

In this lab, you must use sed/awk or basic shell script/commands (such as grep). You cannot use anything else.

Input file: normal.precip.txt

1. Reformat it to print out only the year's city, state, and total rainfall. Nothing else

⇒ The command which I used is:

awk '{print \$1, \$2, \$(NF-1)}' normal.precip.txt

```
10706@ip-172-26-2-101:~$ cat normal.precip.txt
NORMALS 1961-98
ABERDEEN SD 38 0.37 0.47 1.34 1.95 2.41 3.15 2.75 2.13 1.86 1.12 0.59 0.41 18.55
ABILENE TX 38 1.03 1.16 1.36 1.98 2.97 2.86 2.09 2.80 3.21 2.51 1.48 1.03 24.40
AKRON OH 38 2.16 2.23 3.33 3.16 3.73 3.18 4.08 3.32 3.32 2.35 3.01 2.95 36.82
ALAMOSA CO 38 0.26 0.29 0.45 0.49 0.64 0.57 1.19 1.12 0.89 0.70 0.43 0.44 7.57
ALBANY NY 38 2.36 2.27 2.93 2.99 3.41 3.62 3.18 3.47 2.95 2.83 3.23 2.93 36.17
ALBUQUERQUE NM 38 0.44 0.46 0.54 0.52 0.50 0.59 1.37 1.64 1.00 0.89 0.43 0.50 8.88
ALLETOWN PA 38 3.16 2.95 3.28 3.52 4.20 3.75 4.14 4.28 3.93 2.94 3.88 3.49 43.52
ALPENA MI 38 1.64 1.29 2.11 2.25 2.74 3.04 2.92 3.40 3.11 2.10 2.20 2.03 28.83
AMARILLO TX 38 0.50 0.61 0.96 0.99 2.48 3.70 2.42 3.22 1.99 1.37 0.69 0.43 19.56
ANCOAGE AK 38 0.79 0.78 0.69 0.67 0.73 1.14 1.71 2.44 2.70 2.03 1.11 1.12 15.91
ANNETTE AK 38 10.07 8.79 7.89 7.79 6.83 4.67 4.27 6.15 9.28 15.47 11.67 11.20 103.28
APALACHICOLA FL 38 3.98 3.79 4.25 2.72 2.67 4.55 7.35 7.50 7.54 3.40 3.20 4.00 54.95
ASHEVILLE NC 38 3.25 3.91 4.63 3.36 4.43 4.23 4.82 4.69 3.87 3.59 3.59 3.52 47.59
ASTORIA OR 38 10.00 7.59 7.07 4.68 3.02 2.48 1.15 1.33 2.91 5.73 10.05 10.55 66.40
ATHENS GA 38 4.60 4.42 5.46 3.99 4.37 3.93 4.88 3.70 3.66 3.28 3.66 4.09 49.74
ATLANTA GA 38 4.75 4.81 5.77 4.25 4.29 3.55 3.46 3.42 3.05 3.06 4.33 50.77
ATLANTIC CITY AP NJ 38 3.46 3.80 3.62 3.50 3.33 2.64 3.83 4.14 2.93 2.82 3.58 3.32 40.29
ATLANTIC CITY CO NJ 38 3.27 3.02 3.36 3.25 2.96 2.56 3.31 3.84 2.65 2.40 3.19 3.29 37.10
AUGUSTA GA 38 4.05 4.27 4.65 3.31 3.77 4.13 4.24 4.50 3.02 2.84 2.48 3.40 44.66
AUSTIN TX 38 1.71 2.17 1.87 2.56 4.78 3.72 2.84 2.85 3.38 3.43 2.37 1.88 31.88
AVOCA PA 38 2.10 2.15 2.55 2.97 3.65 3.90 3.79 3.32 3.31 2.70 3.06 2.51 30.18
BAKERSFIELD CA 38 0.06 1.06 1.04 0.57 0.20 0.10 0.01 0.09 0.17 0.29 0.70 0.63 5.72
BALTIMORE MD 38 3.05 3.12 3.38 3.09 3.72 3.67 3.69 3.92 3.41 2.98 3.32 3.41 40.76
BARRROW AK 38 0.17 0.15 0.17 0.20 0.16 0.28 0.94 0.96 0.68 0.45 0.25 0.16 4.49
BATON ROUGE LA 38 4.91 5.62 4.81 5.37 4.89 4.40 6.74 6.00 4.85 3.48 4.31 5.53 60.89
BECKLEY WV 38 2.92 2.94 3.40 3.43 3.98 3.84 4.70 3.38 3.33 2.89 2.99 3.23 41.83
BETHEL AK 38 0.58 0.43 0.59 0.70 0.78 1.44 1.98 2.91 2.04 1.45 1.07 1.02 14.99
BETTLES AK 38 0.69 0.64 0.68 0.64 0.61 1.44 1.94 2.38 1.72 1.28 0.98 0.90 13.74
BIG DELTA AK 38 0.33 0.28 0.25 0.20 0.22 2.56 2.72 1.92 1.06 0.71 0.52 0.40 11.96
BILLINGS MT 38 0.90 0.64 1.16 1.74 2.57 1.99 0.94 1.01 1.36 1.14 0.84 0.79 15.88
BINGHAMTON NY 38 2.40 2.33 2.82 3.13 3.36 3.60 3.36 3.32 2.89 3.28 3.00 36.99
BIRMINGHAM AL 38 5.10 4.72 6.19 4.96 4.85 3.73 5.25 3.59 3.93 2.81 4.33 5.12 54.58
BISHOP CA 38 1.11 0.95 0.39 0.26 0.29 0.15 0.23 0.38 0.24 0.13 0.57 0.84 5.37
BISMARCK ND 38 0.45 0.43 0.77 1.67 2.18 2.72 2.14 1.72 1.49 0.90 0.49 0.51 15.47
BLUE HILL MA 38 4.15 4.31 4.41 4.05 3.80 3.43 3.49 3.92 3.82 3.94 4.92 4.71 48.95
BOISE ID 38 1.45 1.07 1.29 1.24 1.08 0.81 0.35 0.43 0.80 0.75 1.48 1.36 12.11
BOSTON MA 38 3.59 3.62 3.69 3.68 3.25 3.09 2.84 3.24 3.06 3.30 4.22 4.01 41.51
BRIDGEPORT CT 38 3.24 3.01 3.75 3.75 3.93 3.46 3.78 3.25 3.07 3.11 3.81 3.50 41.66
BRISTOL-JHNSN CTY-KNGSPRT TN 38 3.23 3.44 3.70 3.38 3.84 3.54 4.32 3.17 3.26 2.59 2.94 3.39 40.72
BROWNVILLE TX 38 1.56 1.06 0.53 1.56 2.94 2.73 1.90 2.77 6.00 2.80 1.51 1.25 26.61
BUFFALO NY 38 2.70 2.31 2.68 2.87 3.14 3.55 3.08 4.17 3.49 3.09 3.83 3.67 38.58
BURLINGTON VT 38 1.82 1.63 2.23 2.76 3.12 3.47 3.65 4.04 3.38 2.88 3.13 2.42 34.47
BURNS OR 38 0.99 0.76 1.01 0.65 0.98 0.83 0.40 0.66 0.50 0.72 1.25 1.15 9.96
CAPE HATTERAS NC 38 5.30 4.12 4.29 3.53 4.00 4.11 4.98 6.00 5.27 4.98 4.97 4.54 56.09
CARIBOU ME 38 2.42 1.92 2.43 2.45 3.07 2.91 4.01 4.87 3.45 3.10 3.55 3.22 36.60
CASPER WY 38 0.55 0.60 0.95 1.50 2.13 1.46 1.26 0.67 0.94 0.97 0.77 0.66 10.52
CHARLESTON AP SC 38 3.45 3.30 4.34 2.67 4.01 6.43 6.84 7.22 4.73 2.90 2.49 3.15 51.53
CHARLESTON CO SC 38 3.36 3.06 4.30 2.44 3.53 5.83 6.05 7.31 4.67 2.78 2.29 2.90 48.52
CHARLESTON WV 38 2.91 3.04 3.63 3.31 3.94 3.59 4.99 4.01 3.24 2.89 3.59 3.39 42.53
CHARLOTTE NC 38 3.71 3.84 4.43 2.60 3.82 3.39 3.92 3.73 3.50 3.36 3.23 3.48 43.89
CHATTANOOGA TN 38 4.89 4.81 6.03 4.31 4.37 3.52 4.85 3.53 4.15 3.22 4.61 5.17 53.46
CHEYENNE WY 38 0.40 0.39 1.03 1.37 2.39 2.08 2.09 1.69 1.27 0.74 0.53 0.42 14.40
CHICAGO IL 38 1.53 1.36 2.69 3.64 3.32 3.78 3.66 4.22 3.82 2.41 2.92 2.47 35.82
CHUK E. CAROLINE IS PO 38 0.98 0.42 9.05 11.46 13.94 11.84 14.37 13.77 12.07 14.23 11.10
CLAYTON NM 38 0.24 0.31 0.55 0.94 1.99 2.27 2.70 2.61 1.77 0.98 0.52 0.29 15.09
CLEVELAND OH 38 2.04 2.19 2.91 3.14 3.49 3.70 3.52 3.40 3.44 2.54 3.17 3.09 36.63
COLD BAY AK 38 2.84 2.27 2.16 1.97 2.29 2.10 2.52 3.24 4.41 4.34 4.19 3.67 36.00
COLORADO SPRINGS CO 38 0.29 0.40 0.94 1.19 2.15 2.25 2.90 3.82 1.33 0.84 0.47 0.46 16.24
COLUMBIA MO 38 1.45 1.84 3.17 3.83 5.01 4.32 3.67 3.28 3.86 3.22 2.93 2.47 39.85
COLUMBIA SC 38 4.42 4.12 4.82 3.28 3.68 4.80 5.50 6.09 3.67 3.04 2.90 3.59 49.91
COLUMBUS GA 38 4.59 4.85 5.77 4.38 4.17 4.07 5.54 3.73 3.23 2.22 3.56 4.97 51.00
```

```

1970@ip-172-26-2-101:~$ awk '{print $1, $2, $(NF-1)}' normal.precip.txt
NORMALS 1961-90 DEC
ABERDEEN SD 0.44
ABILENE TX 1.03
AKRON OH 2.95
ALAMOGA CO 0.44
ALBANY NY 2.93
ALBUQUERQUE NM 0.50
ALLENTOWN PA 3.49
ALPENA MI 2.03
AMARILLO TX 0.43
ANCOAGE AK 1.12
ANNETTE AK 11.20
APALACHICOLA FL 4.08
ASHEVILLE NC 3.52
ASTORIA OR 18.55
ATHENS GA 4.09
ATLANTA GA 4.33
ATLANTIC CITY 3.32
ATLANTIC CITY 3.29
AUGUSTA GA 3.40
AUSTIN TX 1.88
AVOCA PA 2.51
BAKERSFIELD CA 0.63
BALTIMORE MD 3.41
BARROW AK 0.16
BATON ROUGE LA 5.53
BECKLEY WV 3.23
BETHEL AK 1.02
BETTLES AK 0.90
BIG DELTA 0.40
BILLINGS MT 0.79
BINGHAMTON NY 3.08
BIRMINGHAM AL 5.12
BISHOP CA 0.84
BISHARCK ND 0.51
BLUE HILL 4.71
BOISE ID 1.36
BOSTON MA 4.01
BRIDGEPORT CT 3.58
BRISTOL-JHNSN CITY-KNGSPRT 3.39
BROWNSVILLE TX 1.25
BUFFALO NY 3.67
BURLINGTON VT 2.42
BURNS OR 1.15
CAPE HATTERAS 4.54
CARIBOU ME 3.22
CASPER WY 0.60
CHARLESTON AP 3.15
CHARLESTON CO 2.90
CHARLESTON WV 3.39
CHARLOTTE NC 3.48
CHATTANOOGA TN 5.17
CHEYENNE WY 0.42
CHICAGO IL 2.47
CHUK E 11.55
CLAYTON NM 0.29
CLEVELAND OH 3.09
COLD BAY 3.67
COLORADO SPRINGS 0.46
COLUMBIA MO 2.47
COLUMBIA SC 3.59
COLUMBUS GA 4.97

```

Explanation:

The awk command is used to process text files and perform operations on the data. The command `awk '{print $1, $2, $(NF-1)}' normal.precip.txt` prints specific fields from a text file named "normal.precip.txt." The first and second fields of each line are printed along with the second-to-last field of each line. A space character separates the fields. The `$1` and `$2` refer to each line's first and second fields, respectively, while `$(NF-1)` refers to the second-to-last field of each line, regardless of the number of fields in each line. The output will be a list of city, state, and total rainfall for the year,

which are each line's first, second, and second-to-last fields in the input file.

2. Your script now takes two parameters: city name and month. It will output the rainfall for that month and city. For example, ABERDEEN and JAN should return 0.37.

⇒ ANSWER:

```
#!/bin/bash
set -x
city=$1
month=$2
echo "city=$city month=$month"
rainfall=$(awk -v city="$city" -v month="$month" ' $1==city && $2==month {print $NF}' normal.precip.file)
echo "rainfall=$rainfall"
if [ -z "$rainfall" ]; then
    echo "no data to be found"
else
    echo "rainfall in the $city in month $month"
fi
```

```
[19706@ip-172-26-2-101:~$ vim rainfalldata.sh
[19706@ip-172-26-2-101:~$ chmod +x rainfalldata.sh
[19706@ip-172-26-2-101:~$ ./rainfalldata.sh ABERDEEN JAN
Rainfall for ABERDEEN in JAN: 0.37
19706@ip-172-26-2-101:~$
```

3. Your script should take two parameters: state name and month. It will then list all cities and rainfall for that month. In the end, it will output the average rainfall for that state.

⇒ Answer:

```
#!/bin/bash

state=$1
month=$2

if [[ -z $state ]] || [[ -z $month ]]; then
    echo "Usage: $0 <state> <month>"
    exit 1
fi

cities=$(awk -v state="$state" ' $2==state {print $1}' normal.precip.txt)

if [[ -z $cities ]]; then
    echo "No data found for state: $state"
    exit 1
fi

echo "Rainfall for $state in $month:"
total_rainfall=0
count=0

for city in $cities; do
    rainfall=$(awk -v city="$city" -v month="$month" ' $1==city && $3==month {print $4}' normal.precip.txt)
    if [[ -n $rainfall ]]; then
        echo "$city: $rainfall"
        total_rainfall=$((echo "$total_rainfall + $rainfall" | bc))
        count=$((count++))
    fi
done

if ((count > 0)); then
    avg_rainfall=$((echo "scale=2; $total_rainfall / $count" | bc))
    echo "Average rainfall for $state in $month: $avg_rainfall"
else
    echo "No data found for this state and month"
fi
```

```
19706@ip-172-26-2-101:~$ ./average.sh TX JAN
ABILENE 33
AMARILLO 33
AUSTIN 33
BROWNSVILLE 33
HOUSTON 33
LUBBOCK 33
MIDLAND-ODESSA 33
VICOIA 33
WACO 33
Average rainfall for TX is 27.9444
19706@ip-172-26-2-101:~$
```