Lab Assignment_3

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TASK 1:Hadoop MapReduce Algorithm

Objective:

Implementing MapReduce algorithm for finding Facebook common friends and running the MapReduce job on Apache Spark

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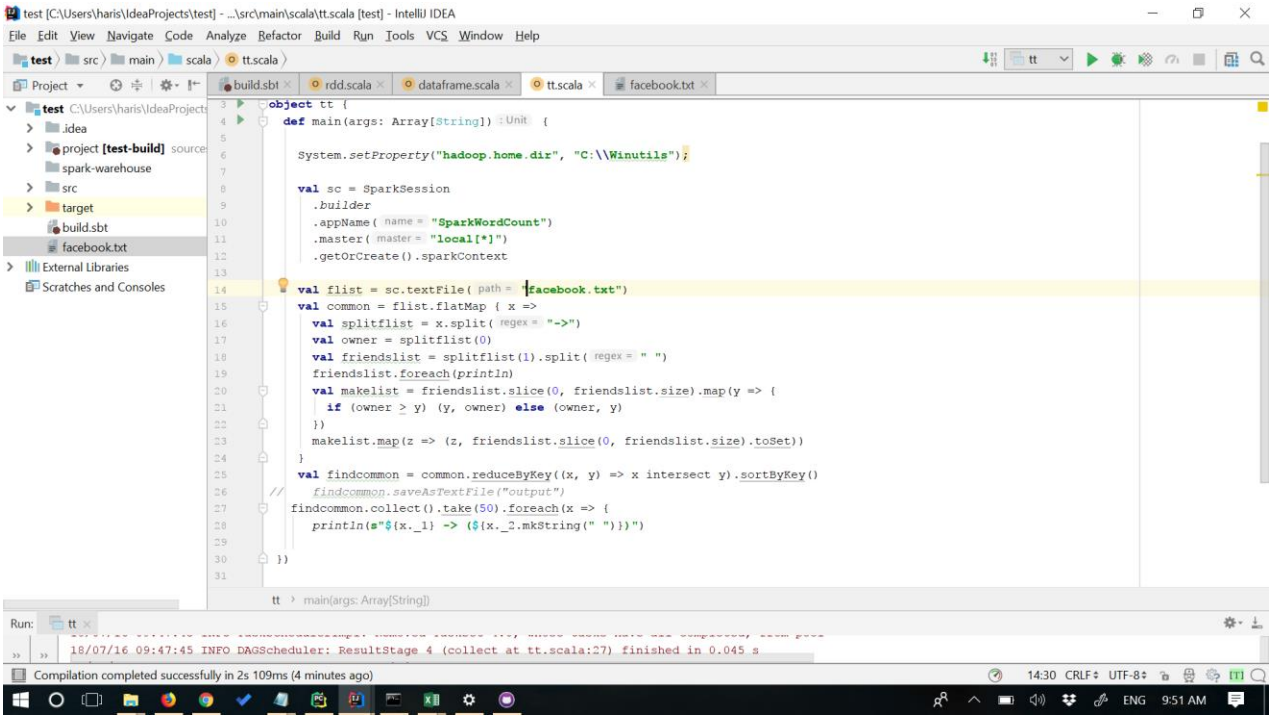
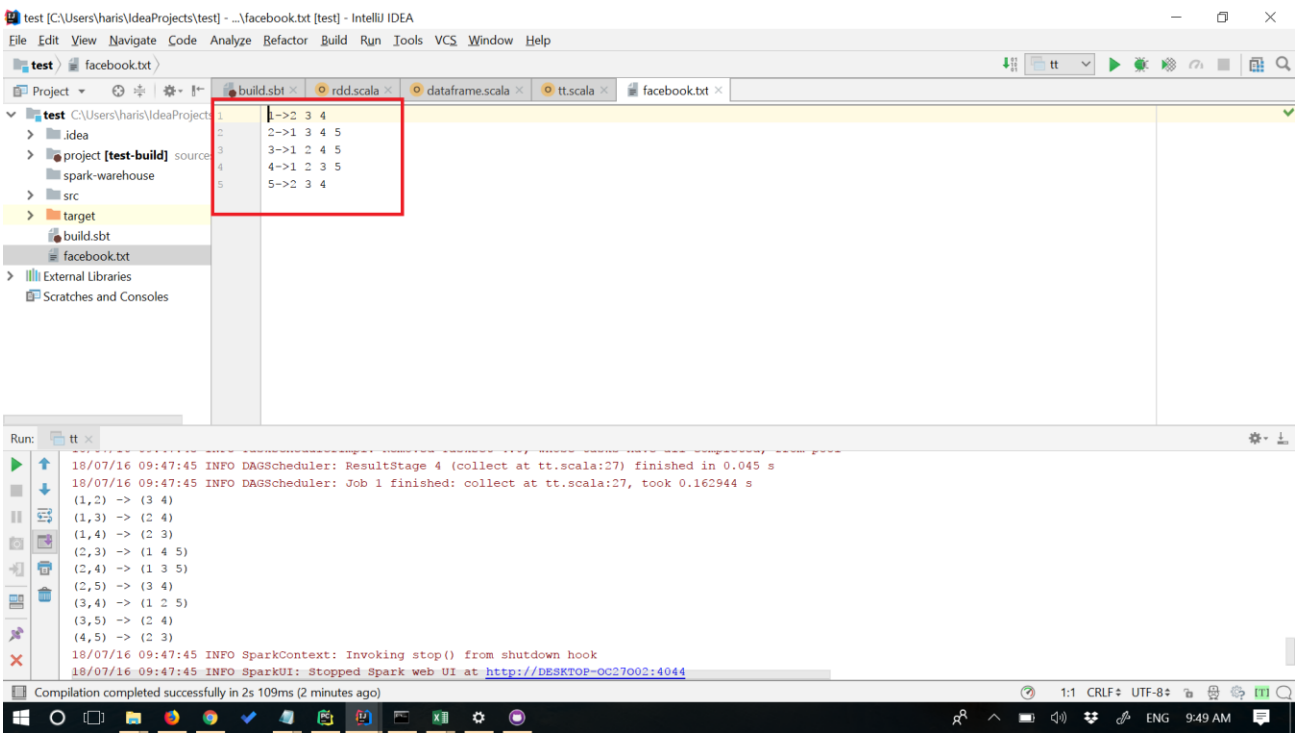
Execution of Mapreduce:



Input:



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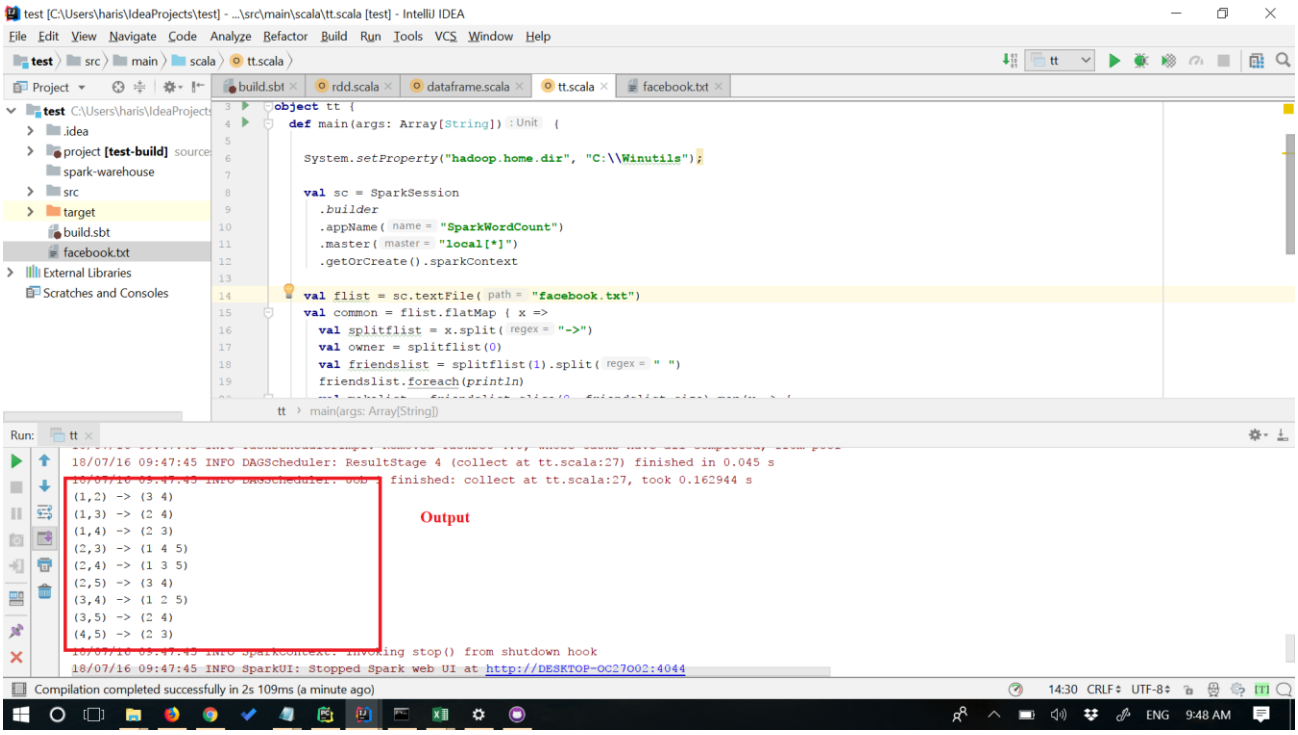
Output:



Algorithm: The map function

map(owner,friends list): emit(owner,friend)-> friends list return set of (key,value) pairs that each key,(owner,friend),has values(friends list)

Algorithm: The Reduce function

reduce(owner, friend)->friends list emit (owner, friend)->friends list

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TASK 2: Spark Data Frames

Objective:

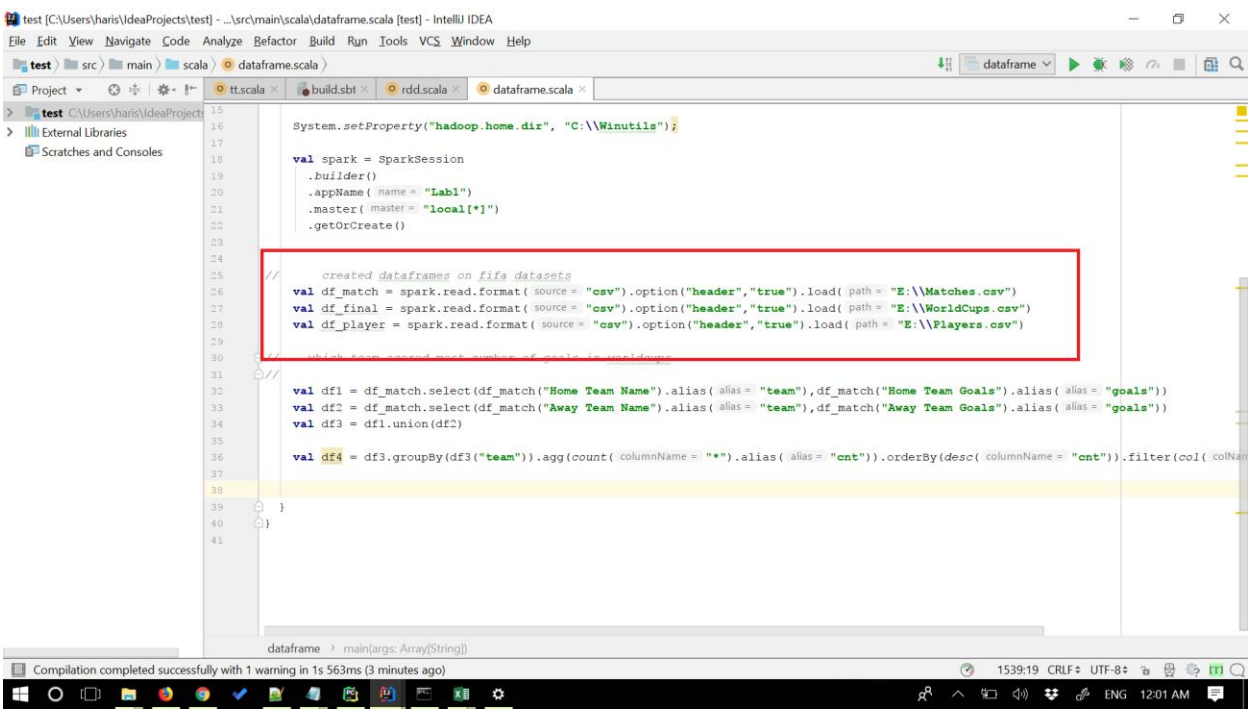
a) Creating a DataFrame from the datasets

b) Performing 10 Intutive questions

c) Queries in spark RDD's

Datasets Used:

a) Creating a DataFrame from the datasets



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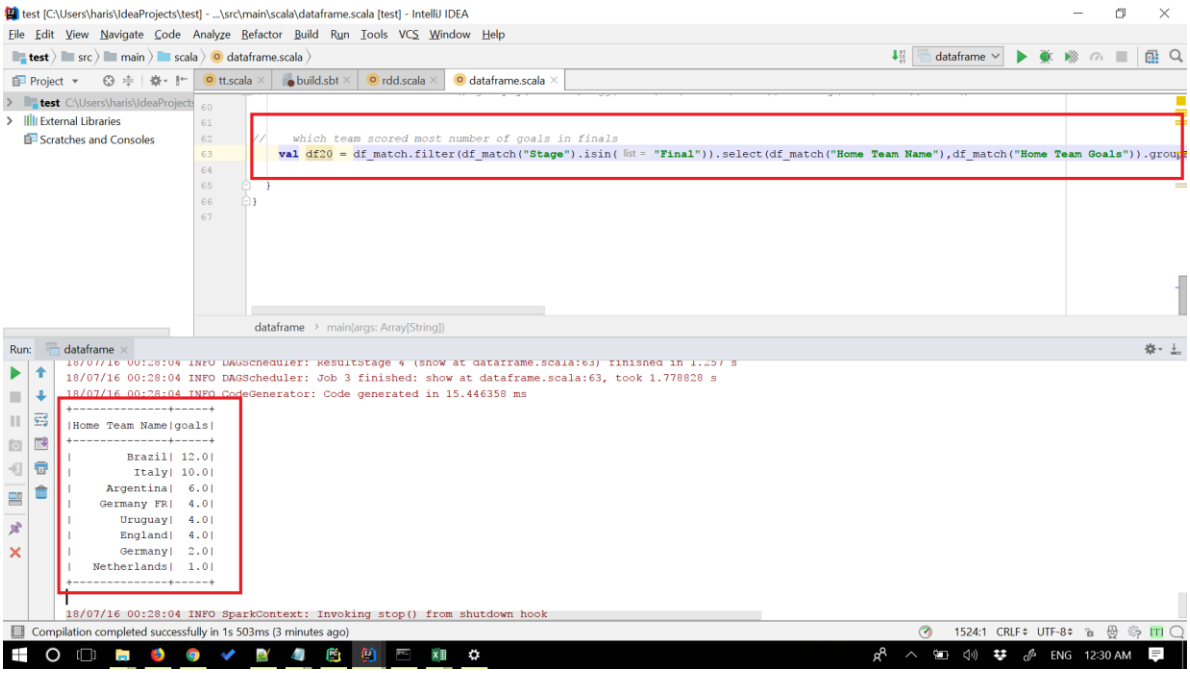
b) Performing 10 Intutive questions

1) Teams that scored most number of goals in finals

Query: val df20 = df_match.filter(df_match("Stage").isin("Final")).select(df_match("Home Team Name"),df_match("Home Team Goals")).groupBy(df_match("Home Team Name")).agg(sum(df_match("Home Team Goals")).alias("goals")).orderBy(desc("goals")).show()



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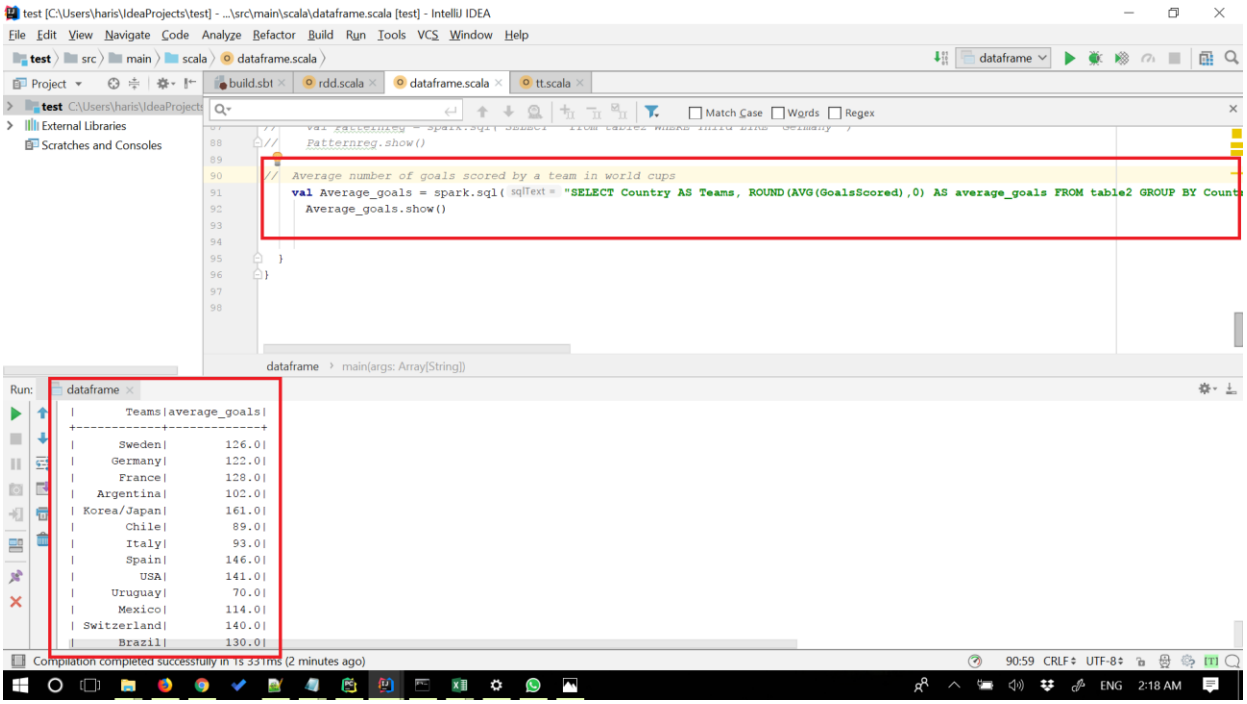
2) Average number of goals scored by a team in worldcups

Query: val Average_goals = spark.sql("SELECT Country AS Teams, ROUND(AVG(GoalsScored),0) AS average_goals FROM table2 GROUP BY Country")
Average_goals.show()



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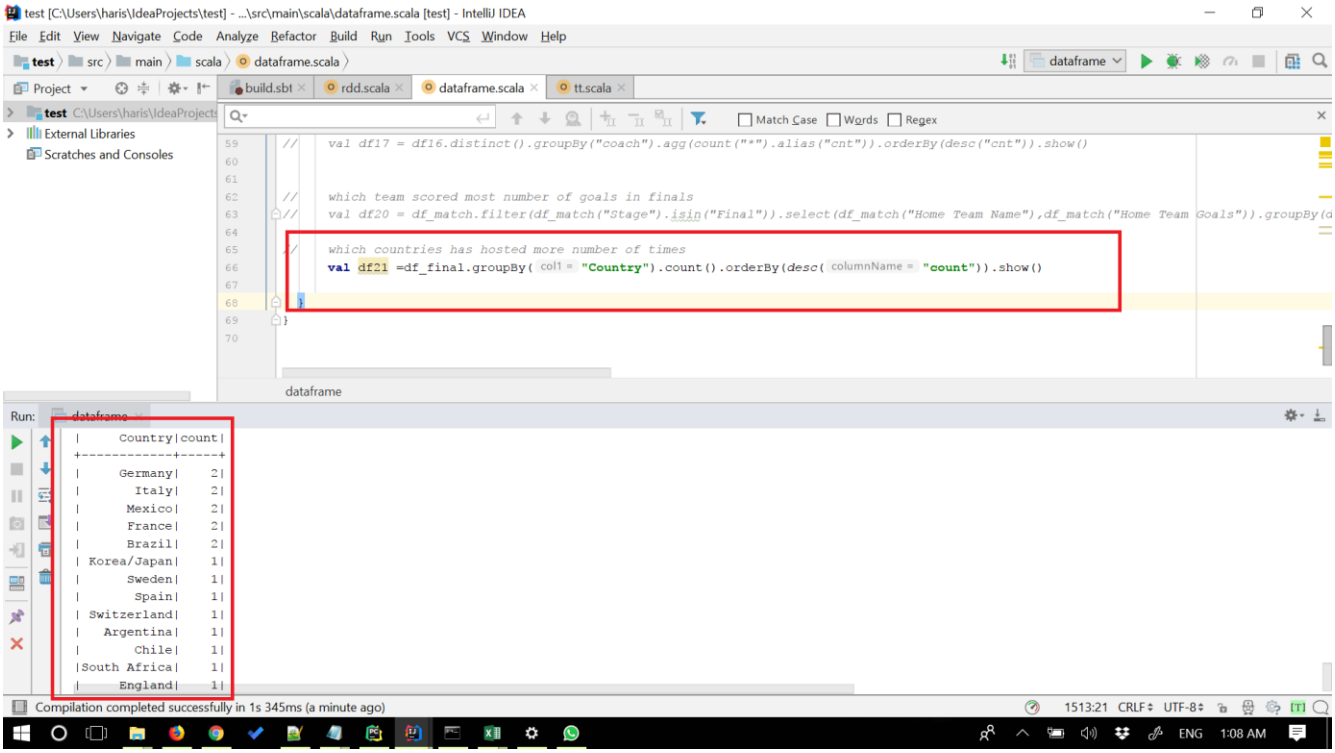
3) Most number of time a country has hosted Worldcups

Query: val df21 =df_final.groupBy("Country").count().orderBy(desc("count")).show()



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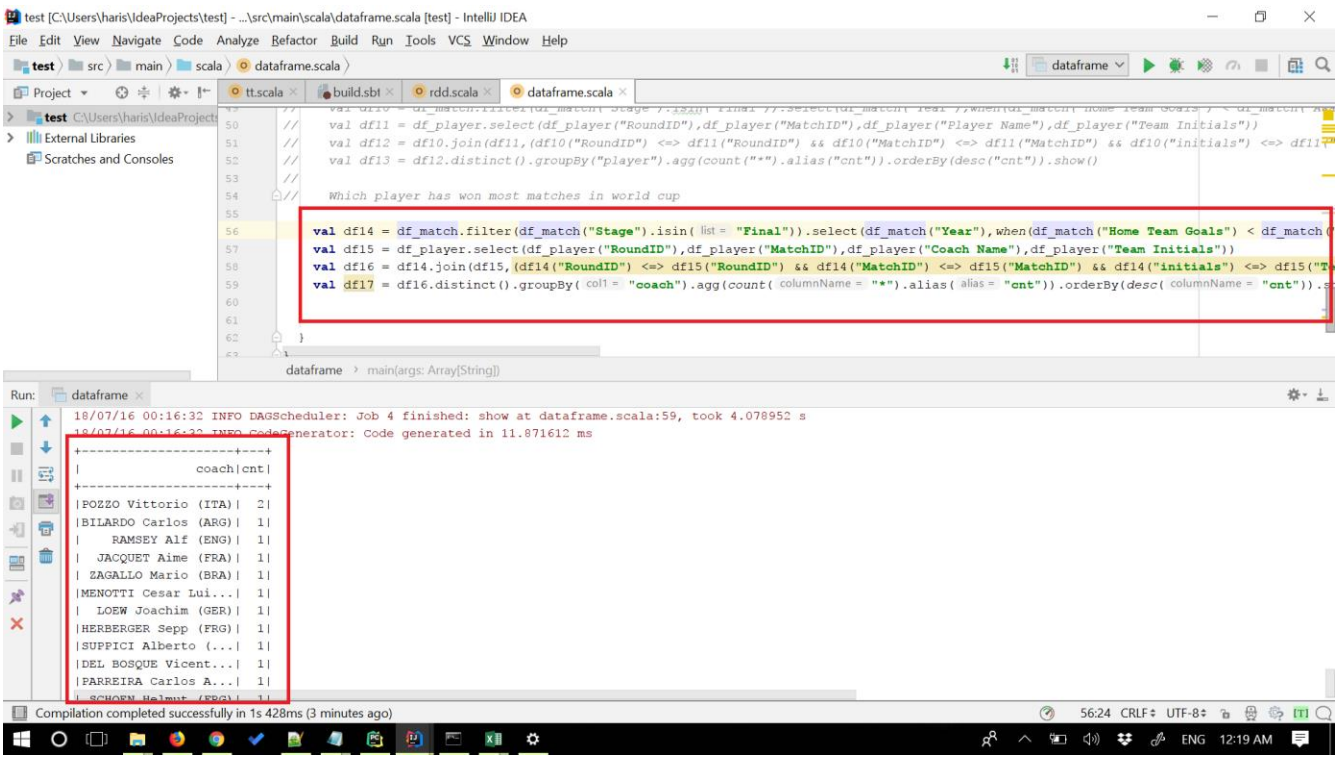
4) Player who has won most matches in Worldcup

Query: val df14 = df_match.filter(df_match("Stage").isin("Final")).select(df_match("Year"),when(df_match("Home Team Goals") < df_match("Away Team Goals"),df_match("Away Team Name")).otherwise(df_match("Home Team Name")).alias("team"),when(df_match("Home Team Goals") < df_match("Away Team Goals"),df_match("Away Team Initials")).otherwise(df_match("Home Team Initials")).alias("initials"),df_match("RoundID"),df_match("MatchID")) val df15 = df_player.select(df_player("RoundID"),df_player("MatchID"),df_player("Coach Name"),df_player("Team Initials")) val df16 = df14.join(df15,(df14("RoundID") <=> df15("RoundID") && df14("MatchID") <=> df15("MatchID") && df14("initials") <=> df15("Team Initials"))).select(df15("Coach Name").alias("coach"),df14("Year")) val df17 = df16.distinct().groupBy("coach").agg(count("*").alias("cnt")).orderBy(desc("cnt")).show()



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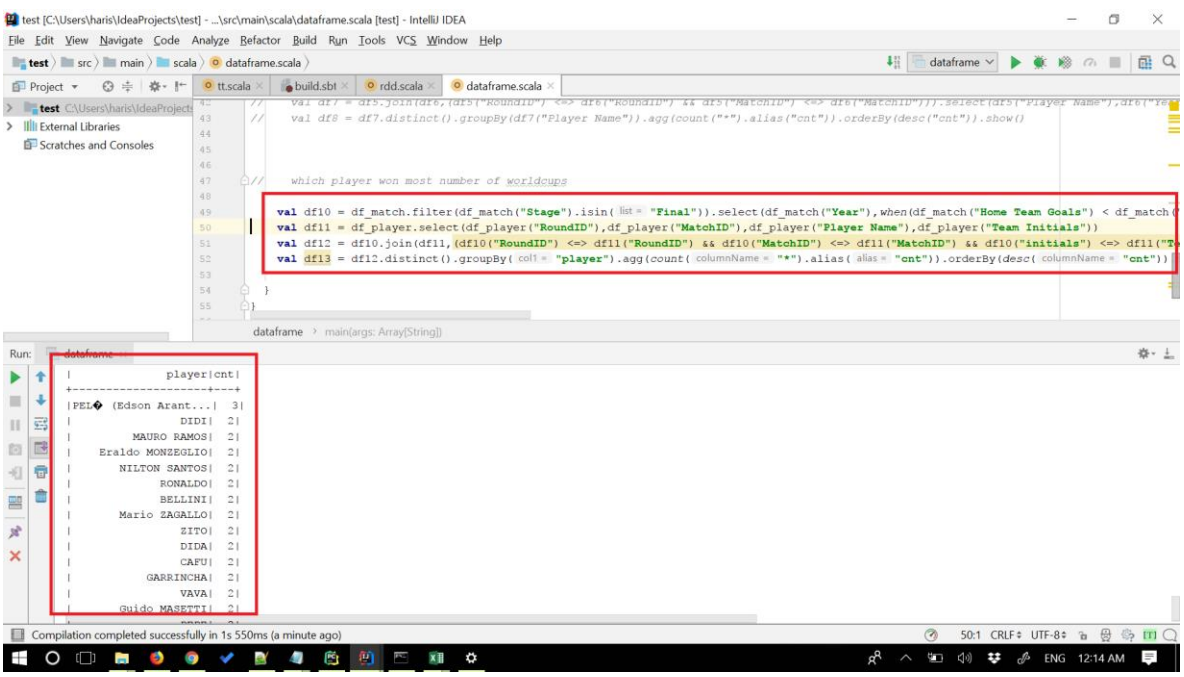
5) Players who won most number of Worldcups

Query: val df10 = df_match.filter(df_match("Stage").isin("Final")).select(df_match("Year"),when(df_match("Home Team Goals") < df_match("Away Team Goals"),df_match("Away Team Name")).otherwise(df_match("Home Team Name")).alias("team"),when(df_match("Home Team Goals") < df_match("Away Team Goals"),df_match("Away Team Initials")).otherwise(df_match("Home Team Initials")).alias("initials"),df_match("RoundID"),df_match("MatchID")) val df11 = df_player.select(df_player("RoundID"),df_player("MatchID"),df_player("Player Name"),df_player("Team Initials")) val df12 = df10.join(df11,(df10("RoundID") <=> df11("RoundID") && df10("MatchID") <=> df11("MatchID") && df10("initials") <=> df11("Team Initials"))).select(df11("Player Name").alias("player"),df10("Year").alias("year")) val df13 = df12.distinct().groupBy("player").agg(count("*").alias("cnt")).orderBy(desc("cnt")).show()



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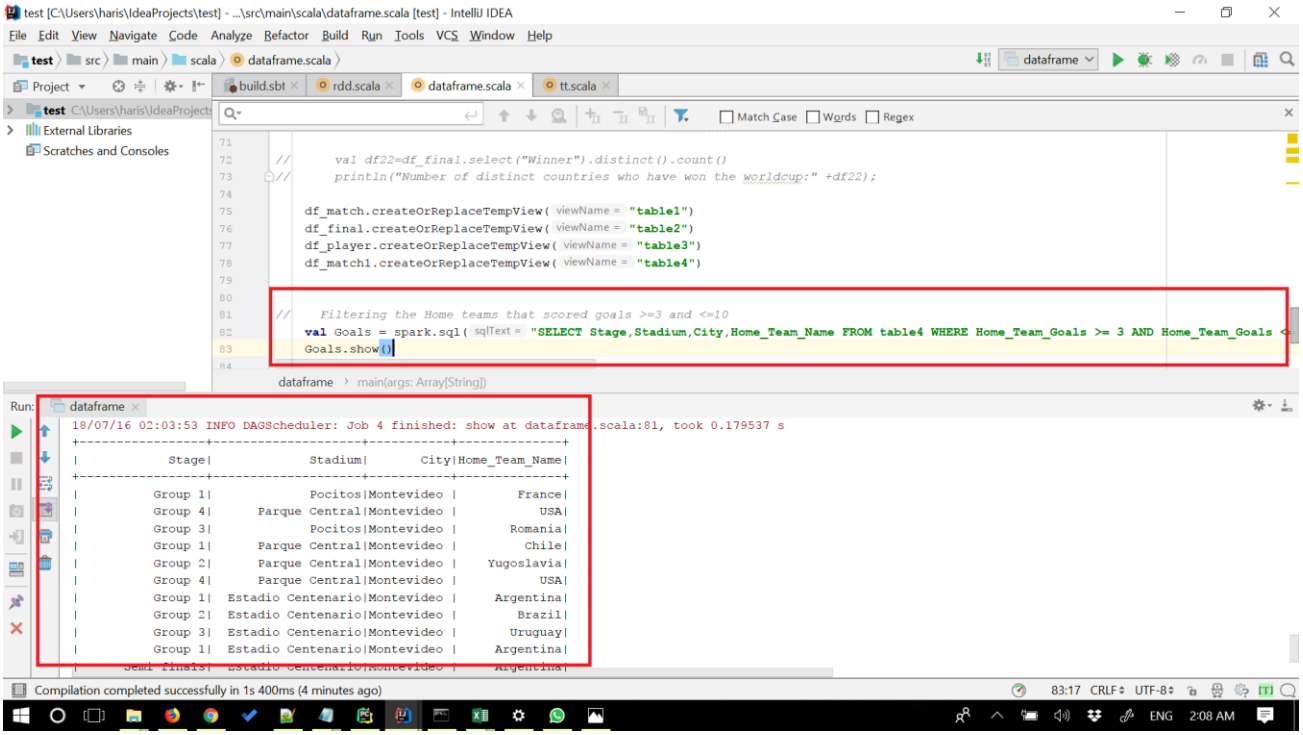
6) Home team who scored goals greater than 3

Query: val Goals = spark.sql("SELECT Stage,Stadium,City,Home_Team_Name FROM table4 WHERE Home_Team_Goals >= 3 AND Home_Team_Goals <= 10") Goals.show()



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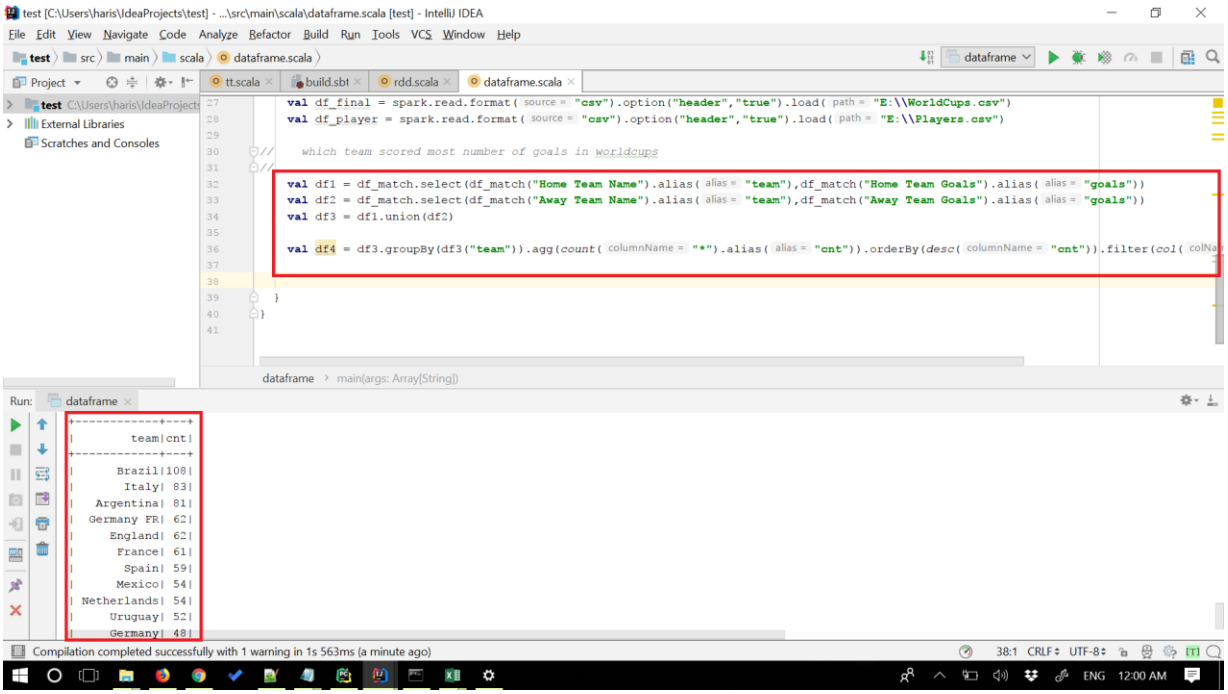
7) Teams scored most number of goals in Worldcups

Query: val df1 = df_match.select(df_match("Home Team Name").alias("team"),df_match("Home Team Goals").alias("goals")) val df2 = df_match.select(df_match("Away Team Name").alias("team"),df_match("Away Team Goals").alias("goals")) val df3 = df1.union(df2) val df4=df3.groupBy(df3("team")).agg(count("*").alias("cnt")).orderBy(desc("cnt")).filter(col("team")isNotNull).show()



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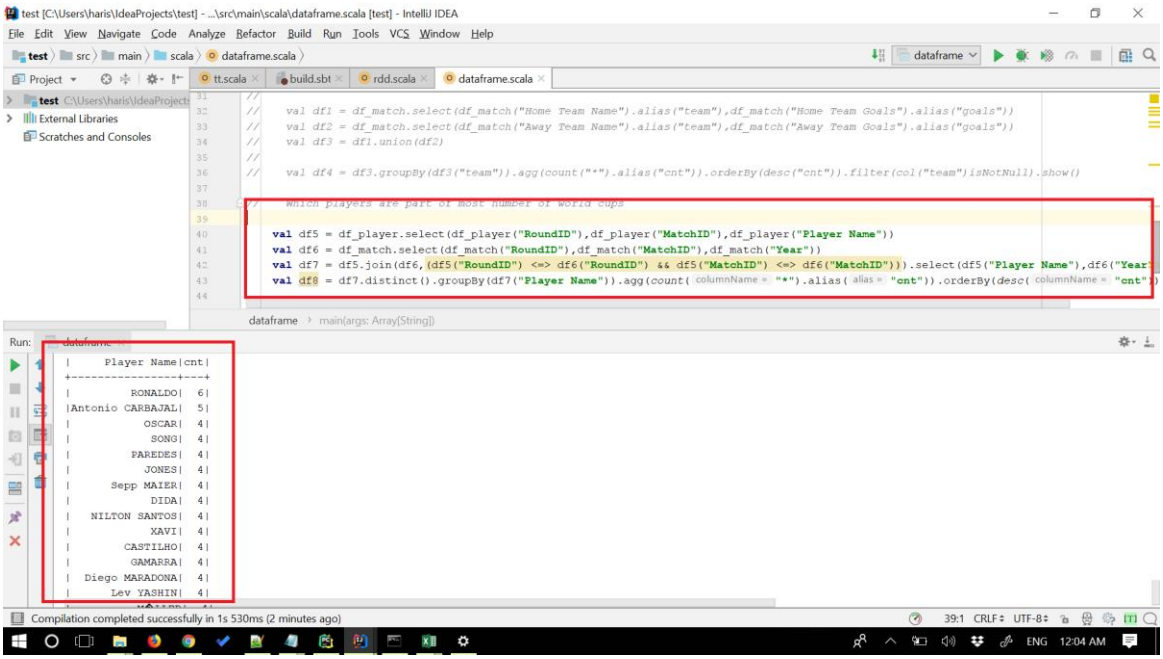
8) Players part of most number of Worldcups

Query: val df5 = df_player.select(df_player("RoundID"),df_player("MatchID"),df_player("Player Name")) val df6 = df_match.select(df_match("RoundID"),df_match("MatchID"),df_match("Year")) val df7 = df5.join(df6,(df5("RoundID") <=> df6("RoundID") && df5("MatchID") <=> df6("MatchID"))).select(df5("Player Name"),df6("Year")) val df8 = df7.distinct().groupBy(df7("Player Name")).agg(count("*").alias("cnt")).orderBy(desc("cnt")).show()



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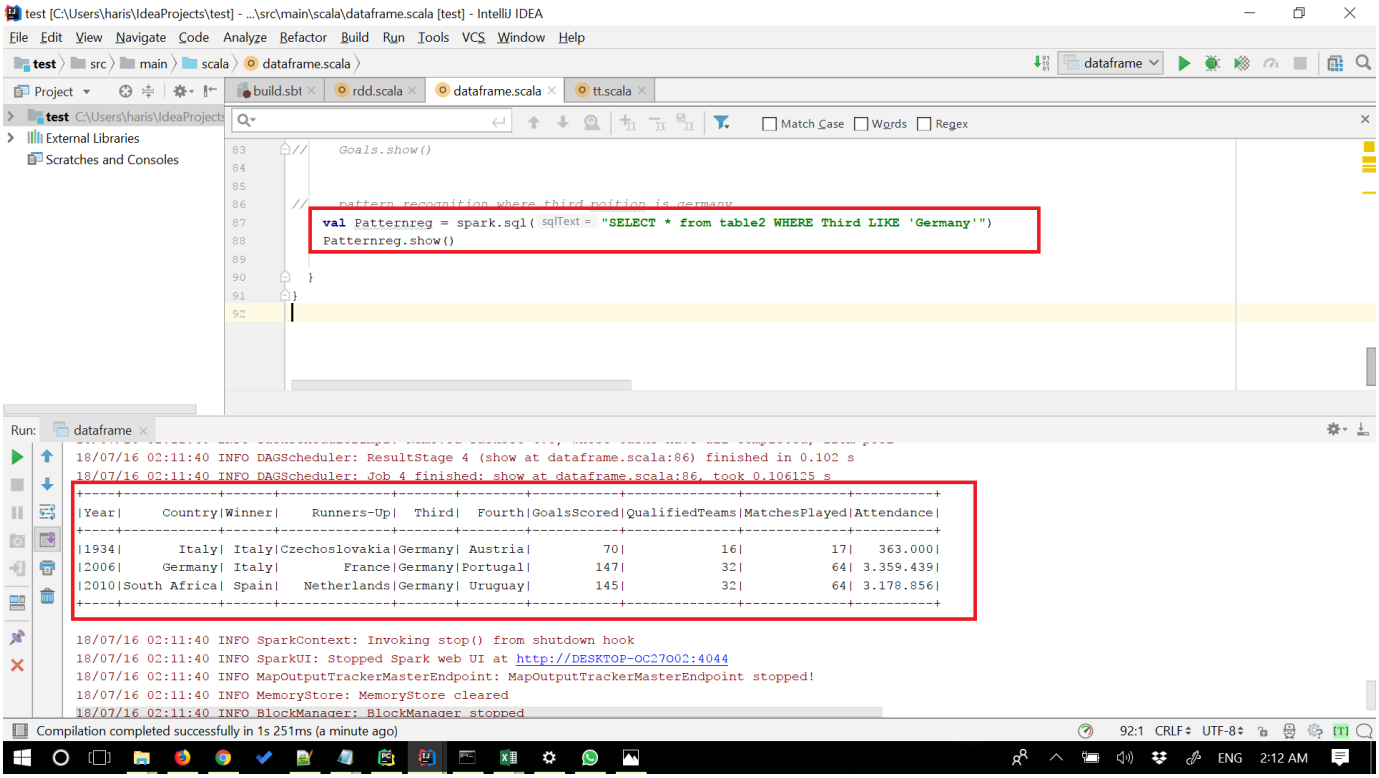
9) pattern Recognition Germany

Query: val Patternreg = spark.sql("SELECT * from table2 WHERE Third LIKE 'Germany'")
Patternreg.show()



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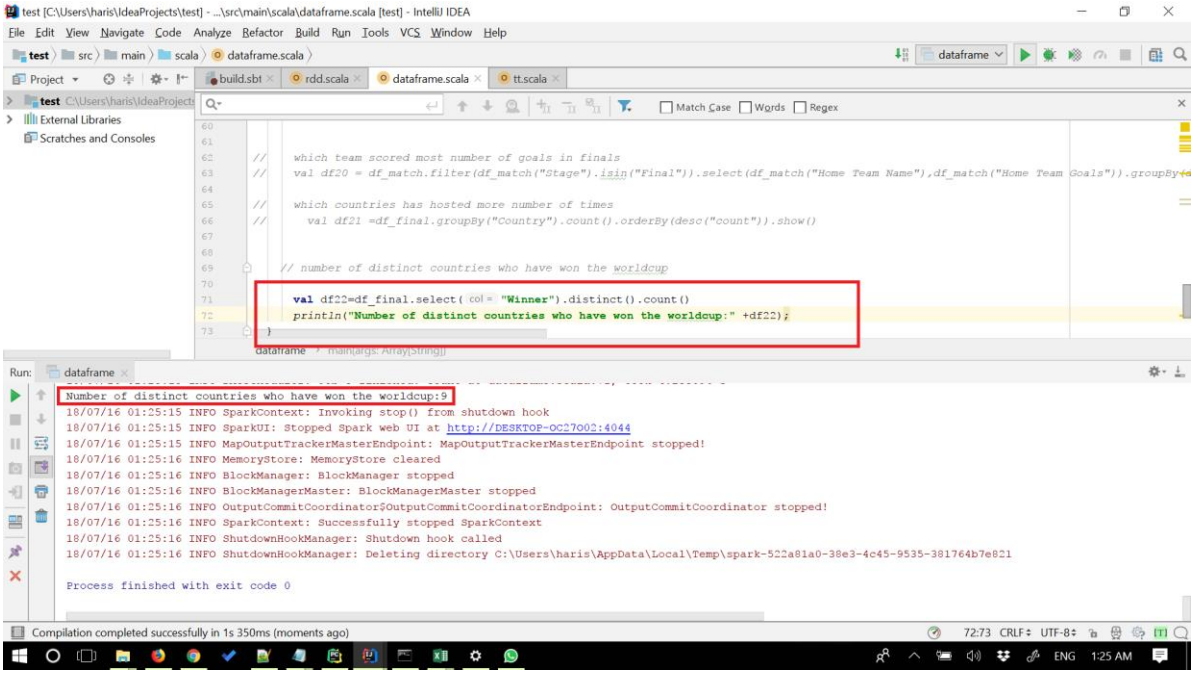
10) Number of distinct countries Who won the Worldcup

Query: val df22=df_final.select("Winner").distinct().count() println("Number of distinct countries who have won the worldcup:" +df22);



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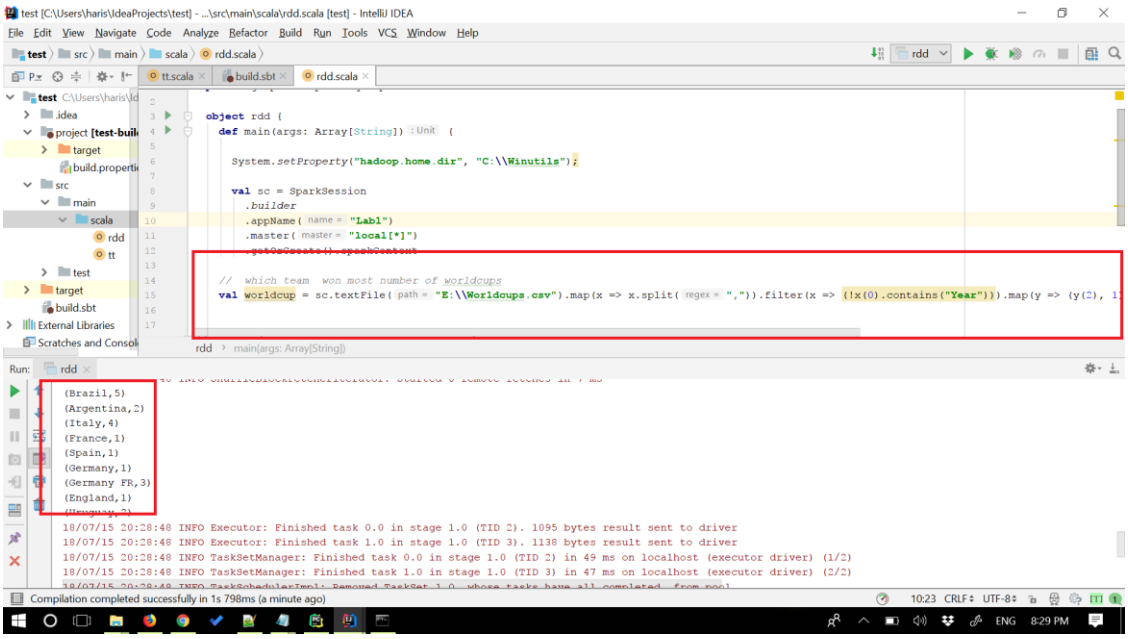
c) Queries in spark RDD's

1) Team won most number of Worldcups

Query: val worldcup = sc.textFile("E:\Worldcups.csv").map(x => x.split(",")).filter(x => (!x(0).contains("Year"))).map(y => (y(2), 1)).re



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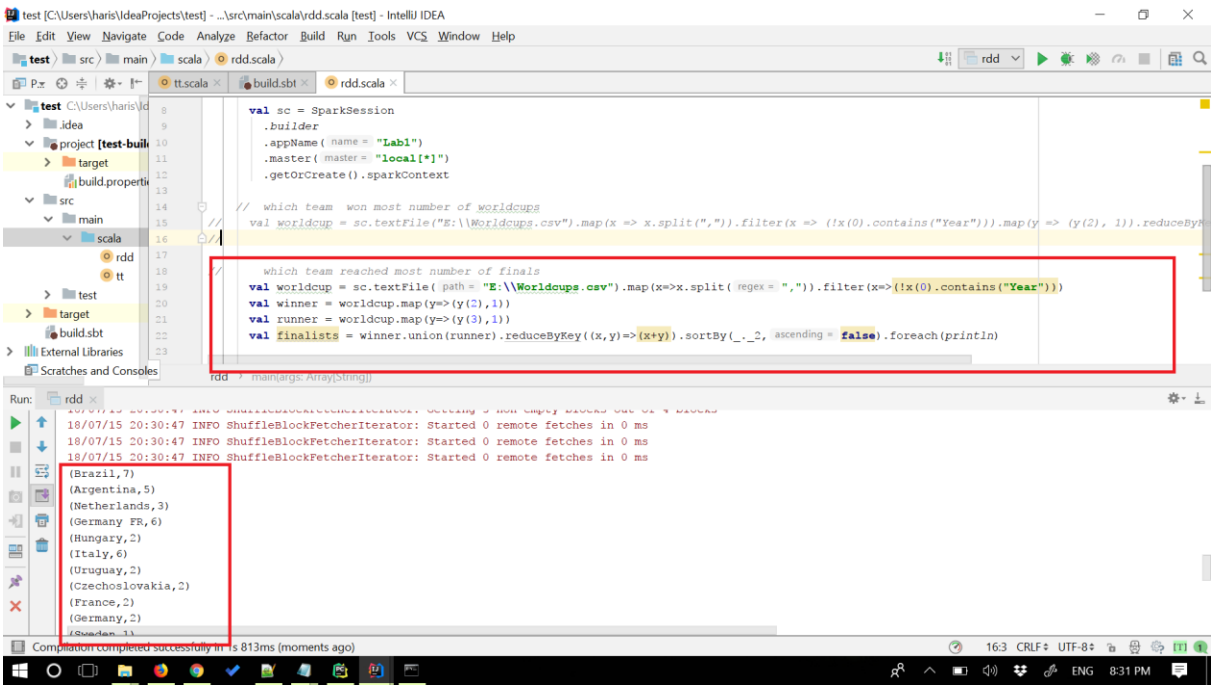
2) Team that reached most number of finals.

Query: val worldcup = sc.textFile("E:\Worldcups.csv").map(x=>x.split(",")).filter(x=>(!x(0).contains("Year"))) val winner = worldcup.map(y=>(y(2),1)) val runner = worldcup.map(y=>(y(3),1)) val finalists = winner.union(runner).reduceByKey((x,y)=>(x+y)).sortBy(_._2,false).foreach(println)



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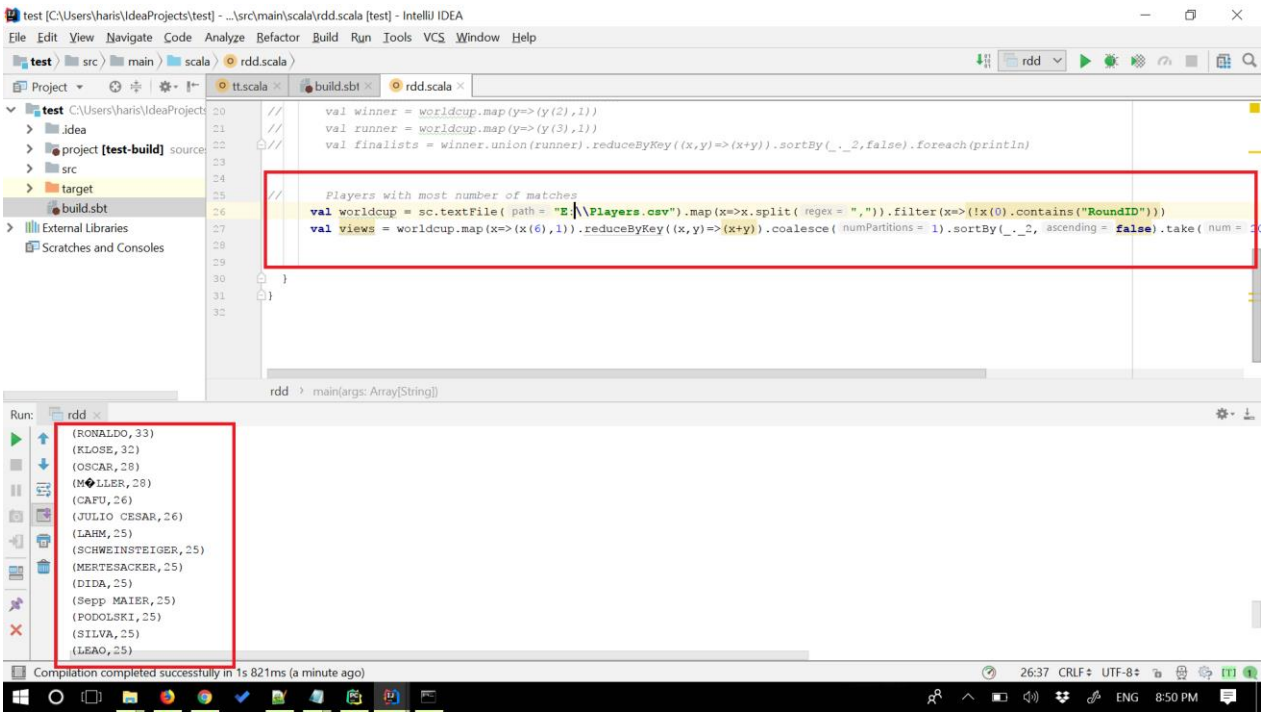
3)Players with most number of matches

Query: val worldcup = sc.textFile("E:\Players.csv").map(x=>x.split(",")).filter(x=>(!x(0).contains("RoundID"))) val views = worldcup.map(x=>(x(6),1)).reduceByKey((x,y)=>(x+y)).coalesce(1).sortBy(_._2,false).take(20).foreach(println)



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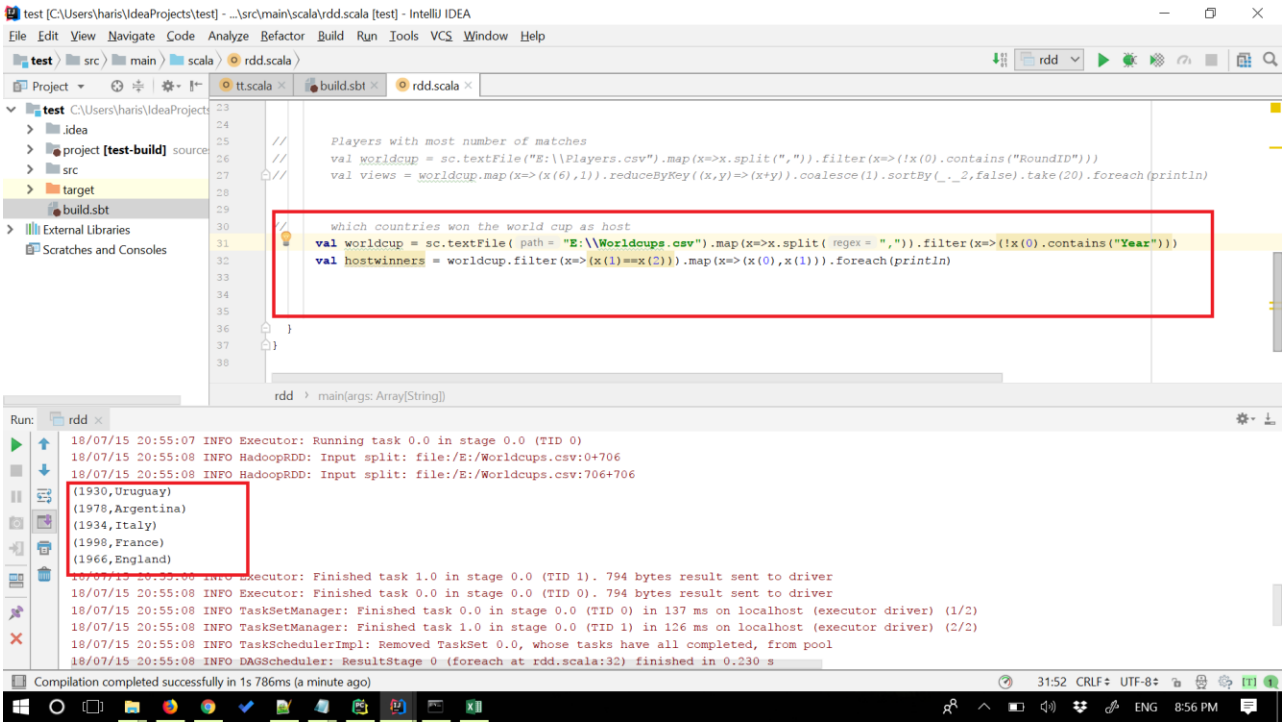
4) Countries which won Worldcup as hosting countries

Query: val worldcup = sc.textFile("E:\Worldcups.csv").map(x=>x.split(",")).filter(x=>(!x(0).contains("Year"))) val hostwinners = worldcup.filter(x=>(x(1)==x(2))).map(x=>(x(0),x(1))).foreach(println)



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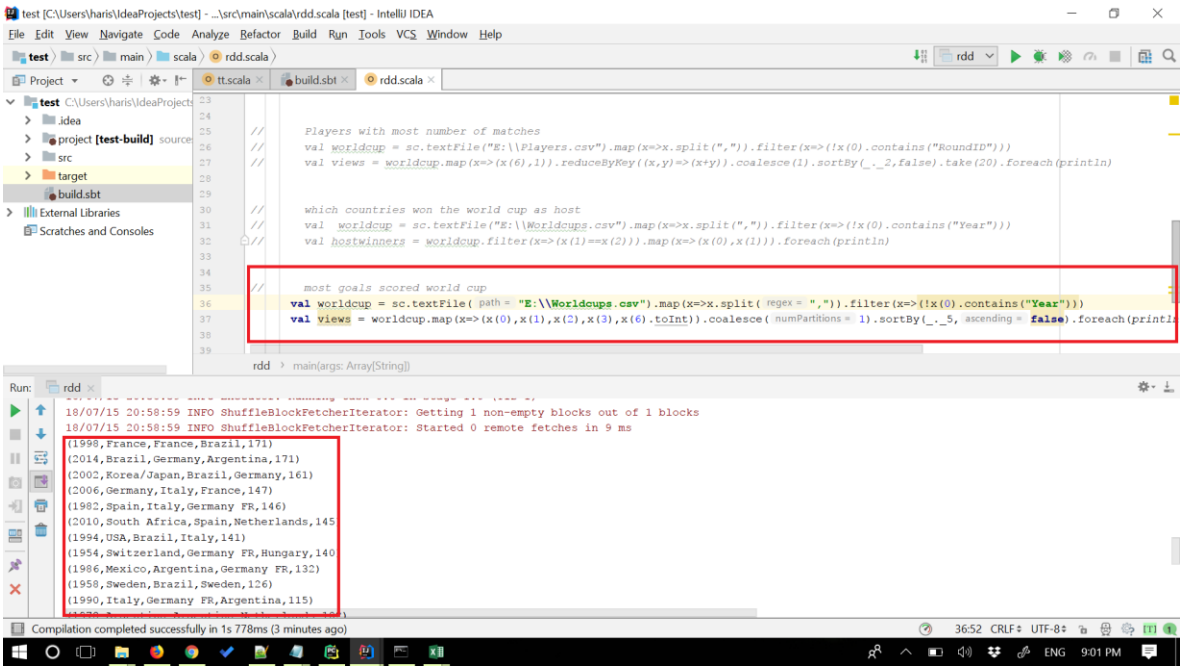
5) Most goals scored in a worldcup

Query: val worldcup = sc.textFile("E:\Worldcups.csv").map(x=>x.split(",")).filter(x=>(!x(0).contains("Year"))) val views = worldcup.map(x=>(x(0),x(1),x(2),x(3),x(6).toInt)).coalesce(1).sortBy(_._5,false).foreach(print ln)



References:

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3. https://www.tutorialspoint.com/spark_sql/spark_sql_dataframes.htm
4. http://spark.apache.org/docs/latest/sql-programming-guide.html