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Analyzing a COBOL Data Name during maintenance

Definition of what happens in a COBOL program (*background*)

DATA PROCESSING is what it is all about in a COBOL program. You have DATA and it is being processed in the PROCEDURE DIVISION.

- There are two major DIVISIONs in a COBOL program, the DATA Division and the PROCESSING Division (more correctly named the PROCEDURE Division).
- In today's world, we have so many new names like IT for Information Technology, that the term DATA PROCESSING is out of date and not heard as often.
- Yes, we have the Environment Division for bringing a FILE into or out of a program, or we use CALLs to access files. We also have the ID DIVISION to create a name for our program.

Difficulty of COBOL Maintenance

It could be a simple one-line change, such as correcting a VALUE to what it should be.

More difficult changes require following the logic of the PROCEDURE DIVISION, (*hopefully the COBOL program is in a structured format**) and then tracing a data field through that structure for all used references for understanding, and then make appropriate changes for a modified COBOL program.

How Data is Traced

Tracing Data is done first and then modification is done to complete the process. Without additional software beyond a COBOL compiler, there are certain steps to follow:

- Find the Data Field in the DATA DIVISION and quickly review any attributes, such as the record it belongs to, PICTURE size, USAGE and so on. Usually do a FIND on this name to find the field.
- Look at all references to this field. These references are shown alongside data field or in cross reference map.
- Review each references and make note (maybe write down) those that are significant to this modification
- Look at the top down structure of the program and determine the order routines are PERFORMed for a clearer understanding of how this data field is processed
- Holding all this information in your mind to visualize what is fully happening and then make the change

Using Control/DCD to trace the data for you

There are several ways to get Narrative like that shown below, created in Control/DCD. The Narrative on a COBOL data field example shown below is taken from Control/DCD's DDM (Digital Documentation Manual) in

PDF format for reading on other media off the mainframe. Narrative is also available on the mainframe in three other formats.

Getting immediately to Analysis on a data-field in the DDM requires the use of an & (ampersand) just before the data-name as follows: **&CR-RED-ACCT**

This one-time search provides **instant analysis** on everything needed to do create very complete analysis!

The following analysis offers the following information:

- **Data Attributes** (From-To positions, parent 01 record, PIC, etc.)
- *Relevant to this data-name* **Forward-Tracing** (by PERFORMED Routine)
 - See [Forward Tracing](#) for info on full Forward-Tracing available
- **Procedure Division Activity** within Performed Routine

```
(0429) &CR-RED-ACCT / This field: \  
In 13-16 of 01 CR-BILLING-RECORD ==> Data Attributes <==  
In WORKING-STORAGE  
05 CR-RED-ACCT  
PIC S9(7) VALUE ZEROS  
USAGE COMP-3  
  
01 PROGRAM-ENTRY ==> Forward Tracing <==  
02 B-PROCESS-INPUT --> (Perform/UNTIL)  
03 BM-DO-ACCT-VERIFCATION  
02 F-FORMAT-NEW-RECD --> (4 Performs)  
03 FRA-ADJUST-RED-ACCT  
  
PROGRAM-ENTRY ==> Activity by Routine <==  
MOVE 135 TO CR-RED-ACCT (729)  
MOVE 19 TO CR-RED-ACCT (741)  
MOVE 103 TO CR-RED-ACCT (769)  
B-PROCESS-INPUT --> (Perform/UNTIL)  
IF CR-RED-ACCT = 19 (1135)  
IF CR-RED-ACCT = BR-RED-ACCT @343 (1162)  
BM-DO-ACCT-VERIFICATION  
MOVE 136 TO CR-RED-ACCT (1291)  
IF CR-RED-ACCT NOT = ZERO (1325)  
F-FORMAT-NEW-RECORD  
IF CR-RED-ACCT = BR-RED-ACCT @343 (1721)  
FRA-ADJUST-RED-ACCT  
MOVE 999999 TO CR-RED-ACCT (1983)
```

Example Narrative generated for every data field

- Numbers in parenthesis such as (0429) or (729) show the sequence number in the program where the data field resides or the Procedure Division line number of Procedure Division activity.
- Numbers after an @character show where the other data field in a MOVE that resides in the Data Division.

It can take an hour or two one time to fully get use to the Narrative created by Control/DCD. Once this process of understanding is over, the time difference between putting together the UNDERSTANDING of what happens to one data-field can easily be a couple minutes versus 15 or more minutes for each data field.

*Less than well-structured program is a major consideration in modifying COBOL programs and are not the topic of this short article. See [Forward Tracing](#) and [Perform Errors](#) for articles that cover well-structured programs.

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