Data Entry Using Extended Tables in Release 6.07 of the SAS® System

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ABSTRACT

This paper discusses a system for entering the results of a survey. The information for this particular survey relates to the background of people in the Cleveland SAS Users Group. Through the use of SAS/AF®, Screen Control Language (SCL), and extended tables, a system was developed that displayed the question and all possible choices, including blank lines for comments. The data entry person could then select the answers from the list and enter any comments. The entire system required one screen and three SAS data sets.

BACKGROUND

As president of the Cleveland SAS Users Group, one of my main concerns has been how do I keep in touch with the general membership? Our membership consists of over 200 hundred people from over 50 companies across northeastern Ohio. It is awfully difficult to talk to everyone individually. So, invariably, someone mentions the dreaded word SURVEY! Well, after the cringing has subsided, and some semblance of sanity has settled over those gathered to discuss plans for the users group, the general discussion begins:

Remember the last time? We sent out 225 surveys and got back 85.

Hey, count your blessings, you didn’t have to enter all that data into that PROC FSEDIT screen. It took forever!

Yes, now it’s all becoming clear. The worst part wasn’t the 30% response, but trying to enter those eighty odd surveys into SAS so that PROC FREQ’s could be run. The first attempt to enter the data involved trying to type the actual answers in free form. That was O.K. as long as everything was spelled consistently, which it wasn’t. The next brilliant idea involved assigning codes to each of the possible answers and just typing the codes in. That seemed easy enough in concept. It was putting it into practice that wasn’t so easy. The codes were assigned on a blank survey. It would have been too time consuming to go through and hand code all the existing surveys. All the data entry person had to do was look at the actual survey and then look at the coded survey to determine what code to enter. This is the reason that the president of the users group sometimes has trouble keeping his eyes from crossing. No wonder the word survey is usually accompanied by all that cringing. The alternative would have been to put a little forethought into
the survey and design it with
the coding already on it,
i.e., choose a,b,or c. Even
in this case, it is sometimes
very easy to lose one's place.

Did I just enter question
number 15 or 16?

Not only does one suffer from
eye crossing, but now one is
often accused of talking to
oneself!

ANOTHER METHOD OF DATA ENTRY

With 200 members, there is no
way that one can avoid the "S"
word. So, how to avoid the
chinging, the eye crossing,
and the talking to oneself?
Eliminate the cause of the
chinging! Eliminate the data
entry nightmare!

In thinking about how to
simplify the entry of any
survey, the idea of displaying
a blank survey on-line and
duplicating each respondent's
answers came up. This sounded
rather messy until SCL and
dynamic extended tables came
into the picture. By using an
extended table as a selection
list, all potential answers
can be displayed on the screen
and the data entry person can
select the answer or answers
by cursoring to them and
pressing enter. To further
simplify the process, the
entire question can also be
displayed above the answers.
It's very difficult to become
confused when everything is on
the screen in front of you.

GETTING STARTED

Definitely, the place to start
is to construct the screen.
The reader is referred to
Figure 1 at the end of this
paper. The first point that
should be explained is that
when using extended tables,
the screen is divided into two
distinct areas, the non-
scrollable area and the
scrollable area. The extended
table is contained in the
scrollable area. The
scrollable area is separated
from the non-scrollable area
by the three caret symbols
(^^^). (What symbol is used
may depend on your system and
your keyboard. The reader is
referred to SAS Screen Control
Language: Reference, Version
6, First Edition for the other
characters that are
available.) The reader will
also notice that only one line
has been defined for the
extended table.

The next area of concentration
is the attributes. There are
two attributes that must be
set in order for this
application to work properly.
The first one is in the
General Attributes (GATTR)
Screen. For System Options,
specify EXTENDED TABLE. The
second attribute is in the
Field Attributes Screen. A
Choice group must be specified
for the field in the
scrollable area.

Once the attributes have been
set, the actual SCL program
can be written. The reader is
referred to Figure 2, for the
exact contents of the entire
program. The following is a
brief discussion of each of
the major sections of the
program.

The INIT Section

The main feature of this
section is that it defines the
extended table for the first
time.

CALL SETROW(0,25,'N','Y');

The first argument indicates the maximum number of rows for the table. Since the number of rows will depend on the number of possible answers, there really is no known maximum number. This is indicated by the 0, which means that the table will be dynamic, changing with the number of answers available. The next argument indicates the maximum number of selections allowed. This was arbitrarily set at 25. The third argument is the selection order. N specifies that selected items are highlighted, but are not moved to the top of the list. The list remains in its original order. The final argument indicates that the table is dynamic. The screen control variable quest is initialized to 001, which is the first question number in this application.

The GETROW Section

This is the section executed immediately after the INIT section. There are three permanent data sets involved in the application. The first three statements close any of these data sets that may be open. Following these three statements is a submit block. This submit block selects the question text from the question data set and selects the available answers from the answer data set. The question data set has four variables, one variable contains question number and the other three contain the question text. The answer data set contains two variables, one for question number and one for an answer. In most cases, there will be more than one observation (answer) per question. Remember that upon first entering the application, quest was set to 001. So, initially, the user will see question 001 on the screen. The next four statements make sure that something has been selected by the submit block. The user may have enter an invalid question number. The question and answers selected are stored in temporary data sets. The two temporary data sets are opened for input. The third permanent data set, the survey data set, will be opened for update. It will contain the results of the survey. A CALL SET is done for these three data sets. This ensures that the question and answer text will appear on the screen and that the data selected will eventually make it into the survey data set. The question and answers are then fetched from the temporary data sets. A PF key has been defined as NXTQUEST (Next Question).

The MAIN Section

The system variable, _msg_, is initialized to blank. The screen control variable WORD is set equal to the first command issued using the WORD() function. If the Next Question PF key was pressed, the current question number is incremented by one. Remember, the MAIN section executes before the GETROW section. If the user enters another question number or presses the Next Question PF key, the next section of code executes.
Notice that another SETROW is executed. This blanks out any previous answers that were displayed. This was done because in some instances where a question with a large number of answers was selected before one with fewer answers, the extra answers from the previous question would scroll by and then disappear. This could be rather unnerving to the inexperienced user as several experienced users were observed leaping out of their chairs at this phenomenon. The question dataset is closed if it is open. The new question is then placed in a temporary data set and fetched to the screen.

The PUTROW Section

The answers selected by the user are appended to the survey data set.

The TERM Section

Upon exiting, all open data sets are closed. The survey data set is sorted by survey id and question number. Duplicate observations are eliminated.

Conclusion

Although for this one application, the time spent perfecting the idea may not have totally been equalled by the time saved during the data entry phase, the time saved for other applications will more than make up for it. The knowledge gained regarding extended tables will be useful in other applications that require selection lists.

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Figure 1

Survey Number : &__
Question Number: &__

&QUESTXT1_________________________________________________

&QUESTXT2_________________________________________________

&QUESTXT3_________________________________________________

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&ANSWER__________________________________________________
INIT:
CONTROL ASIS; CONTROL ALWAYS;
CALL SETROW(0,25,'N','Y');
DSID1=0; DSID2=0; DSID3=0;
QUEST='001';
RETURN;
MAIN:
_MSG_=''; WORD=WORD(1);
IF WORD='NXTQUEST' THEN QUEST=PUT(INPUT(QUEST,3.)+1.23.);
IF MODIFIED(QUEST) OR WORD='NXTQUEST' THEN DO;
   CALL SETROW(0,25,'N','Y');
   IF DSID2 NE 0 THEN DSID2=CLOSE(DSID2);
   SUBMIT CONTINUE;
   DATA QUEST; SET SURV.QUEST(WHERE=(QUEST="&QUEST")); RUN;
ENDSUBMIT;
   DSID2=OPEN('QUEST','I');
   CALL SET(DSID2);
   RC=FETCHOBS(DSID2,1);
END;
RETURN;
TERM:
IF DSID1 NE 0 THEN CLOSE(DSID1);
IF DSID2 NE 0 THEN CLOSE(DSID2);
IF DSID3 NE 0 THEN CLOSE(DSID3);
SUBMIT CONTINUE;
   PROC SORT DATA=SURV.SURVEY NODUPSi BY SURV_ID QUESTi
RUN;
ENDSUBMIT;
RETURN;
GETROW:
IF DSID1 NE 0 THEN CLOSE(DSID1);
IF DSID2 NE 0 THEN CLOSE(DSID2);
IF DSID3 NE 0 THEN CLOSE(DSID3);
SUBMIT CONTINUE;
   DATA ANS; SET SURV.ANS(WHERE=(QUEST="&QUEST"));
   DATA QUEST; SET SURV.QUEST(WHERE=(QUEST="&QUEST")); RUN;
ENDSUBMIT;
   DSID1=OPEN('ANS','I');
   IF DSID1 LE 0 THEN DO;
      _MSG_='No Such Question.';
      RETURN;
   END;
   DSID2=OPEN('QUEST','I');
   DSID3=OPEN('SURV.SURVEY','U');
   CALL SET DSID1; CALL SET DSID2; CALL SET DSID3;
   RC=FETCHOBS(DSID2,1);
   IF FETCHOBS(DSID1,_CURROW_) THEN DO;
      IF WORD='NXTQUEST' THEN WORD='';
      CURSOR ANS;
      CALL ENDTABLE();
   END;
RETURN;
PUTROW:
   RC=APPEND(DSID3);
RETURN;