**Description**

Create a new program called “**A7-CallCenterOpReport**”.

This program will read records from a data file named “**A7.dat**”; interprets the data using an array; performs analysis and writes a formatted report output to a file named “**A7- CallCenterOpReport.out**”.

The objective of this assignment is to focus on the use of arrays.

This program is to report on the activity of our call centre operators.

There are many different operators, some full-time, some part-time or contract.

Each month we calculate the number of calls that each operator has answered and produce the data file your program will use, which shows data from the past 12 months.

Starter code is available in the file “**A7-CallCenterOpReport-starter.cbl**”.

**Input File**

Download the required data file (**A7.dat**) from DC Connect.

Formatted the data would look like this:

Op # Op. Name July Aug Sept. Oct. Nov. Dec. Jan Feb March April May June

X(3) X(12) 9(3) for each of the 12 months

A12 JOHN 100 129 88 92 111 74 28 43 115 88 11 34

A14 ANNE 92 114 112 77 121 80 17 50 100 91 14 88

B10 ADAM 0 0 0 0 0 0 0 0 0 0 0 0

B12 JOANNE 104 129 88 92 0 0 0 0 55 0 0 8

Note: This sample data does not match the data in the input file exactly

**General Notes**

* You MUST use OCCURS on the input record and detail line for monthly volume values (July – June)
* The program is to produce the report shown on the last page of this document. You do not have to match the exact spacing, but headings should be aligned over the columns of data.
* DO NOT LOAD THE INPUT DATA INTO A LARGE TABLE FOR PROCESSING. YOU SHOULD PROCESS EACH INPUT RECORD TO GATHER THE REQUIRED DETAILS TO ALLOW YOU TO CALCULATE THE VALUES FOR EACH OPERATOR, AND STORE THE REQUIRED VALUES TO CALCULATE THE SUMMARY TOTALS AND SUMMARY VALUES IN THE OUTPUT.
* Averages where remainder is not being retained should always be rounded

**Requirements**

1. Print your name/assignment at the top of the page in the usual manner. No line counting is required, single space each detail line.
2. Use an OCCURS CLAUSE on the input record to access the sales values and on the detail line to print them out.
3. Use PERFORM… VARYING to process the monthly volume values.
   1. Sum the 12 values in the array to calculate and print out the operator volume total for the 12 month period.

* 1. Calculate and print the operator monthly average calls as shown.

1. For any month when the value is zero, that month is **not** to be included in the average calculation. See Joanne #B12 in the data above where we would divide by 9, not by 12.
2. Use the REMAINDER option on the DIVIDE statement to calculate the remainder. Print a remainder of zero as 0.
3. If a record has 0 for all 12 values the average cannot be calculated because it would be division by zero.   
   The program is to print the word ZERO for the average.   
   (REDEFINE the average variable for the output of this literal)   
   See Amanda #C22 in the data file and output.
4. Count the number of records with no calls (zero for all 12 months), and print out the count with a short title.

In the sample data,   
this answer would be 1 (Adam, #B10 has all zeroes).

1. Count the total number of months with zero calls for any operator and print out the total with a short title.

In the sample data,   
this answer would be 18 = 12 for ADAM + 6 for JOANNE

1. Total and print the total calls, total of avg, and total of remainder for all operators   
   (NOTE: this is a sum of the columns and not calculated from the row of operators with calls, and total calls, and avg calls for each month that appears underneath the columns)
2. Count and print out the total number of calls for all operators and total number of calls for each month.
3. Count and print out the number of operators with calls in each month.
4. Calculate the average number of calls in each month.

If a month has no calls then the average would be zero.

1. Determine the operator with the highest and operator with the lowest non-zero monthly call average.

For duplicates, choose the first operator you find in each case.

Print out the operator # and average for each as shown on the sample report.

1. Finally, determine the month with the HIGHEST MONTHLY AVERAGE. For duplicates, choose the first month you find.
2. Write out the actual column index of the MONTH

(example: July would be 01, August 02, etc.)

1. Write out the MONTH name

(Jul, Aug, Sep, Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun)  
(NOTE: Use a table with month names, and retrieve the month name based on the MONTH as the index)

**Submission Requirements**

**Turn in a zip or 7z archive containing the Visual Studio (VS) project and solution files to the drop box in your DC Connect Lab Section**

**Marking**

**25** marks for following the programming standards document

**2** marks for report heading stored in working-storage and output on first page only

**2** marks for each page heading stored in working-storage and output on each page

**17** marks for column headings aligned over detail line columns

**17** marks for columns in detail line having correct output format and valid data

**15** marks for correct rounded calculations of calculated fields in detail line  
(5 marks each for Total,   
Average (should be printed as “ZERO” when all the months have 0 values),   
Remainder)   
*(NOTE: marks will be deducted if you blindly divide total calls by total months in the case of a record having 0 for all 12 values, read the requirement 3(b) one more time)*

**4** marks for blank line before and after report heading, blank line before summary totals

**39** marks for 36 monthly total values and 3 grand total values having correct format and correct calculations  
(# of Operators with calls for each month, Total calls for each month,   
Avg calls rounded for each month,   
Grand Total of operator total calls, Grand Total of operator avg calls,   
Grand Total of operator avg calls remainder)

**9** marks for 9 correct summary values   
(Number of Operators with no calls,   
Number of Months where operators had no calls,   
Operator with the Highest Monthly Average (number of operator and average), Operator with the Lowest Monthly Average (number of operator and average),   
Month with the Highest Monthly Average *(number and name of the month)*   
and Overall total calls)

**2** marks for complete VS project submission in zip or 7z file  
**2** marks for correct program name

**2** marks for correct output file name

**4** marks for structure chart

**Total 140 marks**

Your Name, Assignment 7

Call Centre Volumes for July - June

Operator Operator Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Total Avg REM

# Name

A12 JOHN 100 129 88 92 111 74 92 114 112 77 121 80 1190 99 2

A14 ANNE 92 114 112 77 121 80 100 129 88 92 111 74 1190 99 2

B10 ADAM 0 0 0 0 0 0 104 129 88 92 0 0 413 103 1

B12 JOANNE 104 129 88 92 0 0 65 0 45 67 87 100 777 86 3

B13 LEE 119 104 80 95 131 74 92 111 74 92 114 112 1198 99 0

B14 MARGARET 90 0 0 0 120 121 112 77 121 80 100 129 950 105 5

B35 NOAH 0 0 0 0 0 0 0 0 0 0 0 0 0 ZERO 0

Operators with calls 5 4 4 4 4 4 6 5 6 6 5 5

Totals 505 476 368 356 483 349 565 560 528 500 533 495 5718 686 14

Averages 101 119 92 89 121 87 94 112 88 83 107 99

Number of Operators with No Calls: 1

Number of Months where Operators have No Calls: 26

Operator with the Highest Monthly Average: B14 105

Operator with the Lowest Monthly Average: B12 86

Month with the Highest Monthly Average: 5 NOV

Overall Total Calls: 5718

**NOTE: the data in the sample report is not the actual data in the input file provided.**