In [24]:
```
import pandas as pd
from pyspark.sql import SparkSession
import findspark
from pyspark.sql import Row
```

In [21]:
```
findspark.init()
findspark.find()
```

Out[21]:
```
'/Users/youngjinseo/anaconda3/lib/python3.10/site-packages/pyspark'
```

In [3]:
```
spark = SparkSession.builder.appName('practice1').config("spark.driver.bindAddress", "127.0.0.1").getOrCreate()
spark
```

```
Setting default log level to "WARN".
To adjust logging level use sc.setLogLevel(newLevel). For SparkR, use setLogLevel(newLevel).
24/09/19 10:46:10 WARN NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
```

Out[3]:
SparkSession - in-memory

SparkContext

Spark UI

Version	v3.5.2
Master	local[*]
AppName	practice1

In [4]:
```
df = spark.read.csv('/Users/youngjinseo/Desktop/파이썬/tested.csv',header = True )
df.show()
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|   Sex| Age|SibSp|Parch|          Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------------+-------+-----+--------+
|        892|       0|     3|    Kelly, Mr. James|  male|34.5|    0|    0|          330911|  7.8292| NULL|       Q|
|        893|       1|     3|Wilkes, Mrs. Jame...|female|47.0|    1|    0|          363272|      7| NULL|       S|
|        894|       0|     2|  Myles, Mr. Thomas...|  male|62.0|    0|    0|          240276|  9.6875| NULL|       Q|
|        895|       0|     3|    Wirz, Mr. Albert|  male|27.0|    0|    0|          315154|  8.6625| NULL|       S|
|        896|       1|     3|Hirvonen, Mrs. Al...|female|22.0|    1|    1|      3101298|12.2875| NULL|       S|
|        897|       0|     3|Svensson, Mr. Joh...|  male|14.0|    0|    0|            7538|  9.225| NULL|       S|
|        898|       1|     3|Connolly, Miss. Kate|female|30.0|    0|    0|          330972|  7.6292| NULL|       Q|
|        899|       0|     2|Caldwell, Mr. Alb...|  male|26.0|    1|    1|          248738|    29| NULL|       S|
|        900|       1|     3|Abrahim, Mrs. Jos...|female|18.0|    0|    0|            2657|  7.2292| NULL|       C|
|        901|       0|     3|Davies, Mr. John ...|  male|21.0|    2|    0|       A/4 48871|  24.15| NULL|       S|
|        902|       0|     3|    Ilieff, Mr. Ylio|  male|NULL|    0|    0|          349220|  7.8958| NULL|       S|
|        903|       0|     1|Jones, Mr. Charle...|  male|46.0|    0|    0|             694|     26| NULL|       S|
|        904|       1|     1|Snyder, Mrs. John...|female|23.0|    1|    0|        21228|82.2667|  B45|       S|
|        905|       0|     2|Howard, Mr. Benjamin|  male|63.0|    1|    0|           24065|     26| NULL|       S|
|        906|       1|     1|Chaffee, Mrs. Her...|female|47.0|    1|    0|    W.E.P. 5734|  61.175|  E31|       S|
|        907|       1|     2|del Carlo, Mrs. S...|female|24.0|    1|    0| SC/PARIS 2167|27.7208|  NULL|       C|
|        908|       0|     2|  Keane, Mr. Daniel|  male|35.0|    0|    0|          233734|  12.35| NULL|       Q|
|        909|       0|     3|  Assaf, Mr. Gerios|  male|21.0|    0|    0|            2692|  7.225| NULL|       C|
|        910|       1|     3|Ilmakangas, Miss....|female|27.0|    1|    0|STON/O2. 3101270|  7.925| NULL|       S|
|        911|       1|     3|Assaf Khalil, Mr....|female|45.0|    0|    0|            2696|  7.225| NULL|       C|
+-----------+--------+------+--------------------+------+----+-----+-----+----------------+-------+-----+--------+
only showing top 20 rows
```

GROUPBY

In [5]:
```
group_df = df.groupby('Sex').count()
group_df.show()
```

```
+------+-----+
|   Sex|count|
+------+-----+
|female|  152|
|  male|  266|
+------+-----+
```

sort & orderBy

In [6]:
```
sort_df = df.sort('PassengerId')
sort_df.show()
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|   Sex| Age|SibSp|Parch|    Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|       1000|       0|     3|"Willer, Mr. Aaro...|  male|NULL|    0|    0|      3410|  8.7125| NULL|       S|
|       1001|       0|     2|  Swane, Mr. George|  male|18.5|    0|    0|    248734|     13|   F|       S|
|       1002|       0|     2|Stanton, Mr. Samu...|  male|  41|    0|    0|    237734| 15.0458| NULL|       C|
|       1003|       1|     3|Shine, Miss. Ellе...|female|NULL|    0|    0|    330968|  7.7792| NULL|       Q|
|       1004|       1|     1|Evans, Miss. Edit...|female|  36|    0|    0|PC 17531| 31.6792|  A29|       C|
|       1005|       1|     1|Bucknell, Mrs. Ka...|female|18.5|    0|    0|PC 17610|27.4458|  B11|       C|
|       1006|       1|     1|Straus, Mrs. Isid...|female|  63|    1|    0|PC 17483|221.7792| C55 C57|       S|
|       1007|       0|     1|Chisholm, Mr. Rod...|  male|NULL|    0|    0|     112051|     26| NULL|       S|
|       1008|       0|     3|"Thomas, Mr. John...|  male|NULL|    0|    0|      2681|  6.4375| NULL|       C|
|       1009|       1|     3|Sandstrom, Miss. ...|female|   1|    1|    1|   PP 9549|     16|   G6|       S|
|       1010|       0|     3|Beattie, Mr. Thom...|  male|  36|    0|    0|    13050| 75.2417|   C6|       C|
|       1011|       1|     2|Chapman, Mrs. Joh...|female|  29|    1|    0|SC/AH 29037|     26| NULL|       S|
|       1012|       1|     2|Watt, Miss. Bertha J|female|  12|    0|    0|  C.A. 33595|     15| NULL|       S|
|       1013|       0|     3|Kiernan, Mr. John...|  male|NULL|    1|    0|    367227|   7.75| NULL|       Q|
|       1014|       1|     1|Schabert, Mrs. Pa...|female|  35|    1|    0|     13236|   57.75|  C28|       C|
|       1015|       0|     3|Carver, Mr. Alfre...|  male|  28|    0|    0|    392095|   7.25| NULL|       S|
|       1016|       0|     3|  Kennedy, Mr. John|  male|NULL|    0|    0|    368783|   7.75| NULL|       Q|
|       1017|       1|     3|"Cribb, Miss. Las...|female|  17|    0|    1|    371362|   16.1| NULL|       S|
|       1018|       0|     3|Brobeck, Mr. Karl...|  male|  22|    0|    0|    350045|  7.7958| NULL|       S|
|       1019|       1|     3|  McCoy, Miss. Alicia|female|NULL|    2|    0|    367226|  23.25| NULL|       Q|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
only showing top 20 rows
```

In [7]:
```
order_df = df.orderBy('PassengerId')
order_df.show()
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|   Sex| Age|SibSp|Parch|    Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|       1000|       0|     3|"Willer, Mr. Aaro...|  male|NULL|    0|    0|      3410|  8.7125| NULL|       S|
|       1001|       0|     2|  Swane, Mr. George|  male|18.5|    0|    0|    248734|     13|   F|       S|
|       1002|       0|     2|Stanton, Mr. Samu...|  male|  41|    0|    0|    237734| 15.0458| NULL|       C|
|       1003|       1|     3|Shine, Miss. Ellе...|female|NULL|    0|    0|    330968|  7.7792| NULL|       Q|
|       1004|       1|     1|Evans, Miss. Edit...|female|  36|    0|    0|PC 17531| 31.6792|  A29|       C|
|       1005|       1|     1|Bucknell, Mrs. Ka...|female|18.5|    0|    0|PC 17610|27.4458|  B11|       C|
|       1006|       1|     1|Straus, Mrs. Isid...|female|  63|    1|    0|PC 17483|221.7792| C55 C57|       S|
|       1007|       0|     1|Chisholm, Mr. Rod...|  male|NULL|    0|    0|     112051|     26| NULL|       S|
|       1008|       0|     3|"Thomas, Mr. John...|  male|NULL|    0|    0|      2681|  6.4375| NULL|       C|
|       1009|       1|     3|Sandstrom, Miss. ...|female|   1|    1|    1|   PP 9549|     16|   G6|       S|
|       1010|       0|     3|Beattie, Mr. Thom...|  male|  36|    0|    0|    13050| 75.2417|   C6|       C|
|       1011|       1|     2|Chapman, Mrs. Joh...|female|  29|    1|    0|SC/AH 29037|     26| NULL|       S|
|       1012|       1|     2|Watt, Miss. Bertha J|female|  12|    0|    0|  C.A. 33595|     15| NULL|       S|
|       1013|       0|     3|Kiernan, Mr. John...|  male|NULL|    1|    0|    367227|   7.75| NULL|       Q|
|       1014|       1|     1|Schabert, Mrs. Pa...|female|  35|    1|    0|     13236|   57.75|  C28|       C|
|       1015|       0|     3|Carver, Mr. Alfre...|  male|  28|    0|    0|    392095|   7.25| NULL|       S|
|       1016|       0|     3|  Kennedy, Mr. John|  male|NULL|    0|    0|    368783|   7.75| NULL|       Q|
|       1017|       1|     3|"Cribb, Miss. Las...|female|  17|    0|    1|    371362|   16.1| NULL|       S|
|       1018|       0|     3|Brobeck, Mr. Karl...|  male|  22|    0|    0|    350045|  7.7958| NULL|       S|
|       1019|       1|     3|  McCoy, Miss. Alicia|female|NULL|    2|    0|    367226|  23.25| NULL|       Q|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
only showing top 20 rows
```

na.drop & na.fill

In [8]:
```
nadrop_df = df.na.drop()
nadrop_df.show(10)
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|   Sex| Age|SibSp|Parch|    Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|        904|       1|     1|Snyder, Mrs. John...|female|  23|    1|    0|     21228|82.2667|  B45|       S|
|        906|       1|     1|Chaffee, Mrs. Her...|female|  47|    1|    0| W.E.P. 5734|  61.175|  E31|       S|
|        916|       1|     1|Ryerson, Mrs. Art...|female|  48|    1|    3|  PC 17608|262.375|B57 B59 B63 B66|       C|
|        918|       1|     1|Ostby, Miss. Nele...|female|  22|    0|    1|    113509|  61.9792|  B36|       C|
|        920|       0|     1|Brady, Mr. John B...|  male|  41|    0|    0|    113054|   30.5|  A21|       S|
|        926|       0|     1|Mock, Mr. Philipp...|  male|  30|    1|    0|     13236|   57.75|  C78|       C|
|        936|       1|     1|Kimball, Mrs. Edw...|female|  45|    1|    0|    11753|52.5542|  D19|       S|
|        938|       0|     1|Chevre, Mr. Paul ...|  male|  45|    0|    0|  PC 17594|   29.7|  A9 |       C|
|        940|       1|     1|Buckley, Mrs. Wi...|female|  60|    0|    0|  11813|76.2917|  D15|       C|
|        942|       0|     1|Smith, Mr. Lucien...|  male|  24|    1|    0|     13695|     60|  C31|       S|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
only showing top 10 rows
```

In [9]:
```
fill_df = df.na.fill({'Cabin':'None'})
fill_df.show(10)
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|   Sex| Age|SibSp|Parch|    Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|        892|       0|     3|    Kelly, Mr. James|  male|34.5|    0|    0|    330911|  7.8292| None|       Q|
|        893|       1|     3|Wilkes, Mrs. Jame...|female|  47|    1|    0|    363272|      7| None|       S|
|        894|       0|     2|  Myles, Mr. Thomas...|  male|  62|    0|    0|    240276|  9.6875| None|       Q|
|        895|       0|     3|    Wirz, Mr. Albert|  male|  27|    0|    0|    315154|  8.6625| None|       S|
|        896|       1|     3|Hirvonen, Mrs. Al...|female|  22|    1|    1|3101298|12.2875| None|       S|
|        897|       0|     3|Svensson, Mr. Joh...|  male|  14|    0|    0|      7538|  9.225| None|       S|
|        898|       1|     3|Connolly, Miss. Kate|female|  30|    0|    0|    330972|  7.6292| None|       Q|
|        899|       0|     2|Caldwell, Mr. Alb...|  male|  26|    1|    1|    248738|    29| None|       S|
|        900|       1|     3|Abrahim, Mrs. Jos...|female|  18|    0|    0|      2657|  7.2292| None|       C|
|        901|       0|     3|Davies, Mr. John ...|  male|  21|    2|    0|   A/4 48871|  24.15| None|       S|
|        902|       0|     3|    Ilieff, Mr. Ylio|  male|NULL|    0|    0|    349220|  7.8958| None|       S|
|        903|       0|     1|Jones, Mr. Charle...|  male|  46|    0|    0|       694|     26| None|       S|
|        904|       1|     1|Snyder, Mrs. John...|female|  23|    1|    0|     21228|82.2667|  B45|       S|
|        905|       0|     2|Howard, Mr. Benjamin|  male|  63|    1|    0|     24065|     26| None|       S|
|        906|       1|     1|Chaffee, Mrs. Her...|female|  47|    1|    0| W.E.P. 5734|  61.175|  E31|       S|
|        907|       1|     2|del Carlo, Mrs. S...|female|  24|    1|    0| SC/PARIS 2167|27.7208| None|       C|
|        908|       0|     2|  Keane, Mr. Daniel|  male|  35|    0|    0|    233734|  12.35| None|       Q|
|        909|       0|     3|  Assaf, Mr. Gerios|  male|  21|    0|    0|      2692|  7.225| None|       C|
|        910|       1|     3|Ilmakangas, Miss....|female|  27|    1|    0|STON/O2. 3101270|  7.925| None|       S|
|        911|       1|     3|Assaf Khalil, Mr....|female|  45|    0|    0|      2696|  7.225| None|       C|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
only showing top 20 rows
```

na.replace

In [11]:
```
replace_df = df.na.replace("female","woman")
replace_df.show()
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|   Sex| Age|SibSp|Parch|    Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|        892|       0|     3|    Kelly, Mr. James|  male|34.5|    0|    0|    330911|  7.8292| NULL|       Q|
|        893|       1|     3|Wilkes, Mrs. Jame...| woman|  47|    1|    0|    363272|      7| NULL|       S|
|        894|       0|     2|  Myles, Mr. Thomas...|  male|  62|    0|    0|    240276|  9.6875| NULL|       Q|
|        895|       0|     3|    Wirz, Mr. Albert|  male|  27|    0|    0|    315154|  8.6625| NULL|       S|
|        896|       1|     3|Hirvonen, Mrs. Al...| woman|  22|    1|    1|3101298|12.2875| NULL|       S|
|        897|       0|     3|Svensson, Mr. Joh...|  male|  14|    0|    0|      7538|  9.225| NULL|       S|
|        898|       1|     3|Connolly, Miss. Kate| woman|  30|    0|    0|    330972|  7.6292| NULL|       Q|
|        899|       0|     2|Caldwell, Mr. Alb...|  male|  26|    1|    1|    248738|    29| NULL|       S|
|        900|       1|     3|Abrahim, Mrs. Jos...| woman|  18|    0|    0|      2657|  7.2292| NULL|       C|
|        901|       0|     3|Davies, Mr. John ...|  male|  21|    2|    0|   A/4 48871|  24.15| NULL|       S|
|        902|       0|     3|    Ilieff, Mr. Ylio|  male|NULL|    0|    0|    349220|  7.8958| NULL|       S|
|        903|       0|     1|Jones, Mr. Charle...|  male|  46|    0|    0|       694|     26| NULL|       S|
|        904|       1|     1|Snyder, Mrs. John...| woman|  23|    1|    0|     21228|82.2667|  B45|       S|
|        905|       0|     2|Howard, Mr. Benjamin|  male|  63|    1|    0|     24065|     26| NULL|       S|
|        906|       1|     1|Chaffee, Mrs. Her...| woman|  47|    1|    0| W.E.P. 5734|  61.175|  E31|       S|
|        907|       1|     2|del Carlo, Mrs. S...| woman|  24|    1|    0| SC/PARIS 2167|27.7208| NULL|       C|
|        908|       0|     2|  Keane, Mr. Daniel|  male|  35|    0|    0|    233734|  12.35| NULL|       Q|
|        909|       0|     3|  Assaf, Mr. Gerios|  male|  21|    0|    0|      2692|  7.225| NULL|       C|
|        910|       1|     3|Ilmakangas, Miss....| woman|  27|    1|    0|STON/O2. 3101270|  7.925| NULL|       S|
|        911|       1|     3|Assaf Khalil, Mr....| woman|  45|    0|    0|      2696|  7.225| NULL|       C|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
only showing top 20 rows
```

describe & summary

In [12]:
```
df.describe('Age').show()
```

```
+-------+------------------+
|summary|               Age|
+-------+------------------+
|  count|               332|
|   mean|30.272590361445783|
| stddev|14.181209232542424|
|    min|              0.17|
|    max|                91|
+-------+------------------+
```

In [13]:
```
df.select('Ticket','Age','Fare').summary().show()
```

```
+-------+----------+------------------+------------------+
|summary|    Ticket|               Age|              Fare|
+-------+----------+------------------+------------------+
|  count|       418|               332|               417|
|   mean|2238850.9|30.272590361445783| 35.627188489208646|
| stddev|365923.7764649436|14.181209232542424|55.907576179973844|
|    min|    110469|              0.17|                 0|
|    25%|     17464.0|              21.0|            7.8958|
|    50%|    230136.0|              27.0|           14.4542|
|    75%|    347080.0|              39.0|              31.5|
|    max|W.E.P. 5734|                91|             93.5|
+-------+----------+------------------+------------------+
```

```
24/09/19 10:47:36 WARN SparkStringUtils: Truncated the string representation of a plan since it was too large. This behavior can be adjusted by setting 'spark.sql.debug.maxToStringFields'.
```

withColumnRenamed

In [14]:
```
renamed_df = df.withColumnRenamed("Sex","Gender")
renamed_df.show()
```

```
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|PassengerId|Survived|Pclass|                Name|Gender| Age|SibSp|Parch|    Ticket|   Fare|Cabin|Embarked|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
|        892|       0|     3|    Kelly, Mr. James|  male|34.5|    0|    0|    330911|  7.8292| NULL|       Q|
|        893|       1|     3|Wilkes, Mrs. Jame...|female|  47|    1|    0|    363272|      7| NULL|       S|
|        894|       0|     2|  Myles, Mr. Thomas...|  male|  62|    0|    0|    240276|  9.6875| NULL|       Q|
|        895|       0|     3|    Wirz, Mr. Albert|  male|  27|    0|    0|    315154|  8.6625| NULL|       S|
|        896|       1|     3|Hirvonen, Mrs. Al...|female|  22|    1|    1|3101298|12.2875| NULL|       S|
|        897|       0|     3|Svensson, Mr. Joh...|  male|  14|    0|    0|      7538|  9.225| NULL|       S|
|        898|       1|     3|Connolly, Miss. Kate|female|  30|    0|    0|    330972|  7.6292| NULL|       Q|
|        899|       0|     2|Caldwell, Mr. Alb...|  male|  26|    1|    1|    248738|    29| NULL|       S|
|        900|       1|     3|Abrahim, Mrs. Jos...|female|  18|    0|    0|      2657|  7.2292| NULL|       C|
|        901|       0|     3|Davies, Mr. John ...|  male|  21|    2|    0|   A/4 48871|  24.15| NULL|       S|
|        902|       0|     3|    Ilieff, Mr. Ylio|  male|NULL|    0|    0|    349220|  7.8958| NULL|       S|
|        903|       0|     1|Jones, Mr. Charle...|  male|  46|    0|    0|       694|     26| NULL|       S|
|        904|       1|     1|Snyder, Mrs. John...|female|  23|    1|    0|     21228|82.2667|  B45|       S|
|        905|       0|     2|Howard, Mr. Benjamin|  male|  63|    1|    0|     24065|     26| NULL|       S|
|        906|       1|     1|Chaffee, Mrs. Her...|female|  47|    1|    0| W.E.P. 5734|  61.175|  E31|       S|
|        907|       1|     2|del Carlo, Mrs. S...|female|  24|    1|    0| SC/PARIS 2167|27.7208| NULL|       C|
|        908|       0|     2|  Keane, Mr. Daniel|  male|  35|    0|    0|    233734|  12.35| NULL|       Q|
|        909|       0|     3|  Assaf, Mr. Gerios|  male|  21|    0|    0|      2692|  7.225| NULL|       C|
|        910|       1|     3|Ilmakangas, Miss....|female|  27|    1|    0|STON/O2. 3101270|  7.925| NULL|       S|
|        911|       1|     3|Assaf Khalil, Mr....|female|  45|    0|    0|      2696|  7.225| NULL|       C|
+-----------+--------+------+--------------------+------+----+-----+-----+----------+-------+-----+--------+
only showing top 20 rows
```

Head

In [15]:
```
head_row = df.head()
print(head_row)
```

```
Row(PassengerId='892', Survived='0', Pclass='3', Name='Kelly, Mr. James', Sex='male', Age='34.5', SibSp='0', Parch='0', Ticket='330911', Fare='7.8292', Cabin=None, Embarked='Q')
```

toPandas

In [17]:
```
pandas_df = df.toPandas()
pandas_df.head(5)
```

Out[17]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	892	0	3	Kelly, Mr. James	male	34.5	0	0	330911	7.8292	None	Q
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	female	47	1	0	363272	7	None	S
2	894	0	2	Myles, Mr. Thomas Francis	male	62	0	0	240276	9.6875	None	Q
3	895	0	3	Wirz, Mr. Albert	male	27	0	0	315154	8.6625	None	S
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E Lindqvist)	female	22	1	1	3101298	12.2875	None	S

DataFrame 만들기

In [27]:
```
from pyspark.sql import Row

#예제 데이터프레임
data = [
    {'Name': ['Alice', 'Bob', 'Charlie'],
     'Age': [24, 27, 22],
     'City': ['New York', 'Los Angeles', 'Chicago']
}
```

In [28]:
```
#DataFrame
data = pd.DataFrame(data)
df2 = spark.createDataFrame(data)
df2.show()
```

```
+--------------------+--------------------+--------------------+
|                Name|                 Age|                City|
+--------------------+--------------------+--------------------+
|[Alice, Bob, Char...|[24, 27, 22]|[New York, Los An...|
+--------------------+--------------------+--------------------+
```

In [29]:
```
#Row
df3= spark.createDataFrame([
    Row(Name = 'Alice',Age = 24, City = 'New York'),
    Row(Name = 'Bob',Age = 27, City = 'Los Angeles'),
    Row(Name = 'Charlie',Age = 22, City = 'Chicago'),
])

df3.show()
```

```
+-------+---+-----------+
|   Name|Age|       City|
+-------+---+-----------+
|  Alice| 24|   New York|
|    Bob| 27|Los Angeles|
|Charlie| 22|    Chicago|
+-------+---+-----------+
```