**CSCI 465/565 Assignment 5 Fall 2017**

**COBOL Tables  
 150 points**

**Overview**

In this assignment we are using single and multi-dimensional tables to process a business day's worth of broker deposit and sales data and create two reports.

Up to this point, we have only considered one mutual fund but, in reality, the firm manages many more funds and with branches offices all over the world.

Each business day, each broker is able to sell mutual fund shares from any of those offered by the firm.  The number of shares of each mutual fund sold by a broker each business day depends on the closing price of each share of each mutual fund sold and, of course, the deposit (in dollars and cents) for that mutual fund sold by a broker during that business day.

This program will have three input files found in members (DATA5A), (DATA5B), and (DATA5C) in the current semester's data PDS.  These three PDS members represent, respectively:

1) The number and name of each mutual fund managed by the firm.  
2) Two daily closing prices for a share of each of those mutual   
 funds.  
3)  The broker deposit and sales file.

The first of these PDS members, DATA5A, is unsorted.  Before you begin executing your COBOL program, you will need to sort the data set using a JCL EXEC step that runs DFSORT (see example).  Sort it in ascending order on the mutual fund number (first two bytes, zoned decimal).  Write the sorted data to a temporary data set which you will pass to the executing step of your program and use as input instead of DATA5A itself.  
   
Open and read the first file from beginning to end and fill, or "build", the first dimension of a two-dimensional COBOL table.  The first dimension of this table needs to be a variable length table using an OCCURS DEPENDING ON phrase.  Close the first file.  Open and read the data from the second file from beginning to end and fill, or "build", the second dimension of the same two-dimensional COBOL table.  Close   
  
the second file.  After the two-dimensional table is "built", you can open and begin processing the third file from beginning to end and creating the "MUTUAL FUND DEPOSIT AND SALES REPORT".

**The Mutual Fund Table**

The first dimension of this *variable length* two-dimensional table will hold the mutual fund number, the name of the mutual fund, the total deposit accumulated during the business day and the number of shares sold and accumulated during the business day.  Already sorted by mutual fund number, the data from the first input file will provide the mutual fund number and mutual fund name in the following format:

FUND-NUMBER       PIC 9(2).      A value between 1 and 99.  
FUND-NAME         PIC X(25).  
FILLER            PIC X(53).

The fund number is an integer value between 1 and 99 and there CAN be up to 99 mutual funds.  The first dimension must be indexed and, after being built, will be in ascending order based on the fund number.  This dimension will have 99 entries.

The second dimension of this two-dimensional table should have one field that occurs twice, each ready to hold one of the two daily closing prices for each mutual fund.  The first of these closing prices represents the standard closing price and the second represents the customer loyalty closing price which is a discounted price given only to customers that have invested with the firm for more than 10 years.

Already sorted into the correct order based on the mutual fund number, the data from the second input file will provide the two closing prices in the following format:

STANDARD-PRICE          PIC 9(3)V99.  
LOYALTY-PRICE           PIC 9(3)V99.  
FILLER                  PIC X(70).

(In reality, it is somewhat idiotic to have a second dimension in the Mutual Fund Table but using one here will give you exposure to and practice in manipulating a two-dimensional table.)

**The Mutual Fund Deposit and Sales File**

Each record of the broker sales file represents a one-dimensional table.  This means that there will be a one-dimensional table definition under the FD for this file.

At the beginning of each sales record are the city name and broker name.

CITY-NAME          PIC X(20).  
BROKER-NAME        PIC X(20).

Following the broker name is where the one-dimensional table data is found.  Although a bit unrealistic but to simplify things, a broker can only sell up to four different mutual funds per day.

FUND-NUMBER        PIC 9(2).

PRICE-FLAG         PIC 9.      A value of 1 if the deposit is for a   
 regular, or standard, customer or 2 if   
 the deposit is for a loyalty customer.  
DEPOSIT-AMT       PIC 9(5)V99.

Along with the city name and broker name, adding up to 40 bytes, these four 10-byte sets of fund sales information make up 80 bytes total.  Please note that the deposit amount is now only seven bytes long.  Also note that one or more of these four fund sales sets of data may contain all zeros if the broker sells fewer than four mutual funds during the day.  If the fund number is set to zoned decimal zeros, you can ignore the rest of the data on the record and move on to the next sales record in the file.

For each record representing a broker's sales for the business day, you must first move his or her city name and broker name to the detail line of the MUTUAL FUND DEPOSIT AND SALES REPORT.

You will then parse each of the four 10-byte fund sales sets of data.  For each that has a fund number greater than 0, do a binary search using the sales record's fund number as the search key into the first dimension of the Mutual Fund Table.  If a match is found, move the fund number and the fund name from the Mutual Fund Table to the detail line following the broker's name.  Note that the broker's region, city, and name should only appear on the first detail line for his or her first, or perhaps only, sale of the day.  Then move the   
  
deposit amount to the detail line.  Then you will, depending on the price flag, move either 'S' to the detail line for standard price or 'L' for loyalty price and use the correct of the two prices to compute the number of shares sold in this transaction and move the number of shares to the detail line.  You will not need to compute or report broker commission for this report.

Count the number of brokers reported and the grand total of all of the deposits as you process the sales file.

**Details about the Report**

1. Center the titles under one another at the top of each page,   
 including the totals pages. This should include the name of the   
 firm as used in previous assignments as the title and MUTUAL FUND   
 DEPOSIT AND SALES REPORT' as a subtitle.

2. Each page should have the date in MM/DD/YYYY  format at the far   
 left of the first header line and 'PAGE:  ' with page number in   
 format ZZ9 at the far right of the first header line.

3. Each page should have the time in HH:MM format at the far left of   
 the second header line.

4. Double-spaced after the second of the page headers, or titles,   
 should be an appropriate column header (which can be two lines if   
 necessary) and, single-spaced after that, a line of appropriately   
 placed hyphens.

5. Maximum of 16 double-spaced broker detail lines per page.  It is   
 permissible to page break while listing a broker's four possible   
 sales for the day.

6. Use the full 132 bytes available to spread out your headers and   
 detail lines.

7. All arithmetic calculations for dollars and cents should be   
 rounded to two decimal places.  All for share amounts should be   
 rounded to three decimal places with a fourth decimal place set   
 to 0 when displayed.

8. All numeric-edited fields should be correctly edited with a   
 floating dollar sign (when dollars and cents), commas between the   
 thousands, and decimal points.

9. Remember to ONLY print the broker's region, city name, and broker   
 name on the first of the four possible detail lines reporting his   
 or her daily sale(s).

If the binary search for a matching mutual fund in the Mutual Fund Table returns a not found condition, only move 'MUTUAL FUND NOT   
  
FOUND:  ' followed by a numeric-edited display of the mutual fund number not found to the detail line beginning where the fund number from a good sales transaction would be displayed.  Display NOTHING else on the detail line following this information.

At the end of this report and at the top of a new page, double space and center a third title of 'SALES TOTALS'.  Double-spaced after this third header, center three column headers and, single-spaced after that, a line of appropriately placed hyphens.  Double-spaced below this display the number of brokers, the total of all deposits rounded, of course, to two decimal places, and the average deposit per broker reported rounded, of course, to two decimal places.

**Other Notes**

You MUST use the COPYLIB members FUNDTBL, FUNDREC, PRICEREC, and SALESREC in copy library, or "copylib", PDS KC02322.CSCI465.COPYLIB at least once each in your program.

DFSORT is necessary for this program for member DATA5A.

Call the COBOL intrinsic date function only once in your program and NOT inside of a loop.

Do NOT put a long string of COBOL commands within any part of the SEARCH ALL binary search structure.  You can PERFORM a new paragraph or two, if necessary, at that point.

Once again, you may use the COBOL compiler followed by a Loader step to develop your program.  Of course, you will have to sort the DATA5A data set BEFORE you execute your COBOL program using the Loader.  The DFSORT step can either come before the COBOL Compiler step or immediately after it.  Here is a suggested order:

1)  COBOL Compiler  
2)  DFSORT  
3)  Loader

Be careful to follow the guidelines in the course notes book about COBOL and JCL documentation.

Submit the .txt file with the above three steps on Blackboard before the time and date at which it is due.