CS744 BigDataSystems Assignment 2

PART A

SparkStructuredStreaming SparkStructuredStreaming

Files:

Q1: PartAQuestion1.scala - Maintains state for hourly window updated every 30mins

Q2: PartAQuestion2.scala - Maintains user mentions updated every 10sec

Q3: PartAQuestion3.scala - Maintains user tweet actions updated every 5sec for users mentioned in a HDFS file

CustomConsoleSink: Implemented custom extended version of console sink to print all of the streaming state

stream-emulator.sh: Script to move a csv file from source to stream dir in HDFS every 5sec

All the jobs disable Spark Logging on console.

Steps to build code: sbt clean package

PART B

STORM APPLICATIONS TO PROCESS TWEETS

Question 1

Develop a simple application (Topology) to collect 200,000 tweets which are in English and match certain keywords.

Topology should be runnable in both local and cluster mode.

Prepare the storm-starter-1.0.2.jar using maven in a remote machine/cluster. Then transfer it to the cluster.

Submit topology to cluster. This can be done in either Cluster/Local mode.

CLUSTER TOPOLOGY

- 1) TwitterSampleSpout : Connect to Twitter API and filter tweets in English language and match certain keywords.
- 2) TweetCountBolt: Keep track of the number of tweets processed by the TwitterSampleSpout and also kill the topology after processing 200000 tweets.
- 3) HdfsBolt : Write the tuples to HDFS in cluster mode.

To submit topology in cluster mode use the following command:

storm jar /location/of/storm-starter-1.0.2.jar org.apache.storm.starter.CS744AssignmentQ1 <consumer_key> <consumer_secret_key> <access_token> <access_token_secret> true /user/ubuntu/tweets

LOCAL MODE TOPOLOGY

- 1) TwitterSampleSpout: Connect to Twitter API and filter tweets in English language and match certain keywords.
- 2) TweetCountBolt: Keep track of the number of tweets processed by the TwitterSampleSpout and also kill the topology after processing 200000 tweets.
- 3) FileWriterBolt: Write the tuples to local file system in local mode.

To submit topology in local mode use the following command:

storm jar /location/of/storm-starter-1.0.2.jar org.apache.storm.starter.CS744AssignmentQ1 <consumer_key> <consumer_secret_key> <access_token> <access_token_secret> false /home/ubuntu/tweets.txt

Question 2

Develop a simple application (Topology) to find the top 50% most common words which are not stop words in a set of filtered tweets.

Prepare the storm-starter-1.0.2.jar using maven in a remote machine/cluster. Then transfer it to the cluster.

Submit topology to cluster. This can be done in either Cluster/Local mode.

CLUSTER TOPOLOGY

- 1) TwitterSampleSpout: Connect to Twitter API and filter tweets in English language and match certain keywords.
- 2) TwitterHashtagSpout: Randomly propagate a sample of hashtags.
- 3) FriendsCountSpout: Randomly propagate a friends count value(FC) every 30 sec.
- 4) TwitterHashtagBolt: Filter the tweets which do not have any of given hashtags.
- 5) FriendsCountFilterBolt: Filter the tweets that have friends count value less than FC.
- 6) StopWordsBolt: Remove stop words from a given tweet and then propogate it.
- 7) WordCountBolt: Count the freauency of each word and create (word, count, timestamp) tuples.
- 8) PopularWordsBolt: Sort the tuples by count and output only top 50%.
- 9) HDFSBolt: Write the tuples to HDFS in cluster mode.

To submit topology in cluster mode use the following command:

storm jar /location/of/storm-starter-1.0.2.jar org.apache.storm.starter.CS744AssignmentQ2 <consumer_key> <consumer_secret_key> <access_token> <access_token_secret> /user/ubuntu/tweets_filtered true /home/ubuntu/stopwords.txt

LOCAL TOPOLOGY

- 1) TwitterSampleSpout: Connect to Twitter API and filter tweets in English language and match certain keywords.
- 2) TwitterHashtagSpout: Randomly propagate a sample of hashtags.
- 3) FriendsCountSpout: Randomly propogate a friends count value(FC) every 30 sec.
- 4) TwitterHashtagBolt: Filter the tweets which do not have any of given hashtags.
- 5) FriendsCountFilterBolt: Filter the tweets that have friends count value less than FC.
- 6) StopWordsBolt: Remove stop words from a given tweet and then propogate it.
- 7) WordCountBolt: Count the freauency of each word and create (word, count, timestamp) tuples.
- 8) PopularWordsBolt: Sort the tuples by count and output only top 50%.
- 9) PopularWordsPrinterBolt: Output popular words in local mode.
- 10) TweetPrinterBolt: Output tweets in local mode.

To submit topology in local mode use the following command:

storm jar /location/of/storm-starter-1.0.2.jar org.apache.storm.starter.CS744AssignmentQ2 <consumer_key> <consumer_secret_key> <access_token> <access_token_secret> /home/ubuntu/tweets_filtered/ false /home/ubuntu/stopwords.txt

PART C

The Flink Programs are written in Java:

The TimeWindow start and end times are all in terms of *Event Time*

Question 1:

Case A: Tumbling 1 minute windows without any overlap between windows

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TimeWindow{start=1341394200, end=1341394259} interval=0 Count: 193 Type: (RT)
TimeWindow{start=1341394260, end=1341394319} interval=0 Count: 220 Type: (RT)
TimeWindow{start=1341394320, end=1341394379} interval=0 Count: 191 Type: (RT)
TimeWindow{start=1341394380, end=1341394439} interval=0 Count: 195 Type: (RT)
TimeWindow{start=1341394440, end=1341394499} interval=0 Count: 196 Type: (RT)
TimeWindow{start=1341394500, end=1341394559} interval=0 Count: 190 Type: (RT)
TimeWindow{start=1341394561, end=1341394619} interval=0 Count: 225 Type: (RT)
TimeWindow{start=1341394620, end=1341394679} interval=0 Count: 207 Type: (RT)
TimeWindow{start=1341394680, end=1341394739} interval=0 Count: 195 Type: (RT)
TimeWindow{start=1341394740, end=1341394799} interval=0 Count: 233 Type: (RT)
TimeWindow{start=1341394800, end=1341394859} interval=0 Count: 206 Type: (RT)
TimeWindow{start=1341394860, end=1341394919} interval=0 Count: 196 Type: (RT)
TimeWindow{start=1341394920, end=1341394979} interval=0 Count: 113 Type: (MT)
TimeWindow{start=1341394920, end=1341394979} interval=0 Count: 174 Type: (RT)
TimeWindow{start=1341394980, end=1341395039} interval=0 Count: 191 Type: (RT)
TimeWindow{start=1341395040, end=1341395099} interval=0 Count: 196 Type: (RT)
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TimeWindow{start=1341395160, end=1341395219} interval=0 Count: 200 Type: (RT)
TimeWindow{start=1341395220, end=1341395279} interval=0 Count: 212 Type: (RT)
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TimeWindow{start=1341395400, end=1341395459} interval=0 Count: 111 Type: (MT)
TimeWindow{start=1341395400, end=1341395459} interval=0 Count: 219 Type: (RT)
TimeWindow{start=1341395460, end=1341395519} interval=0 Count: 191 Type: (RT)
TimeWindow{start=1341395520, end=1341395579} interval=0 Count: 209 Type: (RT)
TimeWindow{start=1341395580, end=1341395638} interval=0 Count: 110 Type: (MT)
TimeWindow{start=1341395580, end=1341395639} interval=0 Count: 199 Type: (RT)
TimeWindow{start=1341395640, end=1341395699} interval=0 Count: 222 Type: (RT)
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TimeWindow{start=1341395700, end=1341395759} interval=0 Count: 225 Type: (RT)
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TimeWindow{start=1341395820, end=1341395879} interval=0 Count: 220 Type: (RT)
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TimeWindow{start=1341395940, end=1341395999} interval=0 Count: 235 Type: (RT)
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TimeWindow{start=1341396120, end=1341396179} interval=0 Count: 217 Type: (RT)
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TimeWindow{start=1341396360, end=1341396419} interval=0 Count: 204 Type: (RT)
TimeWindow{start=1341396420, end=1341396479} interval=0 Count: 176 Type: (RT)
TimeWindow{start=1341396480, end=1341396539} interval=0 Count: 186 Type: (RT)
TimeWindow{start=1341396540, end=1341396599} interval=0 Count: 198 Type: (RT)
TimeWindow{start=1341396600, end=1341396659} interval=0 Count: 202 Type: (RT)
TimeWindow{start=1341396660, end=1341396719} interval=0 Count: 186 Type: (RT)
TimeWindow{start=1341396720, end=1341396779} interval=0 Count: 167 Type: (MT)
TimeWindow{start=1341396720, end=1341396779} interval=0 Count: 277 Type: (RT)
TimeWindow{start=1341396780, end=1341396839} interval=0 Count: 102 Type: (MT)
TimeWindow{start=1341396780, end=1341396839} interval=0 Count: 193 Type: (RT)
TimeWindow{start=1341396840, end=1341396899} interval=0 Count: 203 Type: (RT)
TimeWindow{start=1341396900, end=1341396959} interval=0 Count: 197 Type: (RT)
TimeWindow{start=1341396960, end=1341397019} interval=0 Count: 248 Type: (RT)
TimeWindow{start=1341397020, end=1341397079} interval=0 Count: 230 Type: (RT)
TimeWindow{start=1341397080, end=1341397139} interval=0 Count: 243 Type: (RT)
TimeWindow{start=1341397140, end=1341397199} interval=0 Count: 210 Type: (RT)
TimeWindow{start=1341397200, end=1341397259} interval=0 Count: 251 Type: (RT)
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TimeWindow{start=1341397380, end=1341397439} interval=0 Count: 177 Type: (RT)
TimeWindow{start=1341397440, end=1341397499} interval=0 Count: 213 Type: (RT)
TimeWindow{start=1341397500, end=1341397559} interval=0 Count: 190 Type: (RT)
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TimeWindow{start=1341397621, end=1341397679} interval=0 Count: 190 Type: (RT)
TimeWindow{start=1341397680, end=1341397739} interval=0 Count: 175 Type: (RT)
TimeWindow{start=1341397740, end=1341397799} interval=0 Count: 220 Type: (RT)
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TimeWindow{start=1341397860, end=1341397919} interval=0 Count: 218 Type: (RT)
TimeWindow{start=1341397920, end=1341397979} interval=0 Count: 208 Type: (RT)
TimeWindow{start=1341397980, end=1341398039} interval=0 Count: 205 Type: (RT)
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TimeWindow{start=1341398100, end=1341398159} interval=0 Count: 189 Type: (RT)
TimeWindow{start=1341398160, end=1341398219} interval=0 Count: 216 Type: (RT)
TimeWindow{start=1341398220, end=1341398279} interval=0 Count: 181 Type: (RT)
TimeWindow{start=1341398280, end=1341398339} interval=0 Count: 217 Type: (RT)
TimeWindow{start=1341398340, end=1341398399} interval=0 Count: 209 Type: (RT)
TimeWindow{start=1341398400, end=1341398459} interval=0 Count: 192 Type: (RT)
TimeWindow{start=1341398460, end=1341398519} interval=0 Count: 190 Type: (RT)
TimeWindow{start=1341398520, end=1341398579} interval=0 Count: 187 Type: (RT)
TimeWindow{start=1341398580, end=1341398638} interval=0 Count: 176 Type: (RT)
TimeWindow{start=1341398640, end=1341398699} interval=0 Count: 192 Type: (RT)
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TimeWindow{start=1341398880, end=1341398939} interval=0 Count: 229 Type: (RT)
TimeWindow{start=1341398940, end=1341398999} interval=0 Count: 210 Type: (RT)
TimeWindow{start=1341399000, end=1341399059} interval=0 Count: 216 Type: (RT)
TimeWindow{start=1341399060, end=1341399119} interval=0 Count: 208 Type: (RT)
TimeWindow{start=1341399120, end=1341399179} interval=0 Count: 101 Type: (MT)
TimeWindow{start=1341399120, end=1341399179} interval=0 Count: 186 Type: (RT)
TimeWindow{start=1341399180, end=1341399239} interval=0 Count: 113 Type: (MT)
TimeWindow{start=1341399180, end=1341399239} interval=0 Count: 216 Type: (RT)
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TimeWindow{start=1341399240, end=1341399299} interval=0 Count: 210 Type: (RT)
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TimeWindow{start=1341399302, end=1341399359} interval=0 Count: 111 Type: (MT)
TimeWindow{start=1341399361, end=1341399419} interval=0 Count: 203 Type: (RT)
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TimeWindow{start=1341399480, end=1341399539} interval=0 Count: 185 Type: (RT)
TimeWindow{start=1341399540, end=1341399599} interval=0 Count: 221 Type: (RT)
TimeWindow{start=1341399600, end=1341399659} interval=0 Count: 111 Type: (MT)
TimeWindow{start=1341399600, end=1341399659} interval=0 Count: 216 Type: (RT)
TimeWindow{start=1341399660, end=1341399719} interval=0 Count: 214 Type: (RT)
TimeWindow{start=1341399720, end=1341399779} interval=0 Count: 226 Type: (RT)
TimeWindow{start=1341399780, end=1341399839} interval=0 Count: 231 Type: (RT)
TimeWindow{start=1341399840, end=1341399899} interval=0 Count: 224 Type: (RT)
TimeWindow{start=1341399900, end=1341399959} interval=0 Count: 202 Type: (RT)
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TimeWindow{start=1341400320, end=1341400379} interval=0 Count: 211 Type: (RT)
TimeWindow{start=1341400380, end=1341400439} interval=0 Count: 211 Type: (RT)
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TimeWindow{start=1341400800, end=1341400859} interval=0 Count: 115 Type: (MT)
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TimeWindow{start=1341400920, end=1341400979} interval=0 Count: 219 Type: (RT)
TimeWindow{start=1341400980, end=1341401039} interval=0 Count: 111 Type: (MT)
TimeWindow{start=1341400980, end=1341401039} interval=0 Count: 221 Type: (RT)
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TimeWindow{start=1341401040, end=1341401099} interval=0 Count: 220 Type: (RT)
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TimeWindow{start=1341401160, end=1341401219} interval=0 Count: 243 Type: (RT)
TimeWindow{start=1341401220, end=1341401279} interval=0 Count: 182 Type: (RT)
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TimeWindow{start=1341401340, end=1341401399} interval=0 Count: 224 Type: (RT)
TimeWindow{start=1341401342, end=1341401399} interval=0 Count: 111 Type: (MT)
TimeWindow{start=1341401400, end=1341401459} interval=0 Count: 222 Type: (RT)
TimeWindow{start=1341401460, end=1341401519} interval=0 Count: 246 Type: (RT)
TimeWindow{start=1341401520, end=1341401579} interval=0 Count: 197 Type: (RT)
TimeWindow{start=1341401580, end=1341401639} interval=0 Count: 230 Type: (RT)
TimeWindow{start=1341401640, end=1341401699} interval=0 Count: 224 Type: (RT)
TimeWindow{start=1341401700, end=1341401759} interval=0 Count: 267 Type: (RT)
TimeWindow{start=1341401760, end=1341401819} interval=0 Count: 240 Type: (RT)
TimeWindow{start=1341401820, end=1341401879} interval=0 Count: 218 Type: (RT)
TimeWindow{start=1341401880, end=1341401939} interval=0 Count: 213 Type: (RT)
TimeWindow{start=1341401941, end=1341401999} interval=0 Count: 218 Type: (RT)
TimeWindow{start=1341402000, end=1341402059} interval=0 Count: 214 Type: (RT)
TimeWindow{start=1341402060, end=1341402119} interval=0 Count: 214 Type: (RT)
TimeWindow{start=1341402120, end=1341402179} interval=0 Count: 234 Type: (RT)
TimeWindow{start=1341402121, end=1341402179} interval=0 Count: 105 Type: (MT)
TimeWindow{start=1341402180, end=1341402239} interval=0 Count: 212 Type: (RT)
TimeWindow{start=1341402240, end=1341402299} interval=0 Count: 222 Type: (RT)
TimeWindow{start=1341402300, end=1341402358} interval=0 Count: 105 Type: (MT)
TimeWindow{start=1341402300, end=1341402359} interval=0 Count: 221 Type: (RT)
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TimeWindow{start=1341402360, end=1341402419} interval=0 Count: 256 Type: (RT)
TimeWindow{start=1341402420, end=1341402479} interval=0 Count: 212 Type: (RT)
TimeWindow{start=1341402421, end=1341402479} interval=0 Count: 110 Type: (MT)
TimeWindow{start=1341402480, end=1341402539} interval=0 Count: 214 Type: (RT)
TimeWindow{start=1341402540, end=1341402599} interval=0 Count: 219 Type: (RT)
TimeWindow{start=1341402600, end=1341402659} interval=0 Count: 218 Type: (RT)
TimeWindow{start=1341402660, end=1341402719} interval=0 Count: 104 Type: (MT)
TimeWindow{start=1341402660, end=1341402719} interval=0 Count: 210 Type: (RT)
TimeWindow{start=1341402720, end=1341402779} interval=0 Count: 110 Type: (MT)
TimeWindow{start=1341402720, end=1341402779} interval=0 Count: 201 Type: (RT)
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TimeWindow{start=1341403020, end=1341403079} interval=0 Count: 211 Type: (RT)
TimeWindow{start=1341403080, end=1341403139} interval=0 Count: 202 Type: (RT)
TimeWindow{start=1341403140, end=1341403199} interval=0 Count: 199 Type: (RT)
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TimeWindow{start=1341403260, end=1341403319} interval=0 Count: 209 Type: (RT)
TimeWindow{start=1341403320, end=1341403379} interval=0 Count: 185 Type: (RT)
TimeWindow{start=1341403380, end=1341403439} interval=0 Count: 191 Type: (RT)
TimeWindow{start=1341403441, end=1341403499} interval=0 Count: 233 Type: (RT)
TimeWindow{start=1341403500, end=1341403559} interval=0 Count: 102 Type: (MT)
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TimeWindow{start=1341403560, end=1341403619} interval=0 Count: 225 Type: (RT)
TimeWindow{start=1341403620, end=1341403679} interval=0 Count: 220 Type: (RT)
TimeWindow{start=1341403680, end=1341403739} interval=0 Count: 247 Type: (RT)
TimeWindow{start=1341403740, end=1341403799} interval=0 Count: 202 Type: (RT)
TimeWindow{start=1341403800, end=1341403859} interval=0 Count: 209 Type: (RT)
TimeWindow{start=1341403860, end=1341403919} interval=0 Count: 208 Type: (RT)
TimeWindow{start=1341403920, end=1341403979} interval=0 Count: 196 Type: (RT)
TimeWindow{start=1341403980, end=1341404039} interval=0 Count: 211 Type: (RT)
TimeWindow{start=1341404040, end=1341404099} interval=0 Count: 212 Type: (RT)
TimeWindow{start=1341404100, end=1341404159} interval=0 Count: 217 Type: (RT)
TimeWindow{start=1341404160, end=1341404218} interval=0 Count: 109 Type: (MT)
TimeWindow{start=1341404160, end=1341404219} interval=0 Count: 228 Type: (RT)
TimeWindow{start=1341404220, end=1341404278} interval=0 Count: 192 Type: (RT)
TimeWindow{start=1341404280, end=1341404339} interval=0 Count: 173 Type: (RT)
TimeWindow{start=1341404340, end=1341404399} interval=0 Count: 194 Type: (RT)
TimeWindow{start=1341404400, end=1341404459} interval=0 Count: 198 Type: (RT)
TimeWindow{start=1341404460, end=1341404519} interval=0 Count: 229 Type: (RT)
TimeWindow{start=1341404520, end=1341404579} interval=0 Count: 226 Type: (RT)
TimeWindow{start=1341404580, end=1341404639} interval=0 Count: 209 Type: (RT)
TimeWindow{start=1341404640, end=1341404699} interval=0 Count: 213 Type: (RT)
TimeWindow{start=1341404700, end=1341404759} interval=0 Count: 214 Type: (RT)
TimeWindow{start=1341404701, end=1341404758} interval=0 Count: 103 Type: (MT)
TimeWindow{start=1341404760, end=1341404819} interval=0 Count: 242 Type: (RT)
TimeWindow{start=1341404820, end=1341404879} interval=0 Count: 102 Type: (MT)
TimeWindow{start=1341404820, end=1341404879} interval=0 Count: 242 Type: (RT)
TimeWindow{start=1341404880, end=1341404939} interval=0 Count: 214 Type: (RT)
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TimeWindow{start=1341404940, end=1341404999} interval=0 Count: 217 Type: (RT)
TimeWindow{start=1341405001, end=1341405059} interval=0 Count: 208 Type: (RT)
TimeWindow{start=1341405060, end=1341405119} interval=0 Count: 217 Type: (RT)
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TimeWindow{start=1341405240, end=1341405299} interval=0 Count: 168 Type: (RT)
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TimeWindow{start=1341405420, end=1341405479} interval=0 Count: 177 Type: (RT)
TimeWindow{start=1341405480, end=1341405539} interval=0 Count: 209 Type: (RT)
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TimeWindow{start=1341405600, end=1341405659} interval=0 Count: 209 Type: (RT)
TimeWindow{start=1341405660, end=1341405719} interval=0 Count: 221 Type: (RT)
TimeWindow{start=1341405720, end=1341405779} interval=0 Count: 182 Type: (RT)
TimeWindow{start=1341405780, end=1341405839} interval=0 Count: 179 Type: (RT)
TimeWindow{start=1341405840, end=1341405899} interval=0 Count: 190 Type: (RT)
TimeWindow{start=1341405901, end=1341405959} interval=0 Count: 201 Type: (RT)
TimeWindow{start=1341405960, end=1341406019} interval=0 Count: 218 Type: (RT)
TimeWindow{start=1341405961, end=1341406019} interval=0 Count: 104 Type: (MT)
TimeWindow{start=1341406020, end=1341406079} interval=0 Count: 197 Type: (RT)
TimeWindow{start=1341406080, end=1341406139} interval=0 Count: 215 Type: (RT)
TimeWindow{start=1341406140, end=1341406199} interval=0 Count: 195 Type: (RT)
TimeWindow{start=1341406200, end=1341406259} interval=0 Count: 182 Type: (RT)
TimeWindow{start=1341406260, end=1341406319} interval=0 Count: 192 Type: (RT)
TimeWindow{start=1341406320, end=1341406379} interval=0 Count: 203 Type: (RT)
TimeWindow{start=1341406380, end=1341406439} interval=0 Count: 199 Type: (RT)
TimeWindow{start=1341406441, end=1341406499} interval=0 Count: 150 Type: (RT)
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TimeWindow{start=1341406560, end=1341406619} interval=0 Count: 188 Type: (RT)
TimeWindow{start=1341406620, end=1341406679} interval=0 Count: 192 Type: (RT)
TimeWindow{start=1341406680, end=1341406739} interval=0 Count: 178 Type: (RT)
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TimeWindow{start=1341406800, end=1341406859} interval=0 Count: 226 Type: (RT)
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TimeWindow{start=1341406920, end=1341406979} interval=0 Count: 245 Type: (RT)
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TimeWindow{start=1341407040, end=1341407099} interval=0 Count: 252 Type: (RT)
TimeWindow{start=1341407100, end=1341407159} interval=0 Count: 101 Type: (MT)
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TimeWindow{start=1341407220, end=1341407279} interval=0 Count: 225 Type: (RT)
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TimeWindow{start=1341407340, end=1341407399} interval=0 Count: 173 Type: (RT)
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TimeWindow{start=1341407400, end=1341407459} interval=0 Count: 254 Type: (RT)
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TimeWindow{start=1341407640, end=1341407699} interval=0 Count: 256 Type: (RT)
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TimeWindow{start=1341422940, end=1341422999} interval=0 Count: 162 Type: (RT)
TimeWindow{start=1341423000, end=1341423059} interval=0 Count: 199 Type: (RT)
TimeWindow{start=1341423060, end=1341423119} interval=0 Count: 185 Type: (RT)
TimeWindow{start=1341423120, end=1341423179} interval=0 Count: 169 Type: (RT)
TimeWindow{start=1341423180, end=1341423239} interval=0 Count: 159 Type: (RT)
TimeWindow{start=1341423240, end=1341423299} interval=0 Count: 159 Type: (RT)
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TimeWindow{start=1341423360, end=1341423419} interval=0 Count: 150 Type: (RT)
TimeWindow{start=1341423420, end=1341423479} interval=0 Count: 147 Type: (RT)
TimeWindow{start=1341423480, end=1341423539} interval=0 Count: 132 Type: (RT)
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TimeWindow{start=1341424320, end=1341424379} interval=0 Count: 117 Type: (RT)
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TimeWindow{start=1341424680, end=1341424739} interval=0 Count: 117 Type: (RT)
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TimeWindow{start=1341425220, end=1341425279} interval=0 Count: 129 Type: (RT)
TimeWindow{start=1341425280, end=1341425339} interval=0 Count: 121 Type: (RT)
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TimeWindow{start=1341425401, end=1341425459} interval=0 Count: 125 Type: (RT)
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TimeWindow{start=1341425640, end=1341425699} interval=0 Count: 113 Type: (RT)
TimeWindow{start=1341425701, end=1341425759} interval=0 Count: 124 Type: (RT)
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TimeWindow{start=1341426660, end=1341426719} interval=0 Count: 122 Type: (RT)
TimeWindow{start=1341426780, end=1341426839} interval=0 Count: 119 Type: (RT)
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TimeWindow{start=1341427141, end=1341427199} interval=0 Count: 109 Type: (RT)
TimeWindow{start=1341427200, end=1341427259} interval=0 Count: 106 Type: (RT)
TimeWindow{start=1341427320, end=1341427379} interval=0 Count: 116 Type: (RT)
TimeWindow{start=1341427380, end=1341427439} interval=0 Count: 120 Type: (RT)
TimeWindow{start=1341427440, end=1341427499} interval=0 Count: 127 Type: (RT)
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TimeWindow{start=1341427740, end=1341427799} interval=0 Count: 131 Type: (RT)
TimeWindow{start=1341427801, end=1341427859} interval=0 Count: 124 Type: (RT)
TimeWindow{start=1341427860, end=1341427919} interval=0 Count: 121 Type: (RT)
TimeWindow{start=1341427920, end=1341427979} interval=0 Count: 121 Type: (RT)
TimeWindow{start=1341427980, end=1341428037} interval=0 Count: 107 Type: (RT)
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TimeWindow{start=1341428100, end=1341428159} interval=0 Count: 136 Type: (RT)
TimeWindow{start=1341428160, end=1341428218} interval=0 Count: 118 Type: (RT)
TimeWindow{start=1341428220, end=1341428279} interval=0 Count: 118 Type: (RT)
TimeWindow{start=1341428280, end=1341428339} interval=0 Count: 133 Type: (RT)
TimeWindow{start=1341428340, end=1341428399} interval=0 Count: 136 Type: (RT)
TimeWindow{start=1341428400, end=1341428459} interval=0 Count: 113 Type: (RT)
TimeWindow{start=1341428460, end=1341428519} interval=0 Count: 105 Type: (RT)
TimeWindow{start=1341428520, end=1341428579} interval=0 Count: 113 Type: (RT)
TimeWindow{start=1341428580, end=1341428639} interval=0 Count: 111 Type: (RT)
TimeWindow{start=1341428700, end=1341428759} interval=0 Count: 117 Type: (RT)
TimeWindow{start=1341428760, end=1341428818} interval=0 Count: 101 Type: (RT)
TimeWindow{start=1341428820, end=1341428879} interval=0 Count: 144 Type: (RT)
TimeWindow{start=1341428880, end=1341428938} interval=0 Count: 130 Type: (RT)
TimeWindow{start=1341428940, end=1341428997} interval=0 Count: 112 Type: (RT)
TimeWindow{start=1341429060, end=1341429118} interval=0 Count: 104 Type: (RT)
TimeWindow{start=1341429120, end=1341429179} interval=0 Count: 131 Type: (RT)
TimeWindow{start=1341429180, end=1341429239} interval=0 Count: 159 Type: (RT)
TimeWindow{start=1341429240, end=1341429299} interval=0 Count: 164 Type: (RT)
TimeWindow{start=1341429300, end=1341429359} interval=0 Count: 151 Type: (RT)
TimeWindow{start=1341429360, end=1341429419} interval=0 Count: 162 Type: (RT)
TimeWindow{start=1341429420, end=1341429479} interval=0 Count: 136 Type: (RT)
TimeWindow{start=1341429481, end=1341429538} interval=0 Count: 144 Type: (RT)
TimeWindow{start=1341429540, end=1341429599} interval=0 Count: 118 Type: (RT)
TimeWindow{start=1341429600, end=1341429659} interval=0 Count: 136 Type: (RT)
TimeWindow{start=1341429661, end=1341429719} interval=0 Count: 134 Type: (RT)
TimeWindow{start=1341429720, end=1341429779} interval=0 Count: 154 Type: (RT)
TimeWindow{start=1341429780, end=1341429839} interval=0 Count: 126 Type: (RT)
TimeWindow{start=1341429840, end=1341429899} interval=0 Count: 146 Type: (RT)
TimeWindow{start=1341429900, end=1341429959} interval=0 Count: 142 Type: (RT)
TimeWindow{start=1341429960, end=1341430019} interval=0 Count: 142 Type: (RT)
TimeWindow{start=1341430020, end=1341430079} interval=0 Count: 130 Type: (RT)
TimeWindow{start=1341430080, end=1341430139} interval=0 Count: 127 Type: (RT)
TimeWindow{start=1341430140, end=1341430199} interval=0 Count: 119 Type: (RT)
TimeWindow{start=1341430200, end=1341430259} interval=0 Count: 134 Type: (RT)
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TimeWindow{start=1341430500, end=1341430559} interval=0 Count: 105 Type: (RT)
TimeWindow{start=1341430560, end=1341430619} interval=0 Count: 117 Type: (RT)
TimeWindow{start=1341430620, end=1341430679} interval=0 Count: 111 Type: (RT)
TimeWindow{start=1341430740, end=1341430799} interval=0 Count: 102 Type: (RT)
TimeWindow{start=1341430800, end=1341430859} interval=0 Count: 108 Type: (RT)
TimeWindow{start=1341430860, end=1341430919} interval=0 Count: 127 Type: (RT)
TimeWindow{start=1341430920, end=1341430978} interval=0 Count: 104 Type: (RT)
TimeWindow{start=1341430980, end=1341431039} interval=0 Count: 131 Type: (RT)
TimeWindow{start=1341431040, end=1341431099} interval=0 Count: 143 Type: (RT)
TimeWindow{start=1341431100, end=1341431159} interval=0 Count: 108 Type: (RT)
TimeWindow{start=1341431160, end=1341431219} interval=0 Count: 113 Type: (RT)
TimeWindow{start=1341431220, end=1341431279} interval=0 Count: 126 Type: (RT)
TimeWindow{start=1341431280, end=1341431339} interval=0 Count: 125 Type: (RT)
TimeWindow{start=1341431340, end=1341431399} interval=0 Count: 131 Type: (RT)
TimeWindow{start=1341431400, end=1341431458} interval=0 Count: 103 Type: (RT)
TimeWindow{start=1341431460, end=1341431519} interval=0 Count: 123 Type: (RT)
TimeWindow{start=1341431520, end=1341431579} interval=0 Count: 131 Type: (RT)
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TimeWindow{start=1341431820, end=1341431878} interval=0 Count: 111 Type: (RT)
TimeWindow{start=1341431880, end=1341431939} interval=0 Count: 122 Type: (RT)
TimeWindow{start=1341431941, end=1341431999} interval=0 Count: 116 Type: (RT)
TimeWindow{start=1341432000, end=1341432059} interval=0 Count: 121 Type: (RT)
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TimeWindow{start=1341432121, end=1341432179} interval=0 Count: 111 Type: (RT)
TimeWindow{start=1341432180, end=1341432239} interval=0 Count: 122 Type: (RT)
TimeWindow{start=1341432240, end=1341432299} interval=0 Count: 115 Type: (RT)
TimeWindow{start=1341432300, end=1341432359} interval=0 Count: 110 Type: (RT)
TimeWindow{start=1341432360, end=1341432418} interval=0 Count: 119 Type: (RT)
TimeWindow{start=1341432482, end=1341432539} interval=0 Count: 106 Type: (RT)
TimeWindow{start=1341432540, end=1341432598} interval=0 Count: 113 Type: (RT)
TimeWindow{start=1341432600, end=1341432659} interval=0 Count: 102 Type: (RT)
TimeWindow{start=1341432720, end=1341432779} interval=0 Count: 103 Type: (RT)
TimeWindow{start=1341432781, end=1341432838} interval=0 Count: 119 Type: (RT)
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TimeWindow{start=1341432900, end=1341432959} interval=0 Count: 102 Type: (RT)
TimeWindow{start=1341432960, end=1341433019} interval=0 Count: 103 Type: (RT)
TimeWindow{start=1341433020, end=1341433079} interval=0 Count: 111 Type: (RT)
TimeWindow{start=1341433080, end=1341433138} interval=0 Count: 106 Type: (RT)
TimeWindow{start=1341433140, end=1341433198} interval=0 Count: 106 Type: (RT)
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TimeWindow{start=1341433321, end=1341433379} interval=0 Count: 101 Type: (RT) TimeWindow{start=1341433380, end=1341433439} interval=0 Count: 120 Type: (RT) TimeWindow{start=1341433500, end=1341433559} interval=0 Count: 112 Type: (RT) TimeWindow{start=1341433561, end=1341433619} interval=0 Count: 112 Type: (RT) TimeWindow{start=1341433620, end=1341433679} interval=0 Count: 102 Type: (RT) TimeWindow{start=1341433740, end=1341433799} interval=0 Count: 102 Type: (RT) TimeWindow{start=1341433921, end=1341433979} interval=0 Count: 104 Type: (RT) TimeWindow{start=1341433980, end=1341434039} interval=0 Count: 109 Type: (RT) TimeWindow{start=1341434040, end=1341434099} interval=0 Count: 102 Type: (RT) TimeWindow{start=1341434100, end=1341434159} interval=0 Count: 105 Type: (RT) TimeWindow{start=1341434280, end=1341434339} interval=0 Count: 109 Type: (RT) TimeWindow{start=1341435120, end=1341435177} interval=0 Count: 101 Type: (RT) TimeWindow{start=1341436260, end=1341436319} interval=0 Count: 111 Type: (RT) TimeWindow{start=1341436320, end=1341436378} interval=0 Count: 112 Type: (RT) TimeWindow{start=1341439140, end=1341439199} interval=0 Count: 109 Type: (RT) TimeWindow{start=1341439200, end=1341439257} interval=0 Count: 114 Type: (RT) TimeWindow{start=1341439320, end=1341439379} interval=0 Count: 102 Type: (RT) TimeWindow{start=1341439380, end=1341439437} interval=0 Count: 107 Type: (RT) TimeWindow{start=1341447540, end=1341447599} interval=0 Count: 229 Type: (RT) TimeWindow{start=1341447600, end=1341447659} interval=0 Count: 164 Type: (RT) TimeWindow{start=1341447660, end=1341447719} interval=0 Count: 102 Type: (RT) TimeWindow{start=1341448200, end=1341448259} interval=0 Count: 118 Type: (RT) TimeWindow{start=1341450841, end=1341450897} interval=0 Count: 105 Type: (RT) TimeWindow{start=1341511260, end=1341511319} interval=0 Count: 106 Type: (RT) TimeWindow{start=1341523680, end=1341523739} interval=0 Count: 163 Type: (RT) TimeWindow{start=1341523740, end=1341523799} interval=0 Count: 148 Type: (RT) TimeWindow{start=1341523800, end=1341523859} interval=0 Count: 105 Type: (RT)

Case B: Sliding 1 minute windows - window slides by 1 second

This generates many more windows - 73238 windows that satisfy the minimum count (>100) criteria.

Results are attached as a separate file rather than copy-pasting here.

Question 2:

Number of intervals that remain the same as real time, in order tweet stream

Late allowance common window count(out of 1224)
30s 0
60s 1
100s 9
500s 990

Actual results are attached as separate files