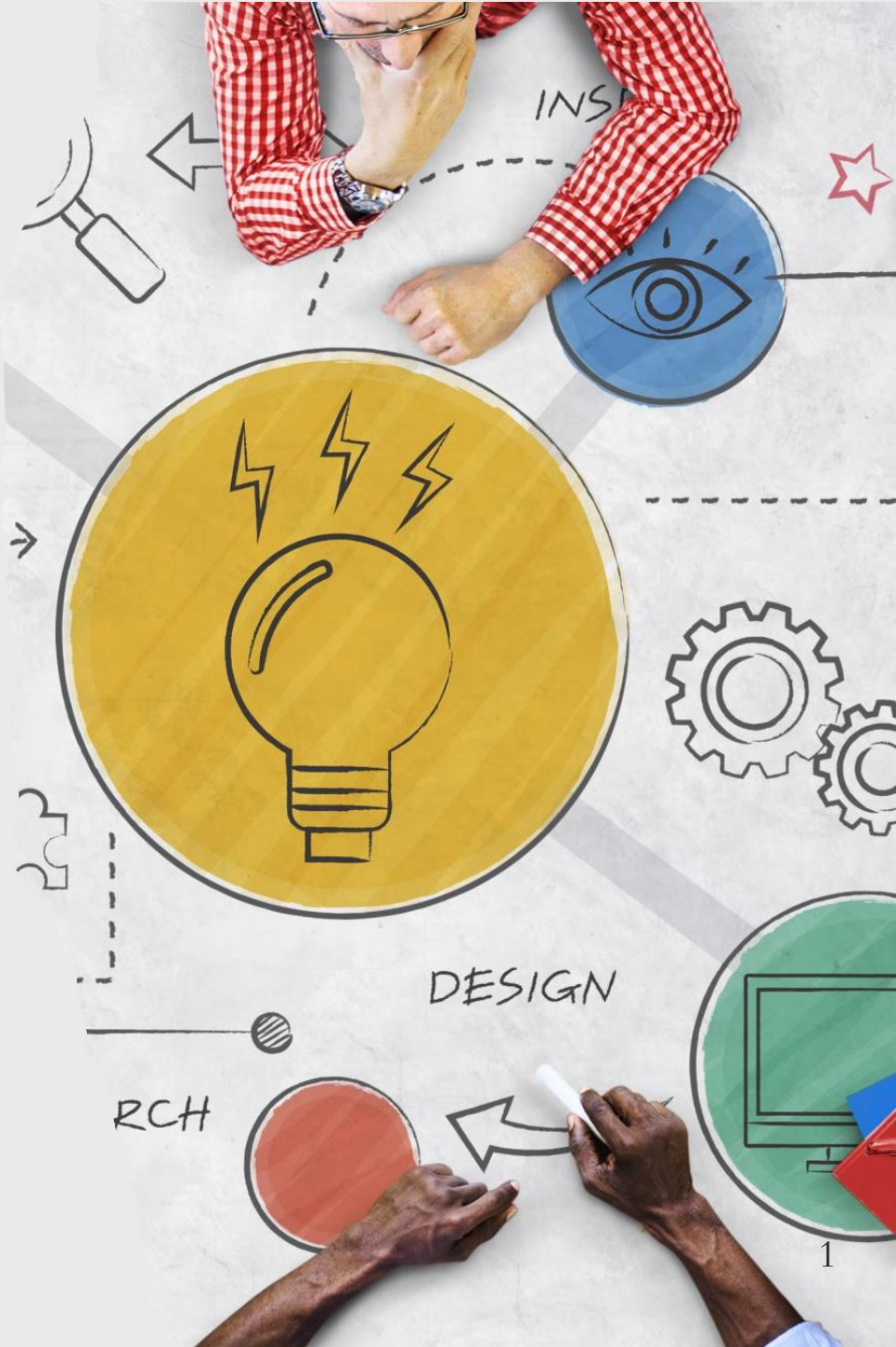
ACTIONS & BASIC TRANSFORMATIONS



CONTENT

- Introduction & Presentation ETL Process
- Actions & Basic Transformations
- Advanced Transformations
- Databricks

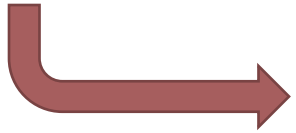
GOAL OF THE LEARNING SECTIONS

- Perform Basic Transformation
- Perform Conditional Selection of Rows
- Carry out basic Data Cleaning

ACCESSING COLUMNS

- Accessing columns with .select()

petalLength	petalWidth	sepalLength	sepalWidth	species
1.4	0.2	5.1	3.5	setosa
1.4	0.2	4.9	3.0	setosa
1.3	0.2	4.7	3.2	setosa
1.5	0.2	4.6	3.1	setosa
1.4	0.2	5.0	3.6	setosa
1.7	0.4	5.4	3.9	setosa
1.4	0.3	4.6	3.4	setosa
1.5	0.2	5.0	3.4	setosa
1.4	0.2	4.4	2.9	setosa
1.5	0.1	4.9	3.1	setosa



```
[ ]  df1.select("petalLength").show(5)
```

```
+-----------+
|petalLength|
+-----------+
|        1.4|
|        1.4|
|        1.3|
|        1.5|
|        1.4|
+-----------+
```

ACCESSING ROWS

- Accessing columns with workaround .collect() then access with print()

(and square brackets-operator for row)

petalLength	petalWidth	sepalLength	sepalWidth	species
1.4	0.2	5.1	3.5	setosa
1.4	0.2	4.9	3.0	setosa
1.3	0.2	4.7	3.2	setosa
1.5	0.2	4.6	3.1	setosa
1.4	0.2	5.0	3.6	setosa
1.7	0.4	5.4	3.9	setosa
1.4	0.3	4.6	3.4	setosa
1.5	0.2	5.0	3.4	setosa
1.4	0.2	4.4	2.9	setosa
1.5	0.1	4.9	3.1	setosa

```
[ ]  # Returns list of Row objects
     local_df1 = df1.collect()
     print(f"Type of entries: {type(local_df1[0])}\n")
     print(f"Entries: {local_df1[:5]}")
```

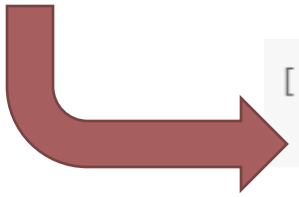
```
Type of entries: <class 'pyspark.sql.types.Row'>

Entries: [Row(petalLength=1.4, petalWidth=0.2, sepalLength=5.1, sepalWidth=3.5, species='setosa'), Row(petalLeng
```

ADDING COLUMNS

- Adding columns with .withColumn()

```
+-----------+----------+-----------+----------+-------+
|petalLength|petalWidth|sepalLength|sepalWidth|species|
+-----------+----------+-----------+----------+-------+
|        1.4|       0.2|        5.1|       3.5| setosa|
|        1.4|       0.2|        4.9|       3.0| setosa|
|        1.3|       0.2|        4.7|       3.2| setosa|
|        1.5|       0.2|        4.6|       3.1| setosa|
|        1.4|       0.2|        5.0|       3.6| setosa|
+-----------+----------+-----------+----------+-------+
```



```
[ ]  df_extraCol = df1.withColumn('newColumn', df1.petalWidth + df1.petalLength)
     df_extraCol.show(5)
```

```
+-----------+----------+-----------+----------+-------+------------------+
|petalLength|petalWidth|sepalLength|sepalWidth|species|         newColumn|
+-----------+----------+-----------+----------+-------+------------------+
|        1.4|       0.2|        5.1|       3.5| setosa|1.5999999999999999|
|        1.4|       0.2|        4.9|       3.0| setosa|1.5999999999999999|
|        1.3|       0.2|        4.7|       3.2| setosa|               1.5|
|        1.5|       0.2|        4.6|       3.1| setosa|               1.7|
|        1.4|       0.2|        5.0|       3.6| setosa|1.5999999999999999|
+-----------+----------+-----------+----------+-------+------------------+
```

REMOVING COLUMNS

- Removing columns with .drop()

petalLength	petalWidth	sepalLength	sepalWidth	species	petalSum
1.4	0.2	5.1	3.5	setosa	1.5999999999999999
1.4	0.2	4.9	3.0	setosa	1.5999999999999999
1.3	0.2	4.7	3.2	setosa	1.5
1.5	0.2	4.6	3.1	setosa	1.7
1.4	0.2	5.0	3.6	setosa	1.5999999999999999

```
[ ]  df1 = df_extraCol.drop(df_extraCol.petalSum)
     df1.show(5)
```

petalLength	petalWidth	sepalLength	sepalWidth	species
1.4	0.2	5.1	3.5	setosa
1.4	0.2	4.9	3.0	setosa
1.3	0.2	4.7	3.2	setosa
1.5	0.2	4.6	3.1	setosa
1.4	0.2	5.0	3.6	setosa

CONCATENATING DATAFRAMES

- Concatenating dataframes with .union()

petalLength	petalWidth	sepalLength	sepalWidth	species
null	null	null	null	null
1.4	0.2	5.1	3.5	setosa
1.4	0.2	4.9	3.0	setosa
4.1	1.3	5.7	2.8	versicolor
4.1	1.3	5.7	2.8	versicolor
6.0	2.5	6.3	3.3	virginica
5.1	1.9	5.8	2.7	virginica
null	null	null	null	null

petalLength	petalWidth	sepalLength	sepalWidth	species
5.1	1.8	5.9	3.0	virginica

```
df1.union(df2).show()
```

petalLength	petalWidth	sepalLength	sepalWidth	species
null	null	null	null	null
1.4	0.2	5.1	3.5	setosa
1.4	0.2	4.9	3.0	setosa
4.1	1.3	5.7	2.8	versicolor
4.1	1.3	5.7	2.8	versicolor
6.0	2.5	6.3	3.3	virginica
5.1	1.9	5.8	2.7	virginica
null	null	null	null	null
5.1	1.8	5.9	3.0	virginica

PERFORM CONDITIONAL SELECTION OF ROWS

- Combining aggregate functions, to achieve exact selection: .filter()
  .where()
  .withColumn()
  ...

petalLength	petalWidth	sepalLength	sepalWidth	species
4.2	1.2	5.7	3.0	versicolor
4.2	1.3	5.7	2.9	versicolor
4.3	1.3	6.2	2.9	versicolor
3.0	1.1	5.1	2.5	versicolor
4.1	1.3	5.7	2.8	versicolor
6.0	2.5	6.3	3.3	virginica
5.1	1.9	5.8	2.7	virginica
5.9	2.1	7.1	3.0	virginica
5.6	1.8	6.3	2.9	virginica
5.8	2.2	6.5	3.0	virginica

```
[ ]  (df1.select("species", "petalWidth")
          .filter(df1.species == "virginica")
          .dropDuplicates()
          .show(5))
```

species	petalWidth
virginica	2.2
virginica	1.7
virginica	2.5
virginica	2.4
virginica	1.6

PERFORM CONDITIONAL SELECTION OF ROWS

```
[ ] (df1.select("species", "petalWidth", "petalLength")
        .where((df1.species == "setosa") & (df1.petalLength > 1.3))
        .withColumn("petalSum", df1.petalWidth + df1.petalLength)
        .dropDuplicates()
        .describe()
        .show(5))
```

```
+-------+-------+------------------+------------------+------------------+
|summary|species|        petalWidth|       petalLength|          petalSum|
+-------+-------+------------------+------------------+------------------+
|  count|     16|                16|                16|                16|
|   mean|   null|0.3000000000000004| 1.5999999999999999| 1.9000000000000001|
| stddev|   null| 0.1414213562373095|0.15916448515084428|0.24221202832779934|
|    min| setosa|               0.1|               1.4|               1.5|
|    max| setosa|               0.6|               1.9|               2.3|
+-------+-------+------------------+------------------+------------------+
```

BASIC DATA CLEANING

- Removing NAs with .dropna()
- Removing duplicates with .dropDuplicates()

```
[ ]  (df1.select("petalWidth")
          .dropna()
          .dropDuplicates()
          .show(n=5))
```

```
+----------+
|petalWidth|
+----------+
|       2.4|
|       0.2|
|       1.4|
|       1.7|
|       2.3|
+----------+
```