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#!/usr/bin/env python3
#!/usr/local/spark/python3
from __future__ import print_function
from pyspark.sql.functions import *
from pyspark import SparkConf, SparkContext
from pyspark.sql import SQLContext
import sys
import pyspark.sql.functions as func
import argparse
import time
from pyspark.sql.functions import count, avg
from pyspark.sql.types import StringType
from pyspark.sql.window import Window

sc = SparkContext()
sqlContext = SQLContext(sc)
def run(args):

    #starts timer
    start_time = time.time()
    #import recordings the text files (recordings data) in the folder given as a spark dataframe
    recordings = sqlContext.read.load(args.recordings + '/*.txt', format="text", header=True)
    #select the STN, YEARMODA, and TEMP columns
    recordings = recordings.select(recordings.value.substr(1, 6).alias('STN'), recordings.value.substr(15, 8).alias('YEARMODA'), recordings.value.substr(27, 4).alias('TEMP'))
    #Filter out the extra headers
    recordings = recordings.filter((recordings.STN != 'STN') & (recordings.YEARMODA != 'YEARMODA') & (recordings.TEMP != 'TEMP'))

    #import recordings the csv files (weather station location) in the folder given as a spark dataframe
    stalocs = sqlContext.read.format('com.databricks.spark.csv').options(header='true', inferschema=True).load(args.locations + '/*.csv')

    #Select only the month values in the YEARMODA column from format yyyyymmdd
    recordings = recordings.withColumn('YEARMODA', recordings['YEARMODA'].substr(5, 2))
    #convert the numerical months into strings
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '01', 'January'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '02', 'February'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '03', 'March'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '04', 'April'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '05', 'May'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '06', 'June'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '07', 'July'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '08', 'August'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '09', 'September'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '10', 'October'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '11', 'November'))
    recordings = recordings.withColumn('YEARMODA', regexp_replace('YEARMODA', '12', 'December'))

    #Filter out country to US, and States/territories that are in the statelist
    recordings = recordings.filter(recordings.STN IN ('US-AL', 'US-AK', 'US-AZ', 'US-CA', 'US-CO', 'US-CT', 'US-DE', 'US-FL', 'US-GA', 'US-HI', 'US-IL', 'US-IN', 'US-IA', 'US-KS', 'US-KY', 'US-LA', 'US-ME', 'US-MD', 'US-MI', 'US-MN', 'US-MO', 'US-NE', 'US-NH', 'US-NJ', 'US-NM', 'US-NY', 'US-NC', 'US-ND', 'US-OH', 'US-OK', 'US-OR', 'US-PA', 'US-RI', 'US-S.C.', 'US-S.D.', 'US-TX', 'US-UT', 'US-VT', 'US-WA', 'US-WI', 'US-WY'))

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stalocs = stalocs.where(stalocs.STATE.isNotNull())
stalocs = stalocs.filter(stalocs['CTRY'] == 'US')
statelist = ['AL', 'AK', 'AS', 'AZ', 'AR', 'CA', 'CO', 'CT', 'DE', 'DC', 'FM', 'FL', 'GA', 'GU', 'HI',
             'ID', 'IL', 'IN', 'IA', 'KS', 'KY', 'LA', 'ME', 'MH', 'MD', 'MA', 'MI', 'MN', 'MS', 'MO',
             'MT', 'NE', 'NV', 'NH', 'NJ', 'NM', 'NY', 'NC', 'ND', 'MP', 'OH', 'OK', 'OR', 'PW', 'PA',
             'PR', 'RI', 'SC', 'SD', 'TN', 'TX', 'UT', 'VT', 'VI', 'VA', 'WA', 'WV', 'WI', 'WY', 'AE',
             'AA', 'AP']

#select only the USAF and STATE columns
stalocs = stalocs.select("USAF", "STATE")
stalocs = stalocs.filter(stalocs['STATE'].isin(statelist))

#join the recordings from all the years wit the station locations based on USAF == STN
join = recordings.join(stalocs, recordings['STN'] == stalocs['USAF'])
#Group the joined df, and find the average temp for each state and month
final = join.groupBy("STATE", "YEARMODA").agg(avg("TEMP"), count("*"))
#round the average temp to 3 decimal places
final = final.withColumn("avg(TEMP)", func.round(final["avg(TEMP)"], 3))

#create window partition to partition by State, and order by month
windowSpec = Window.partitionBy(final['STATE']).orderBy(final['YEARMODA'].desc()).rangeBetween(-sys.maxsize, sys.maxsize)
# dataframe = sqlContext.table("final")
#function for calculating difference between max avg temp and min avg temp for each State
temp_diff = (func.max(final['avg(TEMP)']).over(windowSpec) - func.min(final['avg(TEMP)']).over(windowSpec))
#create new df with max average, min average, and temp difference
finaly = final.select(
    final['STATE'],
    final['YEARMODA'],
    final['avg(TEMP)'],
    temp_diff.alias("td"), func.max(final['avg(TEMP)']).over(windowSpec), func.min(final['avg(TEMP)']).over(windowSpec))
#rename min and max columns
finaly = finaly.withColumnRenamed('max(avg(TEMP)) OVER (PARTITION BY STATE ORDER BY YEARMODA DESC NULLS LAST RANGE BETWEEN UNBOUNDED PRECEDING AND UNBOUNDED FOLLOWING)',
finaly = finaly.withColumnRenamed('min(avg(TEMP)) OVER (PARTITION BY STATE ORDER BY YEARMODA DESC NULLS LAST RANGE BETWEEN UNBOUNDED PRECEDING AND UNBOUNDED FOLLOWING)',

#Create new df with only the MAX average temps for each state its month. each state will appear only once
finalymax = finaly.select(final['STATE'],finaly['YEARMODA'],finaly['avg(TEMP)'],finaly['td'],finaly['max'],finaly['min']).where((finaly['avg(TEMP)'] == finaly['max']))
# Create new df with only the MIN average temps for each state its month. each state will appear only once
finalymin = finaly.select(final['STATE'],finaly['YEARMODA'],finaly['avg(TEMP)'],finaly['td'],finaly['max'],finaly['min']).where((finaly['avg(TEMP)'] == finaly['min']))

print('AVERAGE TEMP FOR EACH STATE AND MONTH')
print('-----')
final = final.sort("STATE", 'YEARMODA')
final.show(636)

finalymin = finalymin.withColumn("min", finalymax["min"].cast(StringType()))
finalymax = finalymax.withColumn("max", finalymax["max"].cast(StringType()))

print("MAXIMUM AVG TEMP FOR EACH STATE AND ITS MONTH")
print('-----')

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finalymax = finalymax.withColumn("max", finalymax["max"].cast(StringType()))

print("MAXIMUM AVG TEMP FOR EACH STATE AND ITS MONTH")
print('-----')
for f in finalymax.collect():
    print('The MAXIMUM average temp for ' + f['STATE'] + ' was ' + f['max'] + ' during the month of ' + f['YEARMODA'])
print('-----')
print("MINIMUM AVG TEMP FOR EACH STATE AND ITS MONTH")
print('-----')
for f in finalymin.collect():
    print('The MINIMUM average temp for ' + f['STATE'] + ' was ' + f['min'] + ' during the month of ' + f['YEARMODA'])

final.coalesce(1).write.format('com.databricks.spark.csv').save(args.output + 'avgTemp.state.csv', header='true')
finalymax.coalesce(1).write.format('com.databricks.spark.csv').save(args.output + 'Max_avgtemp.csv', header='true')
finalymin.coalesce(1).write.format('com.databricks.spark.csv').save(args.output + 'Min_avgtemp.csv', header='true')

end_time = time.time()
total_time = end_time - start_time
print("Execution time in seconds: ", total_time)

__name__ == '__main__':
    parser = argparse.ArgumentParser()
    # Required arguments.
    parser.add_argument(
        "-l",
        "--locations",
        required=True,
        help="Path to directory to locations")
    parser.add_argument(
        "-r",
        "--recordings",
        required=True,
        help="Path to directory containing text file recordings")
    parser.add_argument(
        "-o",
        "--output",
        required=True,
        help="Path to directory of csv outputs")

    args = parser.parse_args()
    run(args)
```

!python 2006.py --r ./weather --l ./weather/loc --o ./weather

19/12/01 00:04:36 WARN Utils: Your hostname, fad-System-Product-Name resolves to a loopback address: 127.0.1.1; using 192.168.1.8 instead (on interface wlp6s0)

19/12/01 00:04:36 WARN Utils: Set SPARK_LOCAL_IP if you need to bind to another address

19/12/01 00:04:36 WARN 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)`.

AVERAGE TEMP FOR EACH STATE AND MONTH

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                                         +-----+-----+-----+-----+
|STATE| YEARMODA|avg(TEMP)|count(1)|
+-----+-----+-----+
| AK| April| 28.478| 31977|
| AK| August| 52.271| 24118|
| AK| December| 18.021| 24494|
| AK| February| 19.754| 29298|
| AK| January| 18.417| 31888|
| AK| July| 54.521| 26840|
| AK| June| 50.219| 32125|
| AK| March| 17.851| 32191|
| AK| May| 41.671| 32980|
| AK| November| 20.649| 23701|
| AK| October| 31.681| 24577|
| AK|September| 46.628| 23696|
| AL| April| 63.859| 5749|
| AL| August| 81.296| 4301|
| AL| December| 51.562| 4487|
| AL| February| 48.477| 5279|
| AL| January| 47.651| 5717|
| AL| July| 80.093| 4768|
| AL| June| 79.366| 5841|
| AL| March| 57.961| 5850|
| AL| May| 71.79| 5977|
| AL| November| 53.644| 4297|
| AL| October| 64.499| 4429|
| AL|September| 74.789| 4254|
| AR| April| 60.502| 6559|
| AR| August| 80.894| 5098|
| AR| December| 42.657| 5184|
| AR| February| 42.86| 6162|

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AR	January	40.526	6834
AR	July	79.811	5641
AR	June	77.71	6747
AR	March	54.468	6835
AR	May	69.24	6913
AR	November	50.403	5046
AR	October	60.917	5250
AR	September	71.204	5064
AZ	April	64.317	6932
AZ	August	78.65	5250
AZ	December	45.264	5287
AZ	February	50.824	6407
AZ	January	46.253	7025
AZ	July	76.111	5679
AZ	June	78.225	6942
AZ	March	57.202	7191
AZ	May	74.55	7146
AZ	November	57.925	5163
AZ	October	66.948	5334
AZ	September	76.846	5148
CA	April	57.602	23929
CA	August	72.366	18001
CA	December	48.124	18576
CA	February	51.275	22459
CA	January	49.247	24463
CA	July	72.594	19831
CA	June	68.621	24155
CA	March	53.892	24661
CA	May	64.038	24878
CA	November	56.774	17950
CA	October	62.332	18509
CA	September	68.493	17775
CO	April	43.233	8798
CO	August	66.264	6698
CO	December	24.131	6812
CO	February	27.41	8271
CO	January	23.18	9150
CO	July	68.828	7408
CO	June	62.735	8869
CO	March	35.691	9125
CO	May	53.518	9065
CO	November	36.354	6641
CO	October	46.151	6770

CO	September	56.488	6491
CT	April	49.085	2662
CT	August	70.636	2050
CT	December	36.415	2154
CT	February	30.74	2534
CT	January	31.757	2776
CT	July	72.951	2247
CT	June	66.965	2650
CT	March	37.889	2859
CT	May	57.9	2716
CT	November	44.457	2100
CT	October	55.362	2106
CT	September	65.021	2082
DC	April	57.773	30
DC	August	76.54	30
DC	December	41.265	31
DC	February	40.214	28
DC	January	32.229	31
DC	July	77.44	15
DC	June	74.397	30
DC	March	45.529	31
DC	May	66.319	31
DC	November	47.683	30
DC	October	58.784	31
DC	September	72.543	30
DE	April	54.152	1102
DE	August	75.736	819
DE	December	41.476	919
DE	February	36.278	1038
DE	January	37.116	1147
DE	July	76.732	894
DE	June	72.446	1102
DE	March	44.352	1114
DE	May	62.869	1137
DE	November	48.133	859
DE	October	59.471	885
DE	September	69.26	832
FL	April	71.33	17131
FL	August	82.565	12717
FL	December	65.285	13190
FL	February	61.382	15833
FL	January	61.379	17439
FL	July	81.672	14079

FL	June	80.847	17017
FL	March	66.776	17547
FL	May	76.626	17632
FL	November	65.23	12674
FL	October	74.798	13081
FL	September	80.223	12494
GA	April	63.99	9985
GA	August	80.865	7497
GA	December	52.295	7825
GA	February	48.884	9467
GA	January	48.221	10346
GA	July	79.53	8287
GA	June	78.847	10012
GA	March	57.392	10395
GA	May	71.423	10353
GA	November	53.492	7492
GA	October	64.545	7684
GA	September	74.366	7426
HI	April	72.038	2533
HI	August	77.724	1854
HI	December	72.548	1922
HI	February	69.768	2347
HI	January	70.941	2536
HI	July	77.325	2035
HI	June	76.399	2551
HI	March	71.377	2641
HI	May	73.967	2627
HI	November	74.303	1853
HI	October	76.219	1921
HI	September	77.161	1797
IA	April	49.528	11938
IA	August	72.74	9042
IA	December	25.393	9111
IA	February	23.356	11272
IA	January	23.395	12436
IA	July	74.585	9981
IA	June	70.898	11903
IA	March	38.18	12344
IA	May	61.961	12352
IA	November	38.863	8870
IA	October	52.428	9267
IA	September	63.07	8781
ID	April	43.342	4170

ID	August	67.558	3203
ID	December	25.441	3243
ID	February	28.935	3899
ID	January	24.627	4362
ID	July	72.362	3506
ID	June	61.683	4132
ID	March	35.491	4334
ID	May	54.141	4323
ID	November	36.181	3130
ID	October	44.921	3223
ID	September	56.968	3076
IL	April	53.0	13098
IL	August	74.755	9945
IL	December	32.352	10265
IL	February	28.769	12261
IL	January	29.92	13624
IL	July	74.612	10977
IL	June	72.657	13044
IL	March	43.465	13586
IL	May	63.297	13585
IL	November	42.657	9854
IL	October	55.4	10214
IL	September	66.621	9782
IN	April	52.509	4498
IN	August	74.108	3377
IN	December	33.047	3519
IN	February	28.338	4229
IN	January	30.237	4639
IN	July	74.046	3718
IN	June	71.732	4418
IN	March	42.454	4603
IN	May	62.404	4588
IN	November	42.461	3385
IN	October	55.357	3453
IN	September	66.466	3321
KS	April	54.481	6038
KS	August	78.864	4582
KS	December	32.741	4639
KS	February	34.449	5664
KS	January	32.811	6194
KS	July	79.094	5061
KS	June	75.005	6036
KS	March	47.072	6217

KS	May	65.508	6225
KS	November	44.705	4504
KS	October	57.179	4647
KS	September	67.643	4508
KY	April	57.234	3144
KY	August	78.057	2342
KY	December	40.328	2392
KY	February	36.497	2908
KY	January	37.011	3170
KY	July	75.913	2601
KY	June	74.338	3128
KY	March	49.411	3169
KY	May	65.584	3240
KY	November	45.949	2308
KY	October	58.389	2433
KY	September	69.784	2324
LA	April	67.928	7329
LA	August	82.524	5385
LA	December	55.369	5664
LA	February	55.16	6667
LA	January	52.453	7076
LA	July	81.742	6002
LA	June	80.866	7317
LA	March	62.593	7332
LA	May	74.928	7475
LA	November	59.533	5576
LA	October	69.182	5678
LA	September	77.418	5190
MA	April	47.179	5808
MA	August	68.767	4202
MA	December	34.986	4477
MA	February	29.058	5447
MA	January	30.123	6006
MA	July	71.517	4646
MA	June	65.1	5685
MA	March	36.046	6006
MA	May	56.441	5985
MA	November	43.114	4311
MA	October	52.997	4374
MA	September	62.865	4214
MD	April	54.793	3861
MD	August	75.692	2943
MD	December	40.416	3301

MD	February	35.986	3562
MD	January	36.455	3984
MD	July	76.508	3372
MD	June	72.806	4065
MD	March	44.899	3911
MD	May	63.48	4010
MD	November	47.146	3202
MD	October	58.762	3224
MD	September	68.873	2913
ME	April	42.324	4219
ME	August	63.67	3180
ME	December	25.692	3256
ME	February	20.909	3900
ME	January	20.766	4292
ME	July	66.621	3480
ME	June	61.132	4226
ME	March	29.347	4310
ME	May	52.449	4357
ME	November	37.773	3183
ME	October	48.034	3248
ME	September	58.007	3139
MI	April	44.906	16569
MI	August	68.276	12426
MI	December	27.862	13024
MI	February	22.056	15367
MI	January	24.554	16979
MI	July	68.786	13863
MI	June	64.578	16585
MI	March	32.652	16988
MI	May	54.958	17248
MI	November	37.968	12646
MI	October	49.957	12806
MI	September	60.881	12362
MN	April	43.772	20977
MN	August	67.955	15968
MN	December	17.253	16130
MN	February	14.836	19591
MN	January	16.38	21548
MN	July	71.154	17570
MN	June	65.35	20887
MN	March	29.335	21666
MN	May	56.291	21669
MN	November	32.587	15745

MN	October	46.807	16149
MN	September	58.905	15624
MO	April	55.493	4663
MO	August	78.257	3498
MO	December	34.872	3562
MO	February	33.655	4341
MO	January	33.221	4745
MO	July	77.524	3903
MO	June	74.547	4697
MO	March	47.706	4783
MO	May	65.675	4826
MO	November	45.299	3468
MO	October	56.977	3562
MO	September	67.688	3436
MS	April	64.919	3833
MS	August	81.985	2749
MS	December	51.438	2958
MS	February	49.742	3583
MS	January	48.125	3848
MS	July	80.781	3156
MS	June	79.994	3948
MS	March	59.072	3965
MS	May	72.783	4004
MS	November	54.42	2722
MS	October	65.22	2838
MS	September	75.158	2745
MT	April	42.692	3780
MT	August	68.142	2986
MT	December	22.695	2948
MT	February	24.322	3522
MT	January	24.147	3869
MT	July	72.894	3303
MT	June	61.696	3935
MT	March	33.5	3905
MT	May	53.628	3909
MT	November	33.804	2816
MT	October	44.158	2959
MT	September	55.771	2980
NC	April	60.634	15546
NC	August	78.958	11746
NC	December	48.682	12290
NC	February	44.43	14773
NC	January	44.159	16322

NC	July	77.559	12925
NC	June	75.846	15520
NC	March	52.561	16211
NC	May	67.06	16085
NC	November	51.074	11845
NC	October	61.767	12243
NC	September	71.658	11745
ND	April	42.314	2570
ND	August	68.501	1955
ND	December	15.397	2013
ND	February	13.656	2372
ND	January	16.402	2658
ND	July	72.138	2175
ND	June	63.709	2600
ND	March	26.856	2633
ND	May	54.362	2646
ND	November	29.852	1950
ND	October	43.858	2013
ND	September	57.451	1940
NE	April	48.639	7936
NE	August	73.603	6035
NE	December	25.61	6157
NE	February	27.386	7422
NE	January	26.458	8135
NE	July	76.31	6651
NE	June	70.132	7928
NE	March	39.404	8199
NE	May	61.059	8194
NE	November	38.514	5950
NE	October	51.186	6125
NE	September	62.618	5920
NH	April	43.666	3020
NH	August	64.893	2274
NH	December	27.533	2376
NH	February	22.349	2798
NH	January	22.781	3093
NH	July	67.834	2525
NH	June	62.73	3010
NH	March	30.335	3057
NH	May	53.834	3121
NH	November	37.69	2302
NH	October	48.103	2337
NH	September	58.802	2232

NJ	April	52.089	3497
NJ	August	73.145	2608
NJ	December	38.525	2737
NJ	February	33.02	3309
NJ	January	34.227	3580
NJ	July	75.293	2861
NJ	June	70.166	3442
NJ	March	41.409	3637
NJ	May	61.075	3575
NJ	November	45.99	2659
NJ	October	56.308	2695
NJ	September	66.736	2572
NM	April	56.07	5431
NM	August	73.492	4154
NM	December	36.284	4100
NM	February	41.791	5022
NM	January	35.723	5518
NM	July	75.116	4522
NM	June	74.074	5431
NM	March	48.593	5647
NM	May	65.274	5656
NM	November	46.171	4022
NM	October	56.957	4202
NM	September	65.802	4106
NV	April	55.998	2725
NV	August	81.074	2090
NV	December	35.063	2047
NV	February	41.831	2701
NV	January	36.318	2904
NV	July	82.584	2257
NV	June	76.394	2701
NV	March	48.178	2895
NV	May	68.098	2752
NV	November	48.18	2144
NV	October	57.776	2171
NV	September	70.671	2054
NY	April	47.968	8128
NY	August	69.407	5981
NY	December	33.304	6300
NY	February	26.885	7613
NY	January	28.886	8414
NY	July	71.263	6667
NY	June	66.606	8027

NY	March	35.053	8399
NY	May	57.181	8335
NY	November	41.89	6002
NY	October	52.805	6201
NY	September	63.198	5925
OH	April	51.639	7308
OH	August	73.076	5582
OH	December	34.099	5853
OH	February	27.948	6925
OH	January	30.308	7572
OH	July	72.675	6078
OH	June	69.985	7336
OH	March	40.111	7566
OH	May	60.963	7587
OH	November	42.262	5591
OH	October	54.524	5660
OH	September	65.603	5457
OK	April	60.441	10214
OK	August	82.251	7679
OK	December	40.414	7661
OK	February	43.097	9592
OK	January	40.092	10454
OK	July	81.98	8559
OK	June	78.406	10157
OK	March	54.673	10575
OK	May	69.514	10582
OK	November	51.224	7561
OK	October	62.052	7733
OK	September	71.83	7506
OR	April	47.216	6092
OR	August	65.509	4651
OR	December	36.259	4725
OR	February	39.177	5640
OR	January	36.482	6175
OR	July	67.969	5103
OR	June	60.657	6167
OR	March	42.584	6252
OR	May	55.461	6313
OR	November	44.041	4591
OR	October	50.037	4748
OR	September	59.482	4576
PA	April	51.173	7568
PA	August	71.494	5724

PA	December	35.315	5915
PA	February	29.135	6992
PA	January	31.345	7761
PA	July	72.616	6321
PA	June	68.857	7568
PA	March	39.642	7762
PA	May	60.0	7732
PA	November	42.892	5683
PA	October	53.829	5833
PA	September	64.403	5607
PR	April	78.442	243
PR	August	82.797	188
PR	December	78.323	189
PR	February	76.707	226
PR	January	76.692	270
PR	July	82.201	196
PR	June	81.635	224
PR	March	77.091	267
PR	May	80.108	259
PR	November	79.664	204
PR	October	81.991	205
PR	September	82.581	209
RI	April	48.504	1650
RI	August	70.896	1325
RI	December	38.128	1313
RI	February	32.17	1544
RI	January	33.539	1686
RI	July	73.009	1427
RI	June	66.294	1665
RI	March	38.623	1679
RI	May	57.3	1707
RI	November	46.055	1374
RI	October	56.017	1378
RI	September	65.389	1272
SC	April	63.378	5074
SC	August	81.187	3424
SC	December	51.899	3654
SC	February	48.085	4758
SC	January	46.855	5106
SC	July	79.782	3829
SC	June	78.557	5092
SC	March	55.774	5185
SC	May	70.433	5311

SC	November	53.487	3433
SC	October	64.284	3536
SC	September	74.331	3370
SD	April	44.669	4354
SD	August	71.513	3182
SD	December	20.852	3327
SD	February	20.626	4050
SD	January	21.825	4485
SD	July	75.471	3618
SD	June	66.546	4389
SD	March	33.361	4460
SD	May	57.324	4520
SD	November	34.376	3221
SD	October	47.231	3253
SD	September	60.139	3144
TN	April	59.52	2294
TN	August	79.77	1721
TN	December	43.313	1762
TN	February	40.562	2126
TN	January	39.973	2336
TN	July	77.685	1905
TN	June	76.09	2310
TN	March	52.496	2348
TN	May	67.634	2369
TN	November	47.773	1709
TN	October	59.787	1763
TN	September	71.049	1704
TX	April	67.079	31852
TX	August	82.851	23809
TX	December	50.791	24562
TX	February	53.819	29768
TX	January	49.162	32688
TX	July	82.003	26342
TX	June	81.338	31697
TX	March	61.381	32874
TX	May	74.603	32858
TX	November	58.83	23678
TX	October	68.199	24209
TX	September	76.133	23231
UT	April	49.962	3796
UT	August	76.062	2904
UT	December	26.906	2927
UT	February	32.682	3599

UT	January	25.372	3951
UT	July	79.602	3079
UT	June	70.759	3715
UT	March	41.372	3966
UT	May	61.161	3888
UT	November	40.62	2859
UT	October	50.43	2948
UT	September	63.67	2834
VA	April	57.221	10859
VA	August	76.881	8240
VA	December	43.869	8485
VA	February	39.054	10187
VA	January	39.635	11190
VA	July	76.273	8993
VA	June	73.762	10750
VA	March	48.294	11130
VA	May	64.61	11244
VA	November	48.573	8145
VA	October	59.399	8390
VA	September	69.275	8146
VI	April	77.585	117
VI	August	83.271	92
VI	December	78.701	93
VI	February	77.554	112
VI	January	77.669	124
VI	July	83.275	101
VI	June	82.556	120
VI	March	77.678	124
VI	May	81.066	122
VI	November	80.457	89
VI	October	81.527	92
VI	September	82.85	90
VT	April	45.315	1428
VT	August	65.287	1074
VT	December	27.245	1049
VT	February	21.805	1228
VT	January	21.598	1363
VT	July	68.287	1198
VT	June	63.982	1469
VT	March	30.633	1364
VT	May	54.701	1550
VT	November	37.835	1018
VT	October	47.811	1052

VT	September	59.495	1056
WA	April	47.5	9099
WA	August	65.088	6973
WA	December	35.22	7021
WA	February	38.754	8511
WA	January	35.824	9271
WA	July	67.151	7633
WA	June	60.729	9150
WA	March	42.42	9436
WA	May	55.404	9462
WA	November	42.834	6874
WA	October	49.601	7113
WA	September	59.395	6860
WI	April	44.953	12883
WI	August	68.432	9707
WI	December	22.078	10111
WI	February	18.612	11911
WI	January	19.93	13128
WI	July	70.078	10788
WI	June	65.243	12855
WI	March	32.062	13136
WI	May	56.042	13352
WI	November	35.872	9871
WI	October	48.837	10098
WI	September	60.218	9698
WV	April	53.777	2848
WV	August	72.281	2101
WV	December	38.801	2180
WV	February	32.62	2584
WV	January	34.608	2878
WV	July	71.05	2364
WV	June	68.913	2825
WV	March	44.559	2875
WV	May	60.731	2935
WV	November	43.729	2154
WV	October	54.534	2204
WV	September	65.164	2111
WY	April	41.333	3844
WY	August	67.873	2961
WY	December	20.959	3041
WY	February	24.646	3639
WY	January	21.343	4019
WY	July	71.857	3300

WY	June	61.534	3931
WY	March	32.853	4052
WY	May	52.109	4074
WY	November	34.509	2956
WY	October	43.651	3044
WY	September	55.144	2956

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MAXIMUM AVG TEMP FOR EACH STATE AND ITS MONTH

The MAXIMUM average temp for AZ was

78.65 during the month of August

The MAXIMUM average temp for SC was 81.187 during the month of August

The MAXIMUM average temp for LA was 82.524 during the month of August

The MAXIMUM average temp for MN was 71.154 during the month of July

The MAXIMUM average temp for NJ was 75.293 during the month of July

The MAXIMUM average temp for DC was 77.44 during the month of July

The MAXIMUM average temp for OR was 67.969 during the month of July

The MAXIMUM average temp for VA was 76.881 during the month of August

The MAXIMUM average temp for RI was 73.009 during the month of July

The MAXIMUM average temp for KY was 78.057 during the month of August

The MAXIMUM average temp for WY was 71.857 during the month of July

The MAXIMUM average temp for NH was 67.834 during the month of July

The MAXIMUM average temp for MI was 68.786 during the month of July

The MAXIMUM average temp for NV was 82.584 during the month of July

The MAXIMUM average temp for WI was 70.078 during the month of July

The MAXIMUM average temp for ID was 72.362 during the month of July

The MAXIMUM average temp for CA was 72.594 during the month of July

The MAXIMUM average temp for CT was 72.951 during the month of July

The MAXIMUM average temp for NE was 76.31 during the month of July

The MAXIMUM average temp for MT was 72.894 during the month of July

The MAXIMUM average temp for NC was 78.958 during the month of August

The MAXIMUM average temp for VT was 68.287 during the month of July

The MAXIMUM average temp for MD was 76.508 during the month of July

The MAXIMUM average temp for DE was 76.732 during the month of July

The MAXIMUM average temp for MO was 78.257 during the month of August

The MAXIMUM average temp for VI was 83.275 during the month of July

The MAXIMUM average temp for IL was 74.755 during the month of August

The MAXIMUM average temp for ME was 66.621 during the month of July

The MAXIMUM average temp for ND was 72.138 during the month of July

The MAXIMUM average temp for WA was 67.151 during the month of July

The MAXIMUM average temp for MS was 81.985 during the month of August

The MAXIMUM average temp for AL was 81.296 during the month of August

The MAXIMUM average temp for IN was 74.108 during the month of August

The MAXIMUM average temp for OH was 73.076 during the month of August
The MAXIMUM average temp for TN was 79.77 during the month of August
The MAXIMUM average temp for IA was 74.585 during the month of July
The MAXIMUM average temp for NM was 75.116 during the month of July
The MAXIMUM average temp for PA was 72.616 during the month of July
The MAXIMUM average temp for SD was 75.471 during the month of July
The MAXIMUM average temp for NY was 71.263 during the month of July
The MAXIMUM average temp for TX was 82.851 during the month of August
The MAXIMUM average temp for WV was 72.281 during the month of August
The MAXIMUM average temp for GA was 80.865 during the month of August
The MAXIMUM average temp for MA was 71.517 during the month of July
The MAXIMUM average temp for KS was 79.094 during the month of July
The MAXIMUM average temp for CO was 68.828 during the month of July
The MAXIMUM average temp for FL was 82.565 during the month of August
The MAXIMUM average temp for AK was 54.521 during the month of July
The MAXIMUM average temp for AR was 80.894 during the month of August
The MAXIMUM average temp for OK was 82.251 during the month of August
The MAXIMUM average temp for PR was 82.797 during the month of August
The MAXIMUM average temp for UT was 79.602 during the month of July
The MAXIMUM average temp for HI was 77.724 during the month of August

MINIMUM AVG TEMP FOR EACH STATE AND ITS MONTH

The MINIMUM average temp for AZ was

45.264 during the month of December
The MINIMUM average temp for SC was 46.855 during the month of January
The MINIMUM average temp for LA was 52.453 during the month of January
The MINIMUM average temp for MN was 14.836 during the month of February
The MINIMUM average temp for NJ was 33.02 during the month of February
The MINIMUM average temp for DC was 32.229 during the month of January
The MINIMUM average temp for OR was 36.259 during the month of December
The MINIMUM average temp for VA was 39.054 during the month of February
The MINIMUM average temp for RI was 32.17 during the month of February
The MINIMUM average temp for KY was 36.497 during the month of February
The MINIMUM average temp for WY was 20.959 during the month of December
The MINIMUM average temp for NH was 22.349 during the month of February
The MINIMUM average temp for MI was 22.056 during the month of February
The MINIMUM average temp for NV was 35.063 during the month of December
The MINIMUM average temp for WI was 18.612 during the month of February
The MINIMUM average temp for ID was 24.627 during the month of January
The MINIMUM average temp for CA was 48.124 during the month of December
The MINIMUM average temp for CT was 30.74 during the month of February
The MINIMUM average temp for NE was 25.61 during the month of December

The MINIMUM average temp for MT was 22.695 during the month of December
The MINIMUM average temp for NC was 44.159 during the month of January
The MINIMUM average temp for VT was 21.598 during the month of January
The MINIMUM average temp for MD was 35.986 during the month of February
The MINIMUM average temp for DE was 36.278 during the month of February
The MINIMUM average temp for MO was 33.221 during the month of January
The MINIMUM average temp for VI was 77.554 during the month of February
The MINIMUM average temp for IL was 28.769 during the month of February
The MINIMUM average temp for ME was 20.766 during the month of January
The MINIMUM average temp for ND was 13.656 during the month of February
The MINIMUM average temp for WA was 35.22 during the month of December
The MINIMUM average temp for MS was 48.125 during the month of January
The MINIMUM average temp for AL was 47.651 during the month of January
The MINIMUM average temp for IN was 28.338 during the month of February
The MINIMUM average temp for OH was 27.948 during the month of February
The MINIMUM average temp for TN was 39.973 during the month of January
The MINIMUM average temp for IA was 23.356 during the month of February
The MINIMUM average temp for NM was 35.723 during the month of January
The MINIMUM average temp for PA was 29.135 during the month of February
The MINIMUM average temp for SD was 20.626 during the month of February
The MINIMUM average temp for NY was 26.885 during the month of February
The MINIMUM average temp for TX was 49.162 during the month of January
The MINIMUM average temp for WV was 32.62 during the month of February
The MINIMUM average temp for GA was 48.221 during the month of January
The MINIMUM average temp for MA was 29.058 during the month of February
The MINIMUM average temp for KS was 32.741 during the month of December
The MINIMUM average temp for CO was 23.18 during the month of January
The MINIMUM average temp for FL was 61.379 during the month of January
The MINIMUM average temp for AK was 17.851 during the month of March
The MINIMUM average temp for AR was 40.526 during the month of January
The MINIMUM average temp for OK was 40.092 during the month of January
The MINIMUM average temp for PR was 76.692 during the month of January
The MINIMUM average temp for UT was 25.372 during the month of January
The MINIMUM average temp for HI was 69.768 during the month of February

Execution time in seconds:

59.756956815719604