DSC 650

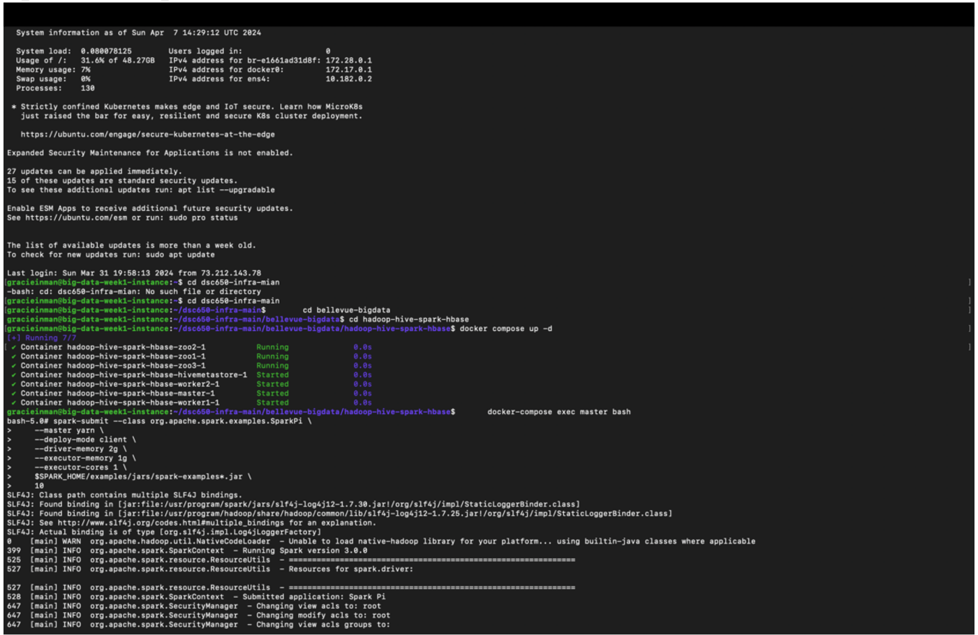
Inman, Gracie

Week 4

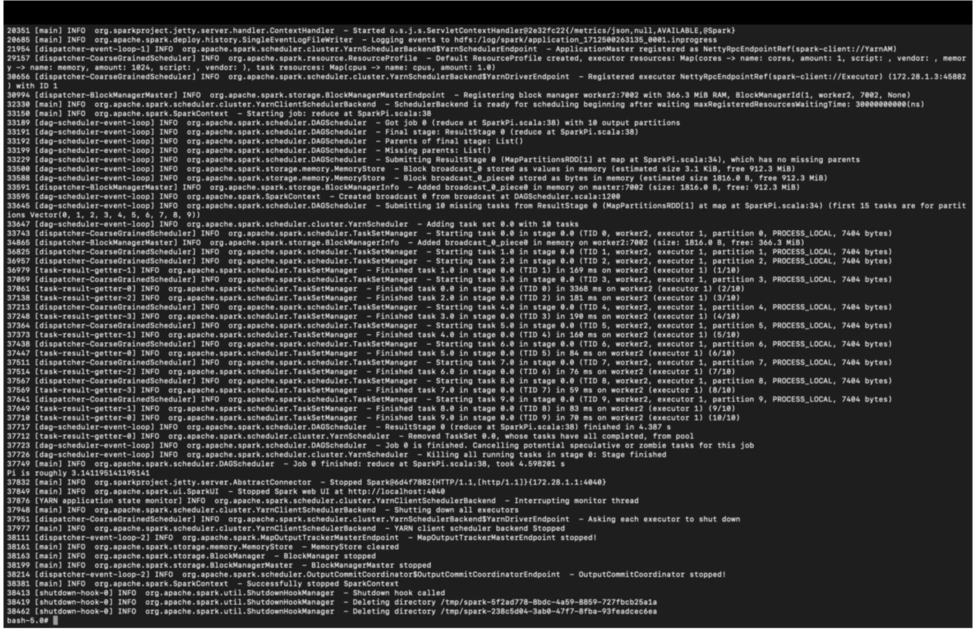
04/07/24

Apache Spark

- SparkPi Output

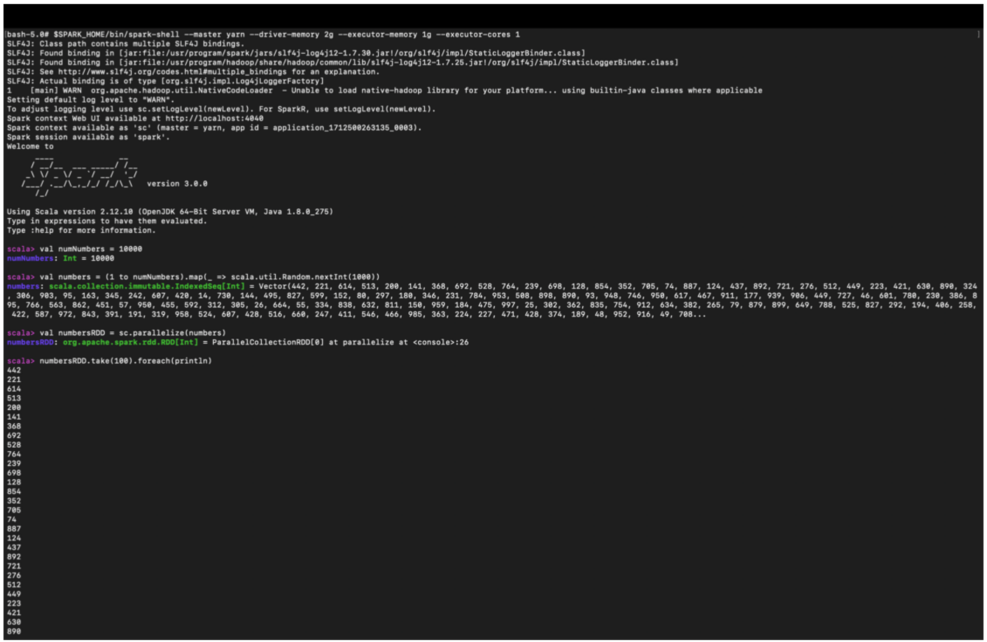


```
  System information as of Sun Apr  7 14:29:12 UTC 2024

  System load:  0.080078125       Users logged in:                0
  Usage of /:   31.6% of 48.27GB  IPv4 address for br-e1661ad31d8f: 172.28.0.1
  Memory usage: 7%                IPv4 address for docker0:         172.17.0.1
  Swap usage:   0%                IPv4 address for ens4:            10.182.0.2
  Processes:    130

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

27 updates can be applied immediately.
15 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sun Mar 31 19:58:13 2024 from 73.212.143.78
gracieinman@big-data-week1-instance:~$ cd dsc650-infra-mian
-bash: cd: dsc650-infra-mian: No such file or directory
gracieinman@big-data-week1-instance:~$ cd dsc650-infra-main
gracieinman@big-data-week1-instance:~/dsc650-infra-main$        cd bellevue-bigdata
gracieinman@big-data-week1-instance:~/dsc650-infra-main/bellevue-bigdata$ cd hadoop-hive-spark-hbase
gracieinman@big-data-week1-instance:~/dsc650-infra-main/bellevue-bigdata/hadoop-hive-spark-hbase$ docker compose up -d
[+] Running 7/7
 ✔ Container hadoop-hive-spark-hbase-zoo2-1          Running             0.0s
 ✔ Container hadoop-hive-spark-hbase-zoo1-1          Running             0.0s
 ✔ Container hadoop-hive-spark-hbase-zoo3-1          Running             0.0s
 ✔ Container hadoop-hive-spark-hbase-hivemetastore-1 Started             0.0s
 ✔ Container hadoop-hive-spark-hbase-worker2-1       Started             0.0s
 ✔ Container hadoop-hive-spark-hbase-master-1        Started             0.0s
 ✔ Container hadoop-hive-spark-hbase-worker1-1       Started             0.0s
gracieinman@big-data-week1-instance:~/dsc650-infra-main/bellevue-bigdata/hadoop-hive-spark-hbase$       docker-compose exec master bash
bash-5.0# spark-submit --class org.apache.spark.examples.SparkPi \
>     --master yarn \
>     --deploy-mode client \
>     --driver-memory 2g \
>     --executor-memory 1g \
>     --executor-cores 1 \
>     $SPARK_HOME/examples/jars/spark-examples*.jar \
>     10
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/spark/jars/slf4j-log4j12-1.7.30.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
0    [main] WARN  org.apache.hadoop.util.NativeCodeLoader  - Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
399  [main] INFO  org.apache.spark.SparkContext  - Running Spark version 3.0.0
525  [main] INFO  org.apache.spark.resource.ResourceUtils  - ==============================================================
527  [main] INFO  org.apache.spark.resource.ResourceUtils  - Resources for spark.driver:

527  [main] INFO  org.apache.spark.resource.ResourceUtils  - ==============================================================
528  [main] INFO  org.apache.spark.SparkContext  - Submitted application: Spark Pi
647  [main] INFO  org.apache.spark.SecurityManager  - Changing view acls to: root
647  [main] INFO  org.apache.spark.SecurityManager  - Changing modify acls to: root
647  [main] INFO  org.apache.spark.SecurityManager  - Changing view acls groups to:
```



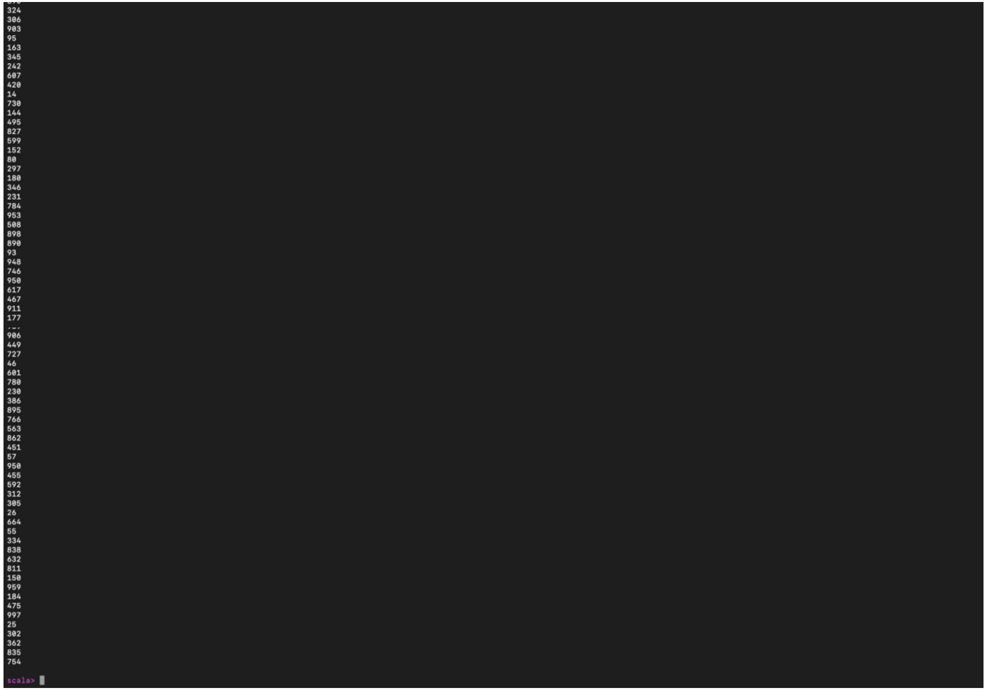
```
20351 [main] INFO  org.sparkproject.jetty.server.handler.ContextHandler  - Started o.s.j.s.ServletContextHandler@2e32fc22{/metrics/json,null,AVAILABLE,@Spark}
20685 [main] INFO  org.apache.spark.deploy.history.SingleEventLogFileWriter  - Logging events to hdfs:/log/spark/application_1712500263135_0001.inprogress
21954 [dispatcher-event-loop-1] INFO  org.apache.spark.scheduler.cluster.YarnSchedulerBackend$YarnSchedulerEndpoint  - ApplicationMaster registered as NettyRpcEndpointRef(spark-client://YarnAM)
29157 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.resource.ResourceProfile  - Default ResourceProfile created, executor resources: Map(cores -> name: cores, amount: 1, script: , vendor: , memor
y -> name: memory, amount: 1024, script: , vendor: ), task resources: Map(cpus -> name: cpus, amount: 1.0)
30656 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.cluster.YarnSchedulerBackend$YarnDriverEndpoint  - Registered executor NettyRpcEndpointRef(spark-client://Executor) (172.28.1.3:45882
) with ID 1
30994 [dispatcher-BlockManagerMaster] INFO  org.apache.spark.storage.BlockManagerMasterEndpoint  - Registering block manager worker2:7002 with 366.3 MiB RAM, BlockManagerId(1, worker2, 7002, None)
32330 [main] INFO  org.apache.spark.scheduler.cluster.YarnClientSchedulerBackend  - SchedulerBackend is ready for scheduling beginning after waiting maxRegisteredResourcesWaitingTime: 30000000000(ns)
33150 [main] INFO  org.apache.spark.SparkContext  - Starting job: reduce at SparkPi.scala:38
33189 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Got job 0 (reduce at SparkPi.scala:38) with 10 output partitions
33191 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Final stage: ResultStage 0 (reduce at SparkPi.scala:38)
33192 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Parents of final stage: List()
33199 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Missing parents: List()
33229 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Submitting ResultStage 0 (MapPartitionsRDD[1] at map at SparkPi.scala:34), which has no missing parents
33500 [dag-scheduler-event-loop] INFO  org.apache.spark.storage.memory.MemoryStore  - Block broadcast_0 stored as values in memory (estimated size 3.1 KiB, free 912.3 MiB)
33588 [dag-scheduler-event-loop] INFO  org.apache.spark.storage.memory.MemoryStore  - Block broadcast_0_piece0 stored as bytes in memory (estimated size 1816.0 B, free 912.3 MiB)
33591 [dispatcher-BlockManagerMaster] INFO  org.apache.spark.storage.BlockManagerInfo  - Added broadcast_0_piece0 in memory on master:7002 (size: 1816.0 B, free: 912.3 MiB)
33595 [dag-scheduler-event-loop] INFO  org.apache.spark.SparkContext  - Created broadcast 0 from broadcast at DAGScheduler.scala:1200
33645 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Submitting 10 missing tasks from ResultStage 0 (MapPartitionsRDD[1] at map at SparkPi.scala:34) (first 15 tasks are for partit
ions Vector(0, 1, 2, 3, 4, 5, 6, 7, 8, 9))
33647 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.cluster.YarnScheduler  - Adding task set 0.0 with 10 tasks
33743 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 0.0 in stage 0.0 (TID 0, worker2, executor 1, partition 0, PROCESS_LOCAL, 7404 bytes)
34865 [dispatcher-BlockManagerMaster] INFO  org.apache.spark.storage.BlockManagerInfo  - Added broadcast_0_piece0 in memory on worker2:7002 (size: 1816.0 B, free: 366.3 MiB)
36825 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 1.0 in stage 0.0 (TID 1, worker2, executor 1, partition 1, PROCESS_LOCAL, 7404 bytes)
36957 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 2.0 in stage 0.0 (TID 2, worker2, executor 1, partition 2, PROCESS_LOCAL, 7404 bytes)
36979 [task-result-getter-1] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 1.0 in stage 0.0 (TID 1) in 169 ms on worker2 (executor 1) (1/10)
37059 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 3.0 in stage 0.0 (TID 3, worker2, executor 1, partition 3, PROCESS_LOCAL, 7404 bytes)
37061 [task-result-getter-0] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 0.0 in stage 0.0 (TID 0) in 3368 ms on worker2 (executor 1) (2/10)
37138 [task-result-getter-2] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 2.0 in stage 0.0 (TID 2) in 181 ms on worker2 (executor 1) (3/10)
37213 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 4.0 in stage 0.0 (TID 4, worker2, executor 1, partition 4, PROCESS_LOCAL, 7404 bytes)
37248 [task-result-getter-3] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 3.0 in stage 0.0 (TID 3) in 190 ms on worker2 (executor 1) (4/10)
37364 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 5.0 in stage 0.0 (TID 5, worker2, executor 1, partition 5, PROCESS_LOCAL, 7404 bytes)
37373 [task-result-getter-1] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 4.0 in stage 0.0 (TID 4) in 160 ms on worker2 (executor 1) (5/10)
37438 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 6.0 in stage 0.0 (TID 6, worker2, executor 1, partition 6, PROCESS_LOCAL, 7404 bytes)
37447 [task-result-getter-0] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 5.0 in stage 0.0 (TID 5) in 84 ms on worker2 (executor 1) (6/10)
37511 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 7.0 in stage 0.0 (TID 7, worker2, executor 1, partition 7, PROCESS_LOCAL, 7404 bytes)
37514 [task-result-getter-2] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 6.0 in stage 0.0 (TID 6) in 76 ms on worker2 (executor 1) (7/10)
37567 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 8.0 in stage 0.0 (TID 8, worker2, executor 1, partition 8, PROCESS_LOCAL, 7404 bytes)
37569 [task-result-getter-3] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 7.0 in stage 0.0 (TID 7) in 59 ms on worker2 (executor 1) (8/10)
37641 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.TaskSetManager  - Starting task 9.0 in stage 0.0 (TID 9, worker2, executor 1, partition 9, PROCESS_LOCAL, 7404 bytes)
37649 [task-result-getter-1] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 8.0 in stage 0.0 (TID 8) in 83 ms on worker2 (executor 1) (9/10)
37710 [task-result-getter-0] INFO  org.apache.spark.scheduler.TaskSetManager  - Finished task 9.0 in stage 0.0 (TID 9) in 70 ms on worker2 (executor 1) (10/10)
37717 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - ResultStage 0 (reduce at SparkPi.scala:38) finished in 4.387 s
37712 [task-result-getter-0] INFO  org.apache.spark.scheduler.cluster.YarnScheduler  - Removed TaskSet 0.0, whose tasks have all completed, from pool
37723 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.DAGScheduler  - Job 0 is finished. Cancelling potential speculative or zombie tasks for this job
37726 [dag-scheduler-event-loop] INFO  org.apache.spark.scheduler.cluster.YarnScheduler  - Killing all running tasks in stage 0: Stage finished
37749 [main] INFO  org.apache.spark.scheduler.DAGScheduler  - Job 0 finished: reduce at SparkPi.scala:38, took 4.598201 s
Pi is roughly 3.141195141195141
37832 [main] INFO  org.sparkproject.jetty.server.AbstractConnector  - Stopped Spark@6d4f7882{HTTP/1.1,[http/1.1]}{172.28.1.1:4040}
37849 [main] INFO  org.apache.spark.ui.SparkUI  - Stopped Spark web UI at http://localhost:4040
37876 [YARN application state monitor] INFO  org.apache.spark.scheduler.cluster.YarnClientSchedulerBackend  - Interrupting monitor thread
37948 [main] INFO  org.apache.spark.scheduler.cluster.YarnClientSchedulerBackend  - Shutting down all executors
37951 [dispatcher-CoarseGrainedScheduler] INFO  org.apache.spark.scheduler.cluster.YarnSchedulerBackend$YarnDriverEndpoint  - Asking each executor to shut down
37977 [main] INFO  org.apache.spark.scheduler.cluster.YarnClientSchedulerBackend  - YARN client scheduler backend Stopped
38111 [dispatcher-event-loop-2] INFO  org.apache.spark.MapOutputTrackerMasterEndpoint  - MapOutputTrackerMasterEndpoint stopped!
38161 [main] INFO  org.apache.spark.storage.memory.MemoryStore  - MemoryStore cleared
38163 [main] INFO  org.apache.spark.storage.BlockManager  - BlockManager stopped
38199 [main] INFO  org.apache.spark.storage.BlockManagerMaster  - BlockManagerMaster stopped
38214 [dispatcher-event-loop-2] INFO  org.apache.spark.scheduler.OutputCommitCoordinator$OutputCommitCoordinatorEndpoint  - OutputCommitCoordinator stopped!
38381 [main] INFO  org.apache.spark.SparkContext  - Successfully stopped SparkContext
38413 [shutdown-hook-0] INFO  org.apache.spark.util.ShutdownHookManager  - Shutdown hook called
38419 [shutdown-hook-0] INFO  org.apache.spark.util.ShutdownHookManager  - Deleting directory /tmp/spark-5f2ad778-8bdc-4a59-8859-727fbcb25a1a
38462 [shutdown-hook-0] INFO  org.apache.spark.util.ShutdownHookManager  - Deleting directory /tmp/spark-238c5d04-3ab0-47f7-8fba-93feadcec6ea
bash-5.0# 
```

- Output of 100 Random Numbers



```
bash-5.0# $SPARK_HOME/bin/spark-shell --master yarn --driver-memory 2g --executor-memory 1g --executor-cores 1
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/program/spark/jars/slf4j-log4j12-1.7.30.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/usr/program/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
1    [main] WARN  org.apache.hadoop.util.NativeCodeLoader  - Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Setting default log level to "WARN".
To adjust logging level use sc.setLogLevel(newLevel). For SparkR, use setLogLevel(newLevel).
Spark context Web UI available at http://localhost:4040
Spark context available as 'sc' (master = yarn, app id = application_1712500263135_0003).
Spark session available as 'spark'.
Welcome to
      ____              __
     / __/__  ___ _____/ /__
    _\ \/ _ \/ _ `/ __/  '_/
   /___/ .__/\_,_/_/ /_/\_\   version 3.0.0
      /_/

Using Scala version 2.12.10 (OpenJDK 64-Bit Server VM, Java 1.8.0_275)
Type in expressions to have them evaluated.
Type :help for more information.

scala> val numNumbers = 10000
numNumbers: Int = 10000

scala> val numbers = (1 to numNumbers).map(_ => scala.util.Random.nextInt(1000))
numbers: scala.collection.immutable.IndexedSeq[Int] = Vector(442, 221, 614, 513, 200, 141, 368, 692, 528, 764, 239, 698, 128, 854, 352, 705, 74, 887, 124, 437, 892, 721, 276, 512, 449, 223, 421, 630, 890, 324
, 306, 903, 95, 163, 345, 242, 607, 420, 14, 730, 144, 495, 827, 599, 152, 80, 297, 180, 346, 231, 784, 953, 508, 898, 890, 93, 948, 746, 950, 617, 467, 911, 177, 939, 906, 449, 727, 46, 601, 780, 230, 386, 8
95, 766, 563, 862, 451, 57, 950, 455, 592, 312, 305, 26, 664, 55, 334, 838, 632, 811, 150, 959, 184, 475, 997, 25, 302, 362, 835, 754, 912, 634, 382, 265, 79, 879, 899, 649, 788, 525, 827, 292, 194, 406, 258,
 422, 587, 972, 843, 391, 191, 319, 958, 524, 607, 428, 516, 660, 247, 411, 546, 466, 985, 363, 224, 227, 471, 428, 374, 189, 48, 952, 916, 49, 708...

scala> val numbersRDD = sc.parallelize(numbers)
numbersRDD: org.apache.spark.rdd.RDD[Int] = ParallelCollectionRDD[0] at parallelize at <console>:26

scala> numbersRDD.take(100).foreach(println)
442
221
614
513
200
141
368
692
528
764
239
698
128
854
352
705
74
887
124
437
892
721
276
512
449
223
421
630
890
```

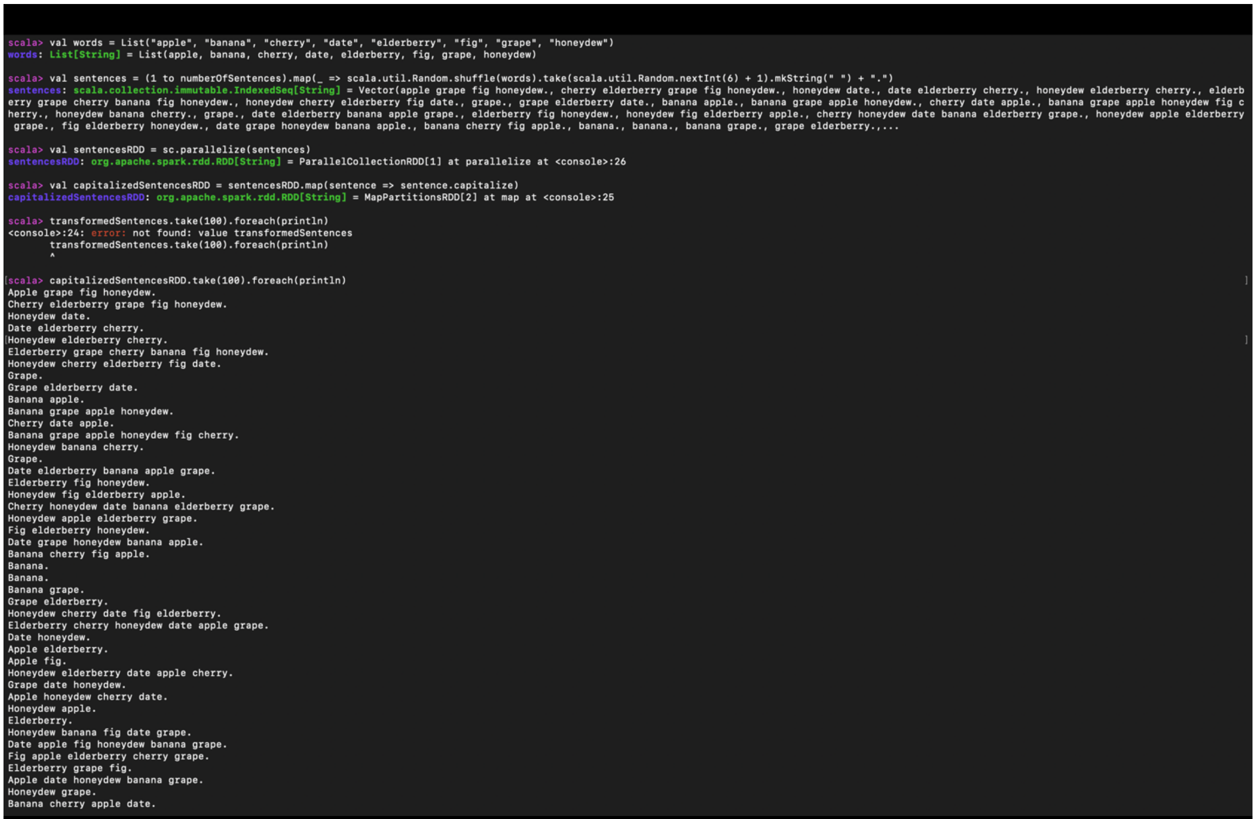
-



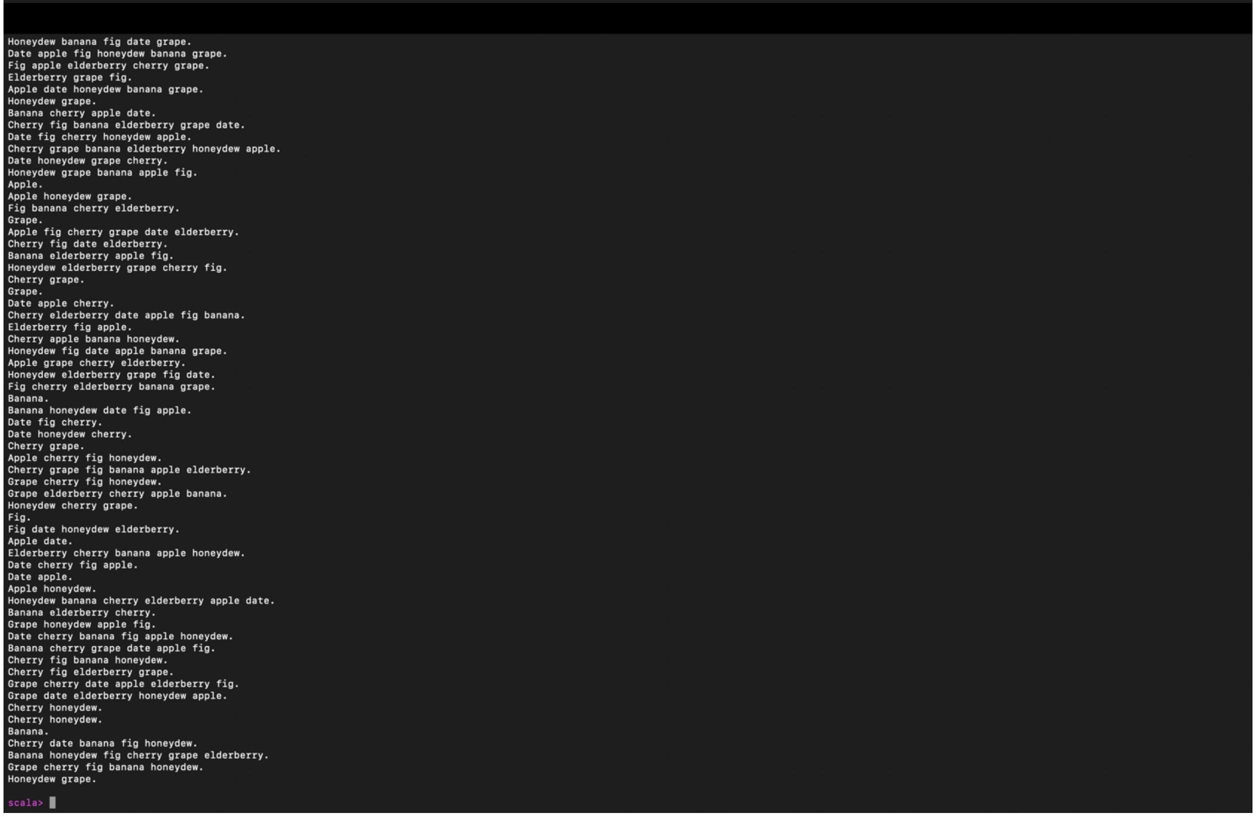
```
324
306
903
95
163
345
242
607
420
14
730
144
495
827
599
152
80
297
180
346
231
784
953
508
898
890
93
948
746
950
617
467
911
177
906
449
727
46
601
780
230
386
895
766
563
862
451
57
950
455
592
312
305
26
664
55
334
838
632
811
150
959
184
475
997
25
302
362
835
754

scala> 
```

-

- Transformed Sentences



```
scala> val words = List("apple", "banana", "cherry", "date", "elderberry", "fig", "grape", "honeydew")
words: List[String] = List(apple, banana, cherry, date, elderberry, fig, grape, honeydew)

scala> val sentences = (1 to numberOfSentences).map(_ => scala.util.Random.shuffle(words).take(scala.util.Random.nextInt(6) + 1).mkString(" ") + ".")
sentences: scala.collection.immutable.IndexedSeq[String] = Vector(apple grape fig honeydew., cherry elderberry grape fig honeydew., honeydew date., date elderberry cherry., honeydew elderberry cherry., elderb
erry grape cherry banana fig honeydew., honeydew cherry elderberry fig date., grape., grape elderberry date., banana apple., banana grape apple honeydew., cherry date apple., banana grape apple honeydew fig c
herry., honeydew banana cherry., grape., date elderberry banana apple grape., elderberry fig honeydew., honeydew fig elderberry apple., cherry honeydew date banana elderberry grape., honeydew apple elderberry
 grape., fig elderberry honeydew., date grape honeydew banana apple., banana cherry fig apple., banana., banana., banana grape., grape elderberry.,...

scala> val sentencesRDD = sc.parallelize(sentences)
sentencesRDD: org.apache.spark.rdd.RDD[String] = ParallelCollectionRDD[1] at parallelize at <console>:26

scala> val capitalizedSentencesRDD = sentencesRDD.map(sentence => sentence.capitalize)
capitalizedSentencesRDD: org.apache.spark.rdd.RDD[String] = MapPartitionsRDD[2] at map at <console>:25

scala> transformedSentences.take(100).foreach(println)
<console>:24: error: not found: value transformedSentences
       transformedSentences.take(100).foreach(println)
       ^

[scala> capitalizedSentencesRDD.take(100).foreach(println)
Apple grape fig honeydew.
Cherry elderberry grape fig honeydew.
Honeydew date.
Date elderberry cherry.
[Honeydew elderberry cherry.
Elderberry grape cherry banana fig honeydew.
Honeydew cherry elderberry fig date.
Grape.
Grape elderberry date.
Banana apple.
Banana grape apple honeydew.
Cherry date apple.
Banana grape apple honeydew fig cherry.
Honeydew banana cherry.
Grape.
Date elderberry banana apple grape.
Elderberry fig honeydew.
Honeydew fig elderberry apple.
Cherry honeydew date banana elderberry grape.
Honeydew apple elderberry grape.
Fig elderberry honeydew.
Date grape honeydew banana apple.
Banana cherry fig apple.
Banana.
Banana.
Banana grape.
Grape elderberry.
Honeydew cherry date fig elderberry.
Elderberry cherry honeydew date apple grape.
Date honeydew.
Apple elderberry.
Apple fig.
Honeydew elderberry date apple cherry.
Grape date honeydew.
Apple honeydew cherry date.
Honeydew apple.
Elderberry.
Honeydew banana fig date grape.
Date apple fig honeydew banana grape.
Fig apple elderberry cherry grape.
Elderberry grape fig.
Apple date honeydew banana grape.
Honeydew grape.
Banana cherry apple date.
```



```
Honeydew banana fig date grape.
Date apple fig honeydew banana grape.
Fig apple elderberry cherry grape.
Elderberry grape fig.
Apple date honeydew banana grape.
Honeydew grape.
Banana cherry apple date.
Cherry fig banana elderberry grape date.
Date fig cherry honeydew apple.
Cherry grape banana elderberry honeydew apple.
Date honeydew grape cherry.
Honeydew grape banana apple fig.
Apple.
Apple honeydew grape.
Fig banana cherry elderberry.
Grape.
Apple fig cherry grape date elderberry.
Cherry fig date elderberry.
Banana elderberry apple fig.
Honeydew elderberry grape cherry fig.
Cherry grape.
Grape.
Date apple cherry.
Cherry elderberry date apple fig banana.
Elderberry fig apple.
Cherry apple banana honeydew.
Honeydew fig date apple banana grape.
Apple grape cherry elderberry.
Honeydew elderberry grape fig date.
Fig cherry elderberry banana grape.
Banana.
Banana honeydew date fig apple.
Date fig cherry.
Date honeydew cherry.
Cherry grape.
Apple cherry fig honeydew.
Cherry grape fig banana apple elderberry.
Grape cherry fig honeydew.
Grape elderberry cherry apple banana.
Honeydew cherry grape.
Fig.
Fig date honeydew elderberry.
Apple date.
Elderberry cherry banana apple honeydew.
Date cherry fig apple.
Date apple.
Apple honeydew.
Honeydew banana cherry elderberry apple date.
Banana elderberry cherry.
Grape honeydew apple fig.
Date cherry banana fig apple honeydew.
Banana cherry grape date apple fig.
Cherry fig banana honeydew.
Cherry fig elderberry grape.
Grape cherry date apple elderberry fig.
Grape date elderberry honeydew apple.
Cherry honeydew.
Cherry honeydew.
Banana.
Cherry date banana fig honeydew.
Banana honeydew fig cherry grape elderberry.
Grape cherry fig banana honeydew.
Honeydew grape.

scala> ▌
```

- For the sentence transformation, I capitalized the first word in each sentence. I did this because it is proper grammar to capitalize the beginning of each sentence.