Tech Module Exercises: 0 / 45

Scala and Spark

* Mini Projects

|  |  |  |
| --- | --- | --- |
| S.No. | Mini-project Description | Topics Covered |
| 1 | SCALA | Scala Problem Statement |
| 2 | SPARK | Spark movielens analysis |

* + In this TECH Module, you are expected to complete the below Mini-Project(s)
* Topics to Learn

To complete the above project, you will need to lean the below technical topics-

* + **SCALA - Introduction**

Learning Material for **SCALA - Introduction**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Overview | <https://www.tutorialspoint.com/scala/scala_overview.htm> | Web | Mandatory |
| 2. | Overview | <https://www.youtube.com/watch?v=LQVDJtfpQU0&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3> | Video | Suggestive |
| 3. | Environment Setup | <https://www.tutorialspoint.com/scala/scala_environment_setup.htm> | Web | Mandatory |
| 4. | Environment Setup | <https://www.youtube.com/watch?v=GD4qyXACuTc&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=2> | Video | Suggestive |
| 5. | Environment Setup | <https://www.youtube.com/watch?v=haMI6uoMKs0&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=3> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA - Introduction**
      * No Hands-on Assignments for this topic
  + **SCALA - Basics**

Learning Material for **SCALA - Basics**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Basic Syntax | <https://www.tutorialspoint.com/scala/scala_basic_syntax.htm> | Web | Mandatory |
| 2. | Data Types | <https://www.tutorialspoint.com/scala/scala_data_types.htm> | Web | Mandatory |
| 3. | Variables | <https://www.tutorialspoint.com/scala/scala_variables.htm> | Web | Mandatory |
| 4. | Data Types and Variables | <https://www.youtube.com/watch?v=6xRsw_6fc18&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=6> | Video | Suggestive |
| 5. | Operator | <https://www.tutorialspoint.com/scala/scala_operators.htm> | Web | Mandatory |
| 6. | Operator | <https://www.youtube.com/watch?v=W7hGNqm_juo> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA - Basics**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to display Hello World. | SCALA - Basics |  |
| 2. | Write a program to declare two variables with integer values and display the addition results | SCALA - Basics |  |

* + **SCALA – Classes and Objects**

Learning Material for **SCALA – Classes and Objects**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Classes & Objects | <https://www.tutorialspoint.com/scala/scala_classes_objects.htm> | Web | Mandatory |
| 2. | Access Modifiers | <https://www.tutorialspoint.com/scala/scala_access_modifiers.htm> | Web | Mandatory |
| 3. | Scala Classes | <https://www.youtube.com/watch?v=xzxke78PNHw&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=29> | Video | Suggestive |
| 4. | Auxiliary constructors | <https://www.youtube.com/watch?v=BXX7cEmZHi0&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=30> | Video | Suggestive |
| 5. | Class inheritance | <https://www.youtube.com/watch?v=zKj5wd4esjU&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=31> | Video | Suggestive |
| 6. | Scala Abstract Class | <https://www.youtube.com/watch?v=ONmBOPgTKYw&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=32> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Classes and Objects**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create Class called Circle by defining an attribute R used to define radius.  Define two functions named calculate\_area and display  Create an object to call these two function and display the area of the circle. | SCALA - Classes and Objects |  |
| 2. | Define Private function called spin() in the above class and try to call the functions inside the class and outside the class and observe the output. | SCALA - Classes and Objects |  |
| 3. | Define Protected function called spinwell() in the above class and try to call the functions inside the class and outside the class and observe the output. | SCALA - Classes and Objects |  |
| 4. | Define Public function called spinfine() in the above class and try to call the functions inside the class and outside the class and observe the output. | SCALA - Classes and Objects |  |
| 5. | Define a class called Line as a child class to the circle class that you have created above and try to call all the three functions and observe the output. | SCALA - Classes and Objects |  |

* + **SCALA – if and Loops**

Learning Material for **SCALA – if and Loops**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | IF ELSE | <https://www.tutorialspoint.com/scala/scala_if_else.htm> | Web | Mandatory |
| 2. | IF ELSE | <https://www.youtube.com/watch?v=JYDhVgKfauk&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=10> | Video | Suggestive |
| 3. | Loop Statements | <https://www.tutorialspoint.com/scala/scala_loop_types.htm> | Web | Mandatory |
| 4. | Loop Statements | <https://www.youtube.com/watch?v=LzL9EPrwGZA&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=11> | Video | Suggestive |
| 5. | Loop Statements | <https://www.youtube.com/watch?v=flfARstLqmc&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=12> | Video | Suggestive |
| 6. | Match expressions | <https://www.youtube.com/watch?v=GuGRsmuczWU&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=13> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – if and Loops**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to accept 4 numbers in 4 different variables and display the maximum and minimum value. | SCALA - If and Loops |  |
| 2. | Write a program to display all the even numbers between 30 to 40 . | SCALA - If and Loops |  |
| 3. | Write a program to display all the numbers that are divisible by 2 and 3 between 20 to 40 | SCALA - If and Loops |  |
| 4. | Write a program to display all the prime numbers between 1 to 100. | SCALA - If and Loops |  |
| 5. | Write a program to display the reverse of all the numbers from 2 to 10. | SCALA - If and Loops |  |
| 6. | Write a program to display the square and cube of all the numbers between 1 to 10. | SCALA - If and Loops |  |

* + **SCALA – Functions**

Learning Material for **SCALA – Functions**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Functions | <https://www.tutorialspoint.com/scala/scala_functions.htm> | Web | Mandatory |
| 2. | Functions | <https://www.youtube.com/watch?v=Tadg1OVTH5E&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=15> | Video | Suggestive |
| 3. | Anonymous Functions | <https://www.youtube.com/watch?v=CHc_hzNKYOI&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=16> | Video | Suggestive |
| 4. | Higher Order Functions | <https://www.youtube.com/watch?v=ohKDVmCMKEg&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=17> | Video | Suggestive |
| 5. | Partially Applied Functions | <https://www.youtube.com/watch?v=afOjfMiicxI&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=17> | Video | Suggestive |
| 6. | Functions Currying in Scala | <https://www.youtube.com/watch?v=YEudoVTR02o&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=19> | Video | Suggestive |
| 7. | Closures | <https://www.tutorialspoint.com/scala/scala_closures.htm> | Web | Mandatory |
| 8. | Closures | <https://www.youtube.com/watch?v=Be6HXqHrU-s&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=18> | Video | Suggestive |
| 9. | Scala Lazy Evaluation | <https://www.youtube.com/watch?v=MiEa3IShVws&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=33> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Functions**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write program to display the functions like addnum,divnum, subnum,mulnum and use it to develop a calculator program. | SCALA - Functions |  |

* + **SCALA – Strings and Arrays**

Learning Material for **SCALA – Strings and Arrays**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Strings | <https://www.tutorialspoint.com/scala/scala_strings.htm> | Web | Mandatory |
| 2. | Strings | <https://www.youtube.com/watch?v=WQTbZ4vk4CY&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=20> | Video | Suggestive |
| 3. | Arrays | <https://www.tutorialspoint.com/scala/scala_arrays.htm> | Web | Mandatory |
| 4. | Arrays | <https://www.youtube.com/watch?v=Br7-ry5swIg&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=21> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Strings and Arrays**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to demonstrate the length functions of a string ?  Eg: input : “hello World” output: 11 | SCALA - Strings and Arrays |  |
| 2. | Write a program to demostrate the concat functions on string1 and string2 values :  String 1 : Welcome  String 2 : to Wipro  New String : Welcome to Wipro | SCALA - Strings and Arrays |  |
| 3. | Write a program to reverse a string . | SCALA - Strings and Arrays |  |
| 4. | Write a program to display all the vowels in a given string . | SCALA - Strings and Arrays |  |
| 5. | Write a program to declare an array of decimal number and display the sum of the numbers. | SCALA - Strings and Arrays |  |
| 6. | Write a program to declare an array of integers and display the count of numbers that are greater than the last number in the array. | SCALA - Strings and Arrays |  |

* + **SCALA – Collections**

Learning Material for **SCALA – Collections**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Collections | <https://www.tutorialspoint.com/scala/scala_collections.htm> | Web | Mandatory |
| 2. | Lists | <https://www.youtube.com/watch?v=sa32HlWC3f8&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=22> | Video | Suggestive |
| 3. | Scala Sets | <https://www.youtube.com/watch?v=l1pFcHa82L8&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=23> | Video | Suggestive |
| 4. | Scala Maps | <https://www.youtube.com/watch?v=Hq91R_QVZ04&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=24> | Video | Suggestive |
| 5. | Scala Tuples | <https://www.youtube.com/watch?v=ZQQs44OHJLc&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=26> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Collections**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to declare a list named MyList1 and find the number of vowels in the list.  MyList1 : apple, orange, mango | SCALA - Collections |  |
| 2. | Write a program to declare two list named as Fruit , Vegetable and combine their values into a new list named Eatables and display the same.  Fruit : apple,orange,mango  Vegetable: potato,tomato,onion | SCALA - Collections |  |
| 3. | Write a program to declare a map containing colors with key values starting from 10 with an increment of 10 for each key .Display the last and the 3rd key values . | SCALA - Collections |  |

* + **SCALA – Traits**

Learning Material for **SCALA – Traits**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | Traits | <https://www.tutorialspoint.com/scala/scala_traits.htm> | Web | Mandatory |
| 2 | Traits | <https://www.youtube.com/watch?v=KARUSWj8sZs&list=PLS1QulWo1RIagob5D6kMIAvu7DQC5VTh3&index=34> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Traits**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Define a trait with two methods called minval and maxval . Extend the trait to class which has list of values and implement the functions to get the minimum and maximum of the list . | SCALA - Traits |  |

* + **SCALA – Pattern Matching and Regular Expressions**

Learning Material for **SCALA – Pattern Matching and Regular Expressions**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | Pattern Matching | <https://www.tutorialspoint.com/scala/scala_pattern_matching.htm> | Web | Mandatory |
| 2 | Pattern Matching | <https://www.youtube.com/watch?v=ULcpWn23waw> | Video | Suggestive |
| 3. | Regular Expressions | <https://www.tutorialspoint.com/scala/scala_regular_expressions.htm> | Web | Mandatory |
| 4. | Regular Expressions | <https://www.youtube.com/watch?v=ivhO2ooKAnE> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Pattern Matching and Regular Expressions**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to declare a string and use a regular expression to find the first occurrence of capital “A” in the string . | SCALA - Pattern Matching and Regular Expressions |  |

* + **SCALA – Exceptions Handling**

Learning Material for **SCALA – Exceptions Handling**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | Exception Handling | <https://www.tutorialspoint.com/scala/scala_exception_handling.htm> | Web | Mandatory |
| 2 | Exception Handling | <https://www.youtube.com/watch?v=WciuN2zdArI> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Exceptions Handling**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to declare two numbers and divide them . When the 2nd number is 0 it should throw an exception. Use try to manage the exceptions and display a string called “the end “ in either case. | SCALA - Exceptions Handling |  |

* + **SCALA – Extractors**

Learning Material for **SCALA – Extractors**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | Extractors | <https://www.tutorialspoint.com/scala/scala_extractors.htm> | Web | Mandatory |
| 2 | Extractors | <https://www.youtube.com/watch?v=Ke5FrznZ3ic> | Video | Suggestive |

* + - Hands-on Assignments for **SCALA – Extractors**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to display the outputs of apply and unapply functions on two strings . | SCALA - Extractors |  |

* + **SCALA – Files I/O**

Learning Material for **SCALA – Files I/O**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Files I/O | <https://www.tutorialspoint.com/scala/scala_file_io.htm> | Web | Mandatory |

* + - Hands-on Assignments for **SCALA – Files I/O**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Write a program to read all the numbers from text file as below and display the sum of all numbers .  Input.txt:  hi the first number is 300 and second is 200 and the last number is 500  Expected output:  1000 | SCALA - Files I/O |  |
| 2. | Write a program to write the above result into a separate file called “output.txt” . | SCALA - Files I/O |  |

* + **SPARK – Introduction and installation**

Learning Material for **SPARK – Introduction and installation**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1. | Introduction | <https://www.tutorialspoint.com/apache_spark/index.htm> | Web | Mandatory |
| 2. | Introduction | <https://www.tutorialspoint.com/apache_spark/apache_spark_introduction.htm> | Web | Mandatory |
| 3. | Spark Overview | <https://www.youtube.com/watch?v=oD-NrBfKSpc&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=20> | Video | Suggestive |
| 4. | History of Apache Spark | <https://www.youtube.com/watch?v=CkO2LX1STtU&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=21> | Video | Suggestive |
| 5. | Spark Ecosystem | <https://www.youtube.com/watch?v=_ZwdXyX0PeU&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=22> | Video | Suggestive |
| 6. | Features of Apache Spark | <https://www.youtube.com/watch?v=DnLWXBunZzY&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=23> | Video | Suggestive |
| 7. | Limitations of Apache Spark | <https://www.youtube.com/watch?v=f3DmJUNeV0o&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=24> | Video | Suggestive |
| 8. | Installation | <https://www.tutorialspoint.com/apache_spark/apache_spark_installation.htm> | Web | Mandatory |

* + - Hands-on Assignments for **SPARK – Introduction and installation**
      * No Hands-on Assignments for this topic
  + **SPARK – RDD Introduction**

Learning Material for **SPARK – RDD Introduction**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | RDD | <https://www.tutorialspoint.com/apache_spark/apache_spark_rdd.htm> | Web | Mandatory |
| 2 | Spark RDD Introduction | <https://www.youtube.com/watch?v=6SetdPtoUZc&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=26> | Video | Suggestive |
| 3 | RDD in Spark | <https://www.youtube.com/watch?v=UFX-Kxn1XZ8&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=27> | Video | Suggestive |
| 4 | Features of RDDS | <https://www.youtube.com/watch?v=W2kC7NKXPw0&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=28> | Video | Suggestive |
| 5 | RDD Operation Transformations | <https://www.youtube.com/watch?v=q2LD25CtmaY&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=29> | Video | Suggestive |

* + - Hands-on Assignments for **SPARK – RDD Introduction**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Create a file as realestate.txt and save in the directory  Property ID|Location|Price|Bedrooms|  Bathrooms|Size|Price SQ Ft|Status  1461262|Arroyo Grande|795000|3|3|2371|365.3|  Short Sale  1478004|Paulo Pablo|399000|4|3|2818|163.59|  Short Sale  1486551|Paulo Pablo|545000|4|3|3032|179.75|  Short Sale  1492832|Santa Bay|909000|4|4|3540|286.78|  Short Sale  1499102|Thomas County|109900|3|1|1249|98.99|  Short Sale  1500741|La Oceana|324900|3|3|1800|180.5|  Short Sale  1507396|Thomas County|192900|4|2|1603|120.34  |Short Sale | SPARK - RDD Introduction |  |
| 2. | Create a RDD from the above file . | SPARK - RDD Introduction |  |

* + **SPARK – Core Programming**

Learning Material for **SPARK – Core Programming**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | Core Programming | <https://www.tutorialspoint.com/apache_spark/apache_spark_core_programming.htm> | Web | Mandatory |
| 2 | Spark Core Programming Introduction | <https://www.youtube.com/watch?v=k_fgc4NUSPs&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=32> | Video | Suggestive |
| 3 | Spark Commands | <https://www.youtube.com/watch?v=7E-HcjkhSRI&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=33> | Video | Suggestive |
| 4 | Spark Transformation Functions | <https://www.youtube.com/watch?v=aMFYQkppuCE&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=34> | Video | Suggestive |
| 5 | Spark Action Functions | <https://www.youtube.com/watch?v=Iq6ZVaNc3zo&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=35> | Video | Suggestive |
| 6 | Spark Wordcount Example | <https://www.youtube.com/watch?v=rLExYqYKDl0&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=36> | Video | Suggestive |
| 7 | Deployment | <https://www.tutorialspoint.com/apache_spark/apache_spark_deployment.htm> | Web | Mandatory |

* + - Hands-on Assignments for **SPARK – Core Programming**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Open spark in scala mode and create RDD called numsrdd from a list 10,20,20,30 | SPARK - Core Programming |  |
| 2. | Apply map functions to increase all the data by 10 and use collect to get the result from the RDD numsrdd that is created | SPARK - Core Programming |  |
| 3. | From the RDD numsrdd use the filter to display the numbers which are greater then 20 | SPARK - Core Programming |  |
| 4. | Use the RDD numsrdd to count the number of elements | SPARK - Core Programming |  |
| 5. | Use the RDD numsrdd and get the distinct values using distinct() | SPARK - Core Programming |  |
| 6. | Create RDD called dataset ((“C”,3),(“A”,1),(“B”,4),(“A”,2),(“B”,5)) and apply group by key and display the result | SPARK - Core Programming |  |
| 7. | Use the reduceBy Key on the RDD dataset and display the output | SPARK - Core Programming |  |

* + **SPARK – SQL**

Learning Material for **SPARK – SQL**

Below is the learning material that you are expected to read along with completion of the hands-on assignments. The material is mentioned is the order in which it should be read.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Material Title | Material Location | Type of Material | Classification |
| 1 | Spark SQL Introduction | <https://www.youtube.com/watch?v=S6jtHLr6UNs&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=37> | Video | Suggestive |
| 2 | Spark SQL Overview | <https://www.youtube.com/watch?v=3-jtd9JGxmY&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=38> | Video | Suggestive |
| 3 | Spark DataFrames & Datasets | <https://www.youtube.com/watch?v=dENdrON2mzk&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=39> | Video | Suggestive |
| 4 | Spark SQL Advantages & Disadvantages | <https://www.youtube.com/watch?v=74Jhh2wgOjE&list=PLWPirh4EWFpGkGRCRPiZWRfeYoVDpmvRv&index=40> | Video | Suggestive |

* + - Hands-on Assignments for **SPARK – SQL**

Complete the below hands-on assignments before proceeding with the next Topic

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hands-on Assignment | Topic Covered | Status |
| 1. | Consider the following json file as datasource.  {”id” : “101”, “ename” : “Ram”, “age” : “29”}  {”id” : “102”, “ename” : “Sai”, “age” : “30”}  {”id” : “103”, “ename” : “joe”, “age” : “32”}  {”id” : “104”, “ename” : “sirish”, “age” : “30”}  {”id” : “105”, “ename” : “shekhar”, “age” : “32”} | SPARK - SQL |  |
| 2. | Using the above file display file data using data frame. | SPARK - SQL |  |
| 3. | Display the structure of data frame . | SPARK - SQL |  |
| 4. | Display only enames from the given file using select. | SPARK - SQL |  |
| 5. | Provide the count of each age. | SPARK - SQL |  |
| 6. | Provide all records in sorted order | SPARK - SQL |  |
| 7. | Display records of persons whose age <=30. | SPARK - SQL |  |

* Learning Outcomes

Upon completion of this TECH Module, you should be able to:

* + Scala Programming skills
  + What is Scala
  + Where to use the Scala
  + Scala Functions
  + Scala Traits
  + Scala Collections
  + Scala Access Modifiers
  + Scala Tuple
  + What is Resilient Distributed Datasets
  + Difference between Map Reduce and Spark
  + Data sharing using Spark RDD
  + Iterative Operations on Spark RDD
  + Installing and working in Spark
  + RDD transformations and functions
  + Programming with RDD
* Sample Questions

After gaining knowledge of the above module, below are the possible interview questions that you should be able to confidently answer.

|  |  |
| --- | --- |
| No. | Questions |
| 1 | What is a Scala Map? |
| 2 | What is the advantage of using Scala over other functional programming  languages? |
| 3 | What is the advantage of companion objects in Scala? |
| 4 | Which Scala library is used for functional programming? |
| 5 | What do you understand by “Unit” and “()” in Scala? |
| 6 | What is the difference between concurrency and parallelism? |
| 7 | What is a Monad in Scala? |
| 8 | Differentiate between Val and var in Scala. |
| 9 | What do you understand by a closure in Scala? |
| 10 | What is Scala Future? How it differs from java.util.concurrent.Future? |
| 11 | What’s the difference ‘Nil’, ‘Null’, ‘None’ and ’Nothing’ in Scala? |
| 12 | When do you use Scala Traits? |
| 13 | What do you understand by apply and unapply methods in Scala? |
| 14 | Compare MapReduce with Spark. |
| 15 | What is Apache Spark? |
| 16 | Explain the key features of Spark. |
| 17 | Define RDD. |
| 18 | What does a Spark Engine do? |
| 19 | Define Partitions. |
| 20 | What operations does an RDD support? |
| 21 | What do you understand by Transformations in Spark? |
| 22 | Define Actions in Spark. |
| 23 | Define the functions of Spark Core. |
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