Assignment19:

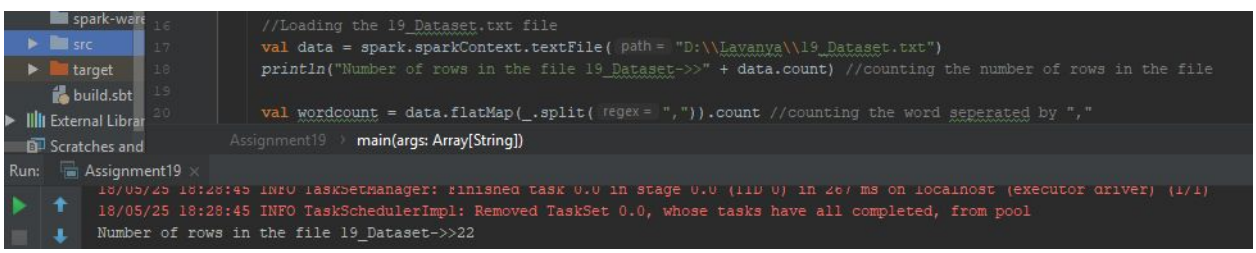
Task 1 :

1.Write a program to read a text file and print the number of rows of data in the document.

Query used:

```
//Loading the 19_Dataset.txt file
val data = spark.sparkContext.textFile("D:\\Lavanya\\19_Dataset.txt")
println("Number of rows in the file 19_Dataset->>" + data.count) //counting the number of rows in the file
```

Output:

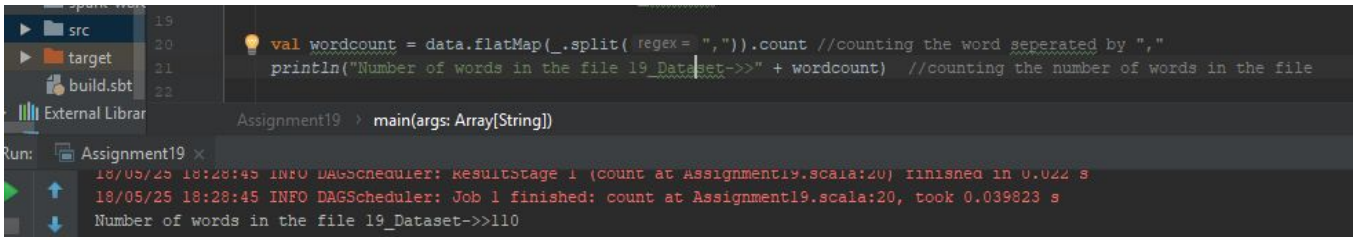


2. Write a program to read a text file and print the number of words in the document.

Query used:

```
val wordcount = data.flatMap(_.split(",")).count //counting the word seperated by ","
println("Number of words in the file 19_Dataset->>" + wordcount)  //counting the number of words in the file
```

Output:

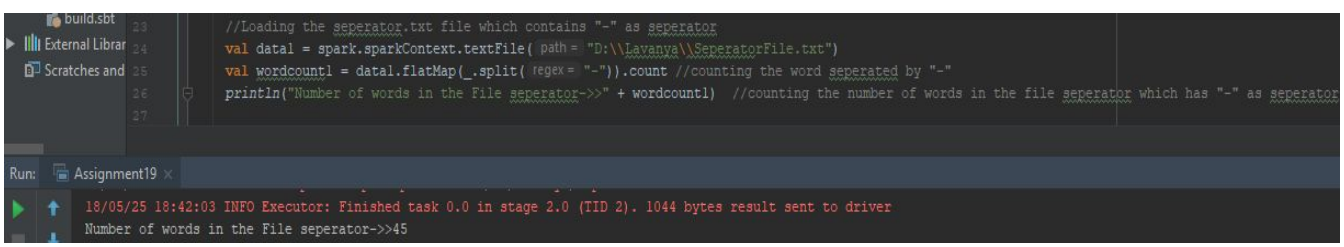


3. We have a document where the word separator is -, instead of space. Write a spark code, to obtain the count of the total number of words present in the document.

Query used:

```
//Loading the seperator.txt file which contains "-" as seperator
val data1 = spark.sparkContext.textFile("D:\\Lavanya\\SeperatorFile.txt")
val wordcount1 = data1.flatMap(_.split(",")).count //counting the word seperated by
"_"
println("Number of words in the File seperator->>" + wordcount1)  //counting the
number of words in the file seperator which has "-" as seperator.
```

Output:



Task 2:

Problem Statement 1:

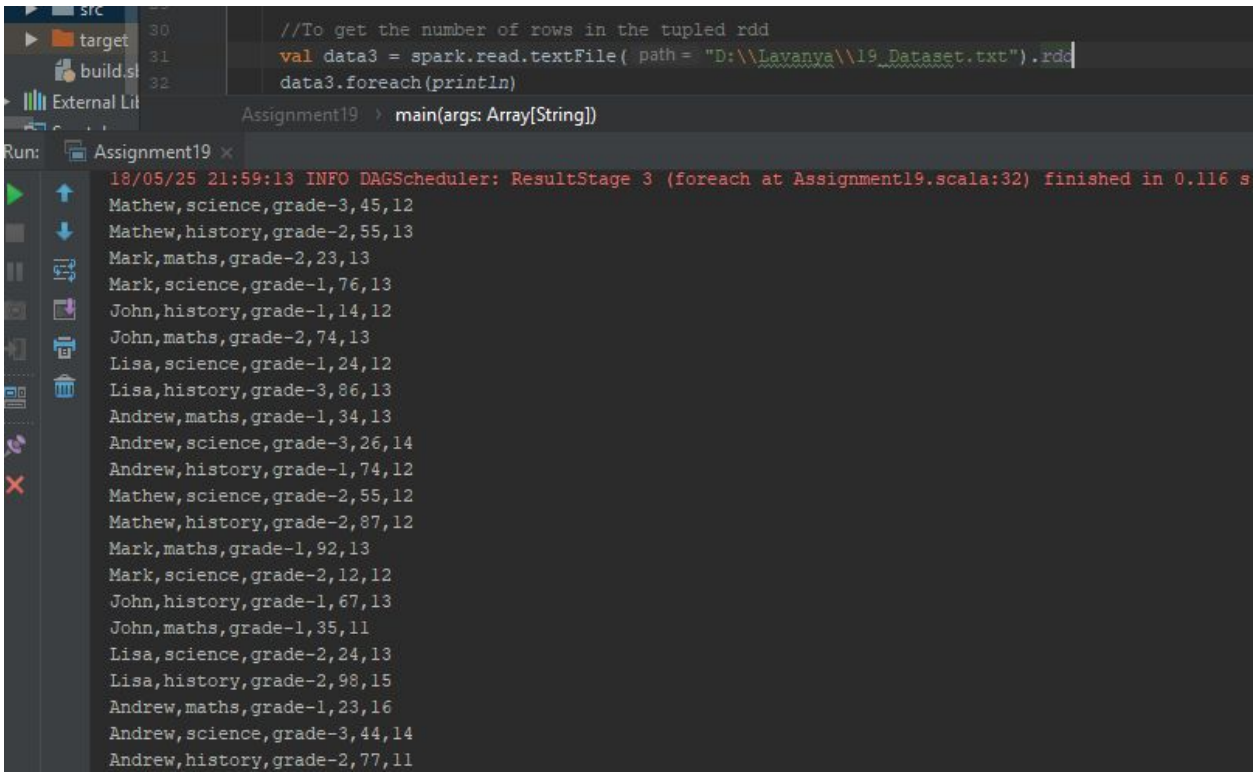
----

1. Read the text file, and create a tupled rdd.

Query used:

```
//To get the number of rows in the tupled rdd
val data3 = spark.read.textFile("D:\\Lavanya\\19_Dataset.txt").rdd
data3.foreach(println)
```

Output:



2. Find the count of total number of rows present.

Query used:

```
//To get the number of rows in the tupled rdd
val data3 = spark.read.textFile("D:\\Lavanya\\19_Dataset.txt").rdd
data3.foreach(println)
println("The number of rows in the rdd tuple data3 is " + data3.count())
```

Output:

```
//To get the number of rows in the tupled rdd
val data3 = spark.read.textFile( path = "D:\\Lavanya\\19_Dataset.txt").rdd
data3.foreach(println)
println("The number of rows in the rdd tuple data3 is " + data3.count())
```

```
Assignment19 > main(args: Array[String])
Run: Assignment19
18/05/25 21:59:14 INFO DAGScheduler: Job 4 finished: count at Assignment19.scala:33, took 0.029276 s
The number of rows in the rdd tuple data3 is 22
```

```
val data4 = data3.map(x=>x.split( regex = ",")).map(x => Students_cls(x(0),x(1),x(2),x(3).toInt,x(4).toInt)).toDF()
data4.show()
data4.registerTempTable( tableName = "StudentsMark") //Registering as temporary table HVAC.
println("Dataframe Registered as table !")
```

```
Assignment19 > main(args: Array[String])
Run: Assignment19
+-------+-------+-------+----+---+
|   name|Subject|  grade|mark| Id|
+-------+-------+-------+----+---+
|Mathew|science|grade-3|  45| 12|
| Mathew|history|grade-2|  55| 13|
|   Mark|  maths|grade-2|  23| 13|
|   Mark|science|grade-1|  76| 13|
|   John|history|grade-1|  14| 12|
|   John|  maths|grade-2|  74| 13|
|   Lisa|science|grade-1|  24| 12|
|   Lisa|history|grade-3|  86| 13|
| Andrew|  maths|grade-1|  34| 13|
| Andrew|science|grade-3|  26| 14|
| Andrew|history|grade-1|  74| 12|
| Mathew|science|grade-2|  55| 12|
| Mathew|history|grade-2|  87| 12|
|   Mark|  maths|grade-1|  92| 13|
|   Mark|science|grade-2|  12| 12|
|   John|history|grade-1|  67| 13|
|   John|  maths|grade-1|  35| 11|
|   Lisa|science|grade-2|  24| 13|
|   Lisa|history|grade-2|  98| 15|
| Andrew|  maths|grade-1|  23| 16|
```

3. What is the distinct number of subjects present in the entire school

Query used:

```
//To get the number of Distinct Subjects
val DistinctSubject = spark.sql("select distinct(Subject) from StudentsMark").count()
println("The number of Distinct Subjects are :" +  DistinctSubject)
```

Output:

```
//To get the number of Distinct Subjects
val DistinctSubject = spark.sql( sqlText = "select distinct(Subject) from StudentsMark").count()
println("The number of Distinct Subjects are :" +  DistinctSubject)
```

```
18/05/25 21:48:43 INFO CodeGenerator: Code generated in 9.392921 ms
The number of Distinct Subjects are :3
```

4. What is the count of the number of students in the school, whose name is Mathew and marks is 55

Query used:

```
//To count the number of students having name as mathew and mark as 55
val StudCount = spark.sql("select * from StudentsMark where name = 'Mathew' and mark = 55").count()
println("The count of number of students having name as mathew and mark as 55 :" + StudCount)
```

Output:

```
//To count the number of students having name as mathew and mark as 55
val StudCount = spark.sql( sqlText = "select * from StudentsMark where name = 'Mathew' and mark = 55").count()
println("The count of number of students having name as mathew and mark as 55 :" +  StudCount)
```

```
18/05/25 21:48:43 INFO TaskSetManager: Starting task 0.0 in stage 8.0 (TID 207, localhost, executor driver, partition 0, ANY, 5885 bytes)
The count of number of students having name as mathew and mark as 55 :2
```

Problem Statement 2:

----

1. What is the count of students per grade in the school?

Query used:

```
//To count of students per grade in the school
val AvgCountpergrade = spark.sql(sqlText= "select count(name), grade from StudentsMark group by grade")
AvgCountpergrade.show()
```

Output:

```
//To count of students per grade in the school
val AvgCountpergrade = spark.sql(sqlText= "select count(name), grade from StudentsMark group by grade")
AvgCountpergrade.show()
```

```
18/05/25 22:38:56 INFO DAGScheduler: Job 12 finished: show at Assignment19.scala:52, took 0.467438 s
+-----------+-------+
|count(name)|  grade|
+-----------+-------+
|          4|grade-3|
|          9|grade-1|
|          9|grade-2|
+-----------+-------+
```

2. Find the average of each student (Note - Mathew is grade-1, is different from Mathew in some other grade!)

Query used:

```
//To count of students per grade in the school
val AvgStudentsgrade = spark.sql(sqlText= "select name,avg(mark), grade from StudentsMark group by grade, name")
AvgStudentsgrade.show()
```

Output:

```
//To get the average of each students per grade in the school
val AvgStudentsgrade = spark.sql(sqlText= "select name,avg(mark), grade from StudentsMark group by grade, name")
AvgStudentsgrade.show()
```

```
+-------+------------------+-------+
|   name|         avg(mark)|  grade|
+-------+------------------+-------+
| Andrew|              35.0|grade-3|
|   John|38.666666666666664|grade-1|
|   Lisa|              24.0|grade-1|
|   Lisa|              86.0|grade-3|
|   Lisa|              61.0|grade-2|
|Mathew|               45.0|grade-3|
|   John|              74.0|grade-2|
|   Mark|              84.0|grade-1|
| Andrew|43.666666666666664|grade-1|
| Andrew|              77.0|grade-2|
| Mathew| 65.66666666666667|grade-2|
|   Mark|              17.5|grade-2|
+-------+------------------+-------+
```

3. What is the average score of students in each subject across all grades?

Query used:

```
//To get average score of students in each subject across all grades
val AvgScoreperSubject = spark.sql(sqlText= "select name,avg(mark), subject from
StudentsMark group by subject, name")
AvgScoreperSubject.show()
```

Output:

```
//To get average score of students in each subject across all grades
 val AvgScoreperSubject = spark.sql(sqlText= "select name,avg(mark), subject from StudentsMark group by subject, name")
 AvgScoreperSubject.show()
Assignment19 > main(args: Array[String])
Assignment19
18/05/26 18:10:07 INFO DAGScheduler: ResultStage 40 (show at Assignment19.scala:60) finished in 0.373 s
18/05/26 18:10:07 INFO DAGScheduler: Job 22 finished: show at Assignment19.scala:60, took 0.379625 s
+-------+---------+-------+
|   name|avg(mark)|subject|
+-------+---------+-------+
| Mathew|     71.0|history|
|Mathew|     45.0|science|
| Mathew|     55.0|science|
|   Lisa|     24.0|science|
|   Mark|     44.0|science|
|   Lisa|     92.0|history|
|   Mark|     57.5|  maths|
|   John|     40.5|history|
| Andrew|     35.0|science|
| Andrew|     75.5|history|
| Andrew|     28.5|  maths|
|   John|     54.5|  maths|
+-------+---------+-------+
```

4. What is the average score of students in each subject per grade?

Query used:

```
//To get What is the average score of students in each subject per grade?
val AvgScoreinSubjectpergrade = spark.sql(sqlText= "select name,avg(mark),subject,
grade from StudentsMark group by grade, subject, name")
AvgScoreinSubjectpergrade.show()
```

Output:

```
//To get What is the average score of students in each subject per grade?
val AvgScoreinSubjectpergrade = spark.sql(sqlText= "select name,avg(mark),subject, grade from StudentsMark group by subject, name, grade")
AvgScoreinSubjectpergrade.show()
```

```
18/05/26 18:24:13 INFO SparkContext: Invoking stop() from shutdown hook
+-------+---------+-------+-------+
|   name|avg(mark)|subject|  grade|
+-------+---------+-------+-------+
|Mathew|     45.0|science|grade-3|
|   John|     74.0|  maths|grade-2|
|   Mark|     23.0|  maths|grade-2|
|   Lisa|     24.0|science|grade-2|
| Andrew|     35.0|science|grade-3|
| Mathew|     71.0|history|grade-2|
|   Lisa|     86.0|history|grade-3|
| Andrew|     28.5|  maths|grade-1|
|   Mark|     12.0|science|grade-2|
|   John|     40.5|history|grade-1|
|   Mark|     92.0|  maths|grade-1|
| Andrew|     74.0|history|grade-1|
| Andrew|     77.0|history|grade-2|
| Mathew|     55.0|science|grade-2|
|   John|     35.0|  maths|grade-1|
|   Lisa|     98.0|history|grade-2|
|   Lisa|     24.0|science|grade-1|
|   Mark|     76.0|science|grade-1|
+-------+---------+-------+-------+
```

5. For all students in grade-2, how many have average score greater than 50?

Query used:

```
//To get how many have average score greater than 50 in grade-2?
val AvgScoregreaterthan50 = spark.sql(sqlText= "select name ,avg(mark), grade from StudentsMark group by name, grade having grade = 'grade-2' and avg(mark) > 50 ")
AvgScoregreaterthan50.show()
```

Output:

```
//To get how many have average score greater than 50 in grade-2?
val AvgScoregreaterthan50 = spark.sql(sqlText= "select name ,avg(mark), grade from StudentsMark group by name, grade having grade = 'grade-2' and
AvgScoregreaterthan50.show()
```

```
+------+-----------------+-------+
| name|        avg(mark)|  grade|
+------+-----------------+-------+
| John|             74.0|grade-2|
| Lisa|             61.0|grade-2|
|Mathew|65.66666666666667|grade-2|
|Andrew|             77.0|grade-2|
+------+-----------------+-------+
```

Problem Statement 3:

Are there any students in the college that satisfy the below criteria:

1. Average score per student_name across all grades is same as average score per student_name per grade Hint - Use Intersection Property

Query used:

```
//  1. Average score per student_name across all grades is same as average score per student_name per grade Hint - Use Intersection Property */
   //To get the average of each students across grades
   val AvgStudentspergrade = spark.sql(sqlText= "select name ,avg(mark) from StudentsMark group by name")
   AvgStudentspergrade.show()
   val droppedAvgStudentsgrade =  AvgStudentsgrade.drop("grade")
   val finalunion = AvgStudentspergrade.intersect(droppedAvgStudentsgrade).count()
   println("Number of students who satisfy the given criteria: " + finalunion)
```

Output: