```
spark-job   | 25/07/15 12:31:48 WARN NativeCodeLoader: Unable to load native-hadoop library for your platform... using built
in-java classes where applicable
spark-job   | 🚀 Starting PySpark Session...
spark-job   | Using Spark's default log4j profile: org/apache/spark/log4j2-defaults.properties

spark-job   |
spark-job   | ✅ CUSTOMER DATA:
spark-job   | 25/07/15 12:32:03 INFO FileSourceStrategy: Pushed Filters:
spark-job   | 25/07/15 12:32:03 INFO FileSourceStrategy: Post-Scan Filters: Set()

spark-job   | +-----------+-------------+
spark-job   | |customer_id|customer_name|
spark-job   | +-----------+-------------+
spark-job   | |          1|        Alice|
spark-job   | |          2|          Bob|
spark-job   | |          3|      Charlie|
spark-job   | +-----------+-------------+
spark-job   |
spark-job   |
spark-job   | ✅ TRANSACTION DATA:
spark-job   | 25/07/15 12:32:04 INFO FileSourceStrategy: Pushed Filters:

spark-job   | +--------------+-----------+-------+-----------+------+----------+
spark-job   | |transaction_id|customer_id|product|   category|amount|      date|
spark-job   | +--------------+-----------+-------+-----------+------+----------+
spark-job   | |           101|          1|     TV|Electronics|   500|2024-06-01|
spark-job   | |           102|          1|  Phone|Electronics|   700|2024-06-10|
spark-job   | |           103|          2|  Shoes|    Fashion|   120|2024-06-15|
spark-job   | |           104|          3|  Watch|    Fashion|   150|2024-06-05|
spark-job   | |           105|          3|  Shirt|    Fashion|   100|2024-06-20|
spark-job   | +--------------+-----------+-------+-----------+------+----------+
spark-job   |
spark-job   |
spark-job   | 🔗 Performing INNER JOIN on 'customer_id'...
spark-job   |
spark-job   | ✅ JOINED DATA:
spark-job   | 25/07/15 12:32:05 INFO FileSourceStrategy: Pushed Filters: IsNotNull(customer_id)

spark-job   | 25/07/15 12:32:06 INFO CodeGenerator: Code generated in 16.673045 ms
spark-job   | +-----------+--------------+-------+-----------+------+----------+-------------+
spark-job   | |customer_id|transaction_id|product|   category|amount|      date|customer_name|
spark-job   | +-----------+--------------+-------+-----------+------+----------+-------------+
spark-job   | |          1|           101|     TV|Electronics|   500|2024-06-01|        Alice|
spark-job   | |          1|           102|  Phone|Electronics|   700|2024-06-10|        Alice|
spark-job   | |          2|           103|  Shoes|    Fashion|   120|2024-06-15|          Bob|
spark-job   | |          3|           104|  Watch|    Fashion|   150|2024-06-05|      Charlie|
spark-job   | |          3|           105|  Shirt|    Fashion|   100|2024-06-20|      Charlie|
spark-job   | +-----------+--------------+-------+-----------+------+----------+-------------+
spark-job   |
spark-job   |
spark-job   | 📊 Calculating LATEST TRANSACTION per customer...
spark-job   |
spark-job   | ✅ LATEST TRANSACTION PER CUSTOMER:
spark-job   | 25/07/15 12:32:06 INFO FileSourceStrategy: Pushed Filters: IsNotNull(customer_id)
```

```
spark-job   | 25/07/15 12:32:09 INFO CodeGenerator: Code generated in 25.942028 ms
spark-job   | +-----------+--------------+-------+-----------+------+----------+-------------+-------+
spark-job   | |customer_id|transaction_id|product|   category|amount|      date|customer_name|row_num|
spark-job   | +-----------+--------------+-------+-----------+------+----------+-------------+-------+
spark-job   | |          1|           102|  Phone|Electronics|   700|2024-06-10|        Alice|      1|
spark-job   | |          2|           103|  Shoes|    Fashion|   120|2024-06-15|          Bob|      1|
spark-job   | |          3|           105|  Shirt|    Fashion|   100|2024-06-20|      Charlie|      1|
spark-job   | +-----------+--------------+-------+-----------+------+----------+-------------+-------+
spark-job   |
spark-job   |
spark-job   | 📊 Ranking PRODUCTS BY REVENUE in each CATEGORY...
spark-job   |
spark-job   | ✅ RANKED PRODUCTS BY REVENUE PER CATEGORY:
spark-job   | 25/07/15 12:32:09 INFO FileSourceStrategy: Pushed Filters: IsNotNull(customer_id)
```

```
spark-job   | 25/07/15 12:32:10 INFO CodeGenerator: Code generated in 15.846604 ms
spark-job   | +-------+-----------+------+----+----------+
spark-job   | |product|   category|amount|rank|dense_rank|
spark-job   | +-------+-----------+------+----+----------+
spark-job   | |  Phone|Electronics|   700|   1|         1|
spark-job   | |     TV|Electronics|   500|   2|         2|
spark-job   | |  Watch|    Fashion|   150|   1|         1|
spark-job   | |  Shoes|    Fashion|   120|   2|         2|
spark-job   | |  Shirt|    Fashion|   100|   3|         3|
spark-job   | +-------+-----------+------+----+----------+
spark-job   |
spark-job   |
spark-job   | 📌 Registering 'joined' DataFrame as a temporary SQL view...
spark-job   |
spark-job   | 🧠 Running SQL query to rank products by revenue in each category...
spark-job   |
spark-job   | ✅ SQL RANK OUTPUT:
```

```
173.738153 ms
spark-job   | +-------+-----------+------+--------+--------------+
spark-job   | |product|   category|amount|sql_rank|sql_dense_rank|
spark-job   | +-------+-----------+------+--------+--------------+
spark-job   | |  Phone|Electronics|   700|       1|             1|
spark-job   | |     TV|Electronics|   500|       2|             2|
spark-job   | |  Watch|    Fashion|   150|       1|             1|
spark-job   | |  Shirt|    Fashion|   100|       3|             3|
spark-job   | +-------+-----------+------+--------+--------------+
spark-job   |
spark-job   |
spark-job   | ✅ Done. Stopping Spark Session.
```