com/py spark/pyspark-windowfunctions/#rank)

PySpark – dense_rank()
(https://sparkbyexamples.com/py
spark/pyspark-windowfunctions/#dense_rank)

PySpark – percent_rank() (https://sparkbyexamples.com/py spark/pyspark-windowfunctions/#percent_rank)

PySpark - typedLit()
(https://sparkbyexamples.com/py
spark/pyspark-lit-add-literalconstant/#typedlit)

PySpark – from_json() (https://sparkbyexamples.com/py spark/pyspark-json-functionswith-examples/#from_json)

<u>PySpark – to_json()</u>
(https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#to_json)</u>

PySpark – json_tuple() (https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#json_tuple) rdd2=df.rdd.map(lambda x: func1

In conclusion, you have learned how to apply a map() transformation on every element of PySpark RDD and learned it returns the same number of elements as input RDD. This is one of the differences between map() and flatMap()

(https://sparkbyexamples.com/pyspark/pyspark-rdd-flatmap-transformation/) transformations.

And you have also learned how to use map() on DataFrame by converting DataFrame to RDD.

Happy Learning !!

Reference:

https://spark.apache.org/docs/latest/api/python/pyspark.sql.html (https://spark.apache.org/docs/latest/api/python/pyspark.sql.html)

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(https://sparkbyexamples.com/py
spark/pyspark-json-functionswith-examples/#get json object)

PySpark – schema_of_json()
(https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-

examples/#schema_of_json)



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