**Introduction**

The Mainframe Development 1 team programming project is a group project that will create 4 interlinked COBOL programs. Groups are comprised of either 2-3 members that belong to the same class section. You will choose your group, BUT you will have to advise your professor by email of the names of your group members to confirm the group enrollment.

**No individual submissions will be accepted**. If you have not identified your group, then you might be assigned to a group randomly. You will only be able to access the necessary input data once you have enrolled in a group.

This assignment is worth **20% of your overall grade.**

The system is to process sales records from the Point-of-Sale (POS) devices at our stores. There are 3 types of transactions (Sales, Returns and Layaways), and the store accepts Cash, Credit and Debit for payment types.

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# Flow of Data Through Project Deliverables



# Program #1 – EDIT

## Description:

The EDIT program is responsible for editing the input records. Records will be output into two files - valid and invalid. An error report file will be created.

## POS DATA Field Layout

Transaction Code – position 1 – pic X.

Transaction Amount – position 2-8 – pic 9(5)V99

Payment Type – position 9-10 – pic XX.

Store Number – position 11-12 – pic XX or 99

Invoice Number – position 13-21 – pic X(9)

SKU Code – position 22-36 – pic X(15)

Edit Rules:

1. All records must have a Transaction Code of either ‘S’, ‘R’ or ‘L’.
2. The Transaction Amount must be numeric.
3. The Payment Type must be ‘CA’, ‘CR’ or ‘DB’.
4. The Store Number must be one of ‘01’, 02’, ‘03’, ‘04’, ‘05’, or ‘12’.
5. The Invoice Number must be in the format XX-000000 where XX means the entry must be alphabetic and the 0 means numeric only.
6. The Invoice Number XX can only be A or B or C or D or E
7. The Invoice Number XX cannot have two letters the same.
8. The Invoice Number 000000 cannot be greater than 900000 or less than 100000.
9. All records should have a dash ‘-‘ in position 3 of the Invoice Number.
10. The SKU Code is a 15-character alphanumeric code that cannot be empty (spaces).

## Processing

Loop through each record in the file and edit according to the rules.

If a record is valid (no edit errors) then write the entire record into the VALID DATA file for later use (See Systems flowchart).

If a record fails one or more edits then:

1. Write the entire record into the INVALID DATA file
2. Add entries to the ERRORS report showing the record in error and as many errors as exist.

The VALID DATA file and the INVALID DATA file have the same layout as the POS DATA file.

You are to design your own ERRORS report. Consider the layout of error reports in Assignments 7 and 8. There are 10 edit rules, so there could be a maximum of 10 errors per record.

For control purposes the ERRORS report will include:

* Number of records read
* Number of valid records
* Number of invalid records

Note that if 30 records were input there might be 24 good records and 6 in error. Make sure these counts sum correctly.

# PROGRAM #2 – DATA SPLIT AND COUNT

## Description

The DATA SPLIT AND COUNT program is responsilble for dividing the input data records into 2 output data files according to Transaction Code and generating a report of the totals of each type of record.

This program is only processing VALID DATA so there is no error checking.

## VALID DATA Field Layout

Since Program #1 copied whole data records the VALID DATA file SHOULD look the same as the POS DATA file. If you altered the record layout on the output of the first program then you will have to adjust accordingly.

## Processing

Transaction code ‘S’ is for a Sale, ‘L’ is for Layaway (which is considered a variation of a sale) and ‘R’ is for Return.

Loop through each record in the file and write the record to either:

1. the S&L RECORDS data file if TRANSACTION CODE is ‘S’ or ‘L’
2. The RETURNS RECORDS data file. If TRANSCTION CODE is ‘R’.

Generate a COUNTS AND CONTROL TOTALS report. You are to design your own layout for this report but it is to include information for each transaction code as follows:

### TRANSACTION CODE ‘S’ or ‘L’

Present the following analysis:

* Total number of S&L records and corresponding Total Amount
* Total number of ‘S’ records and corresponding Total Amount
* Total number of ‘L’ records and corresponding Total Amount
* Total transaction amount for each of the stores
* % number of transactions in each Payment Type category

(for S&L only, type ‘R’ does not count)

### TRANSACTION CODE ‘R’

Present the following analysis:

* Total number of ‘R’ records and corresponding Total Amount for each of the stores
* Total number of ‘R’ records and corresponding Total Amount

### TRANSACTION CODE ‘S’ or ‘L’ or ‘R’

Present the following analysis:

* Grand Total Amount (S&L Total Amount – ‘R’ total amount).

# PROGRAM #3 – S&L PROCESSING

## Description

The S&L PROCESSING program is responsible for producing a detail report of all sales with some summary statistics at the end.

## S&L RECORDS Field Layout

Since Programs #2 copied whole data records the S&L RECORDS file should look the same as the VALID DATA file. If you altered the record layout on the output of the program 2 then adjust accordingly.

## Processing

For each record from the input file produce one line of output.

Report formatting requirements include;

* Single space
* Report heading
* Column headings
* 20 lines per page
* Page numbers

Each detail record must show all 6 fields from the input record and a calculated field “Tax Owing”.

The “Tax Owing” field is calculated as 13% of the Transaction Amount (which does not include the tax).

The summary section of the report (after all detail records) will show:

* Total number of S&L records and corresponding Total Amount
* Total number of ‘S’ records and corresponding total Amount
* Total number of ‘L’ records and corresponding Total Amount
* The number and percentages of each of the Payment Types
  + ‘CA’ for cash, ‘CR’ for Credit Card or ‘DB’ for Debit
  + the 3 percentages should total 100%
* Total Tax Owing
* The Store number that has the highest S&L total transaction amount
* The Store number that has the lowest S&L total transaction amount

Hints:

1. using arrays will make the Store number analysis easier)
2. the total numbers and amounts must match those from Program2.

# PROGRAM #4 – RETURNS PROCESSING

## Description

The RETURNS PROCESSING program is responsible for producing a detail report of returns with some summary statistics at the end.

## RETURNS RECORDS Field Layout

Since Programs #2 copied whole data records the RETURNS RECORDS file should look the same as the VALID DATA file. If you altered the record layout on the output of program 2 then adjust accordingly.

## Processing

For each record from the input file produce one line of output

Report formatting requirements include;

* Single space
* Report heading
* Column headings
* 20 lines per page
* Page numbers

Each detail record must show all 6 fields from the input record and a calculated field “Tax Owed”.

The “Tax Owed” field is calculated as 13% of the Transaction Amount (which does not include the tax).

The summary section of the report (after all detail records) will show:

* Total number of ‘R’ records for each of the 6 stores and the corresponding Total Amount
* Total number of ‘R’ records and corresponding Total Amount
* Total Tax Owed to Us

Hints:

1. using arrays will make the Store number analysis easier)
2. the total numbers and amounts must match those from Program2.

# COMPLETION and SUBMISSION

You can package the 4 programs as a single Visual Studio solution, or as four separate solutions. You may want to consider using a version control system for this, so that group members can gain easy access to your latest work.

Submit the electronic files for the 4 Reports shown in the Systems Flowchart:

1. Errors
2. Counts and Controls
3. S&L Report
4. Returns Report

Submit VISUAL STUDIO solution(s) containing all 4 programs shown in the Systems Flowchart:

1. Edit
2. Data Split and Count
3. S&L Processing
4. Returns Processing

It is mandatory that a comment is included in each program indicating the actual author(s) of each of the programs.

Each student will also submit a peer evaluation of themselves and the other members of their group to the DC Connect Dropbox. Failure to submit a peer evaluation will result in a mark of 0 for that portion of the project.

## EVALUATION – 100%

Program #1 – 20%  
Program #2 – 20%  
Program #3 – 15%  
Program #4 – 15%  
Visual Studio Packaging – 15%  
Peer Evaluation – 15%

* Peer evaluation will be discussed in class closer to the due date, but each group member will evaluate their own performance in the team environment as well as evaluate each other group member’s contribution.