ABSTRACT
A mainstay of database languages is the SCAN loop. This feature allows a programmer to loop through a table and perform tasks using the information in each record. SAS has similar functionality with the built-in loop of the DATA step. However, the constraints of DATA step programming greatly limit what tasks a programmer can perform. A programmer cannot, for example, begin a PROC step or another DATA step while looping within a DATA step. The limitations inherent in the DATA step can be frustrating constraints, but it is possible to create a work-around using macros and the %DO loop. To do this, a SAS program must pull one record at a time from a data set and then store any fields of interest within macro variables. Any program step can now access the contents of a record. Performing these tasks within a %DO loop provides a good simulation of the SCAN loop available in other database languages.

PROCEDURE
A programmer can loop through each record in a SAS data set using a DATA step, but the programmer cannot begin any other program steps while within this loop. Similarly, a programmer can repeat a series of DATA and/or PROC steps a number of times using the %DO loop, but she lacks access to the contents of the records of another data set. By using both of these constructs, a programmer can read each record in a table and perform any number of program steps using the contents of the record.

In order to do this, a programmer must first obtain the number of records in a table and store this value to a macro variable. A %DO loop will be incremented once for each record, and it is necessary to know how many times this counter must be incremented. This following bit of code (modified from a similar bit of code from In the Know… SAS Tips & Techniques From Around the Globe) accomplishes that.

```sas
/* First obtain the number of *\/
DATA _NULL_;
  IF 0 THEN SET FileName NOBS=X;
  CALL SYMPUT('RECCOUNT',X);
  STOP;
RUN;
/* loop from one to number of */
/* records */
%DO I=1 %TO &RECCOUNT;
  CALL SYMPUT('VAR1',&FIELD1);
  CALL SYMPUT('VAR2',&FIELD2);
  RUN;
/* Advance to the Ith record */
DATA _NULL_;
  SET &SCANFILE (FIRSTOBS=&I);
  /* store the variables */
  /* of interest in */
  /* macro variables */
  CALL SYMPUT('VAR1',&FIELD1);
  CALL SYMPUT('VAR2',&FIELD2);
  STOP;
  RUN;
/* now perform the tasks that */
/* wish repeated for each */
/* observation */
PROC PRINT DATA=&VAR1;
  TITLE "&VAR2";
%END;
%MEND SCANLOOP;
/* Call SCANLOOP */
%SCANLOOP(DATALOG,FILENM,DESC);
RUN;
```

Three macros are created to scan through the passed file name, store the requested variables, and print the information. After the SCANLOOP macro is called, the variables are stored in macro variables using CALL SYMPUT.

EXAMPLE
In the following example, a log file (DATALOG) has been created of all the data sets in a library named TEST. Periodically, it is necessary to print the contents of these data sets into a series of quick reports. DATALOG consists of two columns, FILENM (the file name) and DESC (a short description). The reports should be formatted with a standard PROC PRINT and have a title consisting of the table description. The following piece of code accomplishes that task.

```sas
/* Macro to SCAN through DATALOG */
%MACRO SCANLOOP(SCANFILE,FIELD1,FIELD2);
  /* call SCANLOOP */
  /* records in DATALOG */
  DATA _NULL_;
    IF 0 THEN SET &SCANFILE NOBS=X;
    CALL SYMPUT('RECCOUNT',X);
    STOP;
  RUN;
/* loop from one to number of */
/* records */
  %DO I=1 %TO &RECCOUNT;
    CALL SYMPUT('VAR1',&FIELD1);
    CALL SYMPUT('VAR2',&FIELD2);
    RUN;
/* Advance to the Ith record */
  DATA _NULL_;
    SET &SCANFILE (FIRSTOBS=&I);
    /* store the variables */
    /* of interest in */
    /* macro variables */
    CALL SYMPUT('VAR1',&FIELD1);
    CALL SYMPUT('VAR2',&FIELD2);
    STOP;
    RUN;
/* now perform the tasks that */
/* wish repeated for each */
/* observation */
  PROC PRINT DATA=&VAR1;
    TITLE "&VAR2";
  %END;
%MEND SCANLOOP;
/* Call SCANLOOP */
%SCANLOOP(DATALOG,FILENM,DESC);
RUN;
```

The macro SCANLOOP provides a general framework for looping through a data set and performing a set of steps at each record. SCANLOOP is passed three variables: SCANFILE (the data set to be scanned), FIELD1 (a variable in SCANFILE that you want to make available to other steps) and FIELD2 (another variable that you want to make available). As described in the previous section, the number of records in the passed file name is stored to a macro.

STEPS TO IMPLEMENTING A SCAN LOOP IN SAS

1. The number of observations in a data set to a macro variable (RECCOUNT)
2. Increment a variable (I) from one to RECCOUNT using a %DO loop
3. Use the FIRSTOBS option in a DATA step to advance to the record
4. Store record values to macro variables using CALL SYMPUT
5. Perform any desired PROC and DATA steps
variable `RECOUNT`. The variable `I` is incremented from one to `RECOUNT`. A data step is used to advance to the `I`th record of the data set, and a number of values are stored in macro variables using `SYMPUT`. Finally, the desired task (in this case a PROC PRINT) is performed, and the whole cycle is repeated.

It should be noted that this example is quite simple, and this procedure can be generalized to any number of situations. A useful extension would be to use the `%IF-%ENDIF` statements to create the branching structures common in other database languages. For example, if `DATALOG` contained file size in addition to name and description, the above structure could be used to print only data sets of a certain size.

**REFERENCES**

Mason, Phil; *In the Know... SAS Tips & Techniques From Around the Globe*; Cary, NC: the SAS Institute, 1996.

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