

Saving Resources with the TABULATE: Procedure  
The Conversion of Annual Tables from RAMIS to the SAS System

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ABSTRACT

For the past seven years the Division of Financial Aid at Purdue University has run a standardized set of annual tables to produce demographic information on financial aid recipients. All the change in financial aid policy brought about during the Reagan administration has created an increased interest in the impact of financial aid on the student population. Several schools within the University expressed interest in knowing the types and amount of aid their students received and how the figures compared to those of other schools. As a result, last year the annual tables were broken down by school for the first time. This proved to be CPU expensive. The Division of Financial Aid made a decision to continue to provide this service to the schools so a new approach was desired. The programs had been written in RAMIS. SAS seemed a natural choice for reprogramming as past experience had shown up to 80% decrease in CPU when RAMIS programs were converted to SAS. This paper discusses the decision, change, and results of the conversion of the annual tables from RAMIS to the SAS System.

BACKGROUND

Purdue University in West Lafayette, Indiana, has a student population of approximately 33,000 students. Of those, 14,500 students receive some type of financial aid. The Reagan administration, in an effort to decrease government spending, tightened up regulations determining aid eligibility. Beginning last spring, many students received smaller amounts of aid and some received no aid at all. This caused concern among both students and University administrators and resulted in increased interest in financial aid. Several schools within Purdue (i.e. School of Engineering, School of Science) requested information from the Division of Financial Aid (DFA) regarding students enrolled in their respective schools. These schools wanted to know the type of aid and how much their students were receiving.

DFA has run a standardized set of annual tables which produce demographic information on financial aid recipients for the past seven years. These tables break down aid counts and dollars by characteristics such as sex, race, year in school, and residency. In response to the schools' requests for information, the annual tables were broken down by school for the first time last year. The tables had previously been done in RAMIS. In order to furnish the results in a timely manner the programs were simply modified to subgroup the information by school.

PROBLEM

The simple modification of the programs initially saved manhours. However, examination of the costs in machine time indicated that method was very CPU expensive. To produce one complete set of the fourteen tables broken down by school CPU cost was approximately \$880. The high cost generated questions regarding the value of the goodwill created by providing the tables to the schools versus the cost to the office. DFA made the decision to continue to provide the information to the schools. In an effort to keep costs down, other alternatives were examined.

DECISION

The choices available were limited. At the present time, DFA has access only to RAMIS, SPSS, SAS and a form of Report Generator. COBOL programming can be requested through the Administrative Data Processing Center. SPSS and Report Generator were immediately eliminated because of their limited ability to handle reports of this size and complexity. The programs could probably have been done in COBOL; but the request would have been a low priority project for the staff at the Administrative Data Processing Center and, even if it were a high priority, would have generated a manhour expense to DFA. Because of the complexity of our files, DFA has multileveled files with variable length records, we did not believe the RAMIS programs could be modified to be much more efficient. SAS became the logical choice for several reasons: 1) SAS has the ability to handle the size and complexity of the programming needed; 2) past experience has shown up to 80% decrease in CPU time when RAMIS programs were converted to SAS; and 3) the programming could be done by the DFA programmer thereby eliminating both the outside charge for manhours and the dependency on another office to do the work.

CHANGE

Once the decision was made, it became the programmer's responsibility to convert the programs to SAS. The TABULATE procedure was chosen to produce the tables because it could duplicate the RAMIS tables with relative ease. The first program in the set was naturally the most time consuming to produce. Manhours expended were approximately twenty. The remaining tables are primarily standardized with the demographic information varying from table to table so the conversion went quickly. Manhours used to convert those tables were approximately five bringing the total conversion time to twenty-five hours.

## RESULTS

The improved appearance of the tables was a side benefit of using the TABULATE procedure. It was, however, the first thing that DFA staff members commented on when viewing the converted tables. The consensus was that the lines provided by the TABULATE procedure made following the tables much easier.

Clock time decreased by an average of 45.2%. DFA shares the computer with all other administrative offices so decreased execution time means increased probability that all jobs will be completed the night they are submitted.

The change in CPU time was the most impressive result. The average decrease in CPU time was 86.1% with a range of 62.3% to 93.3%. Using the initial cost analysis done as a basis for comparison, CPU costs decreased by approximately \$750. Given that the programs will be run at least twice a year, savings to DFA in the future will be substantial.

## SUMMARY

The decision to convert the RAMIS annual tables to SAS was well justified. The benefits were as follows:

- 1) The DFA programmer was able to make the conversion, thus eliminating the need to request programming time from the Administrative Data Processing Center. This resulted in several benefits: a) DFA was not dependent upon another office to complete the task; b) DFA could control the priority of the project; and c) the manhours needed to make the conversion were already included in the DFA budget as part of the programmer's salary so no outside charges were incurred.

- 2) The manhours expended to make the conversion were approximately twenty-five working hours. There are fourteen tables so time per table averaged out to be less than two hours. The savings realized by the decreased CPU time made up for the manhours "expense" with the first run of the tables.
- 3) The tables produced by the TABULATE procedure had a neater, more concise appearance which made them easier to read and, in some cases, eliminated a second page of output.
- 4) The substantial decrease in CPU time was by far the greatest benefit. DFA was able to save both their own resources and those of the University through decreased CPU time and decreased execution time.

SAS is a trademark of the SAS Institute, Inc., Cary, NC.

RAMIS is a trademark of On-Line Software International, Princeton, NJ.

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Comparison of CPU and Execution Times - RAMIS to the SAS System

Table (Aid by)	CPU		EXECUTION	
	RAMIS Minutes	SAS Minutes	RAMIS Minutes	SAS Minutes
1 Sex	7:52	0:51	11.68	7.11
2 Residency	8:51	0:36	13.84	5.84
3 Ethnic Group	9:42	0:52	16.44	7.54
4 Marital Status	7:53	0:52	13.34	7.91
5 Class	10:01	0:49	14.0	7.39
6 Dependency	9:55	1:41	33.94	28.01
7 Family Income- Undergrad Dependent	16:08	1:30	35.59	13.58
7B Family Income-All	12:30	1:30	22.45	10.39
8 Family Income- Undergrad Dependent Resident	16:31	1:18	26.79	7.84
8B Family Income- All Resident	12:54	1:16	22.50	10.56
9 Family Income- Undergrad Dependent Non-Resident	15:54	1:28	32.77	12.38
9B Family Income- All Non-Resident	12:45	1:32	22.23	11.17
10 Federal Summary- Undergrad Dependent	2:39	1:00	10.36	8.81
10B Federal Summary-All	2:55	1:00	13.02	11.64

SAS table

AID BY RESIDENCY

8:46 WEDNESDAY, MARCH 16, 1988 2

SCHOOL HUMANITIES

	SUB	RES						ALL	
		FOREIGN		IN		OUT		ALL	
		AMOUNT		AMOUNT		AMOUNT		AMOUNT	
		N	SUM	N	SUM	N	SUM	N	SUM
MAIN									
FEDERAL GRANTS	PELL RECEIVED	0	0	21	28,238.00	4	4,100.00	25	32,338.00
	SEOG	1	1,500.00	5	5,790.00	0	0	6	7,290.00
P.U. FEE REMISSIONS	P.U. FEE REMISSIONS	1	5,053.40	59	62,669.20	4	4,530.00	64	72,252.60
P.U. SCHOLARSHIPS	P.U. SCHOLARSHIPS	0	0	43	27,535.00	9	7,310.00	52	34,845.00
ALUMNI SCHOLARSHIPS	ALUMNI SCHOLARSHIPS	0	0	3	1,520.00	0	0	3	1,520.00
OUTSIDE AWARDS	OUTSIDE AWARDS	0	0	169	112,699.46	61	67,736.77	230	180,436.23
SSACI	GRANTS	0	0	486	464,410.00	0	0	486	464,410.00
	SCHOLARSHIPS	0	0	19	9,500.00	0	0	19	9,500.00
LOANS	NDSL	0	0	30	29,420.00	3	3,250.00	33	32,670.00
	GSL RECEIVED	8	22,878.00	380	703,894.00	160	425,255.00	548	1152027.00
	PLUS	0	0	77	303,443.00	15	58,928.00	92	362,371.00
	P.U. LOANS	0	0	5	6,660.00	41	39,835.00	46	46,495.00
	OTHER LOANS	0	0	2	7,818.00	19	59,310.00	21	67,128.00
EMPLOYMENT	WORK STUDY PROGRAM	16	21,500.00	248	329,477.00	46	61,746.00	310	412,723.00
	OTHER EMPLOYMENT	0	0	85	101,830.00	19	21,859.00	104	123,689.00
ALL		26	50,931.40	1,632	2194903.66	381	753,859.77	2,039	2999694.83

RAMIS table

HEALTH SCIENCES  
AID BY RESIDENCY  
RUN DATE: 03/15/88  
FOR THE PERIOD 1986-7 FY

AID CATEGORY

	TOTAL AWARDS		IN-STATE AWARDS		OUT-OF-STATE AWARDS		FOREIGN AWARDS	
	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
FEDERAL GRANTS								
PELL RECEIVED	161	\$224,457.00	141	\$193,057.00	20	\$31,400.00	0	\$0.00
SEOG	79	\$77,009.00	60	\$48,039.00	19	\$28,970.00	0	\$0.00
	85	\$56,836.00	85	\$56,836.00	0	\$0.00	0	\$0.00
P.U. FEE REMISSIONS	112	\$93,455.85	84	\$64,310.45	27	\$24,092.00	1	\$5,053.40
P.U. SCHOLARSHIPS	45	\$31,930.00	36	\$25,870.00	9	\$6,060.00	0	\$0.00
ALUMNI SCHOLARSHIPS	34	\$22,785.00	25	\$14,005.00	9	\$8,780.00	0	\$0.00
OUTSIDE AWARDS	281	\$177,449.16	264	\$165,559.16	17	\$11,890.00	0	\$0.00
SSACI								
GRANTS	133	\$133,837.00	133	\$133,837.00	0	\$0.00	0	\$0.00
SCHOLARSHIPS	22	\$11,000.00	22	\$11,000.00	0	\$0.00	0	\$0.00
	7	\$6,055.00	5	\$5,695.00	2	\$360.00	0	\$0.00
OTHER SCH/GRANTS/BENEFITS	6	\$13,677.00	6	\$13,677.00	0	\$0.00	0	\$0.00
LOANS								
NDSL	94	\$83,485.00	77	\$65,765.00	17	\$17,720.00	0	\$0.00
PHARMACY	1	\$830.00	1	\$830.00	0	\$0.00	0	\$0.00
GSL RECEIVED	189	\$339,579.00	141	\$218,109.00	48	\$121,470.00	0	\$0.00
P.U. LOANS	15	\$14,320.00	2	\$2,500.00	13	\$11,820.00	0	\$0.00
PLUS	32	\$117,467.00	27	\$101,467.00	5	\$16,000.00	0	\$0.00
	6	\$25,344.00	4	\$15,894.00	2	\$9,450.00	0	\$0.00
EMPLOYMENT								
WORK STUDY PROGRAM	55	\$65,733.00	39	\$47,733.00	16	\$18,000.00	0	\$0.00
OTHER EMPLOYMENT	124	\$162,367.00	96	\$119,747.00	28	\$42,620.00	0	\$0.00
TOTAL	1,481	\$1,657,616.01	1,248	\$1,303,930.61	232	\$348,632.00	1	\$5,053.40

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DATA FY;
  INFILE FYAWARDS;
  INPUT @1 (FUND SID AMOUNT) ($5. $9. 10.);
  IF AMOUNT<10 THEN DELETE;
DATA PI(KEEP=SID RS CLS SCH);
  INFILE PRSINFEX;
  INPUT @2 SID $9. @284 (SCH CLS) ($3. $2.) @383 RS $1.;
PROC SORT DATA=FY;
  BY SID;
PROC SORT DATA=PI;
  BY SID;
DATA FY;
  MERGE FY(IN=INFY) PI;
  BY SID;
  IF INFY;
PROC DELETE DATA=PI;
DATA FY;
  SET FY;
  BY SID;
IF AMOUNT<0 THEN AMOUNT=0;
MASK1=SUBSTR(FUND,1,1);
MASK2=SUBSTR(FUND,1,2);
MASK3=SUBSTR(FUND,1,3);
CLSMASK=SUBSTR(CLS,1,1);
SCHMASK=SUBSTR(SCH,2,2);
IF MASK1='G' THEN MAIN=1;
  ELSE IF MASK2='FN' OR MASK2='FS' OR MASK2='FP' THEN MAIN=2;
  ELSE IF MASK1='S' THEN MAIN=3;
  ELSE IF MASK1='A' THEN MAIN=4;
  ELSE IF MASK1='O' THEN MAIN=5;
  ELSE IF MASK1='T' THEN MAIN=6;
  ELSE IF MASK1='M' THEN MAIN=7;
  ELSE IF MASK1='L' THEN MAIN=8;
  ELSE IF MASK1='W' OR MASK1 EQ 'E' THEN MAIN=9;
  ELSE MAIN=10;
IF MAIN=10 THEN DELETE;
SUB:
IF FUND='GX200' OR FUND='GX202' THEN SUB=1;
  ELSE IF FUND='G8200' THEN SUB=2;
  ELSE IF FUND='G7359' OR FUND='G7425' THEN SUB=3;
  ELSE IF FUND='T8639' THEN SUB=4;
  ELSE IF FUND='T8635' THEN SUB=5;
  ELSE IF FUND='T8634' THEN SUB=6;
  ELSE IF FUND='LF159' THEN SUB=7;
  ELSE IF FUND='LF177' THEN SUB=8;
  ELSE IF FUND='LF178' THEN SUB=9;
  ELSE IF FUND='LF179' THEN SUB=10;
  ELSE IF MASK3='LXG' THEN SUB=11;
  ELSE IF MASK3='LGS' THEN SUB=12;
  ELSE IF MASK3='LAP' THEN SUB=13;
  ELSE IF MASK2='LP' THEN SUB=14;
  ELSE IF MASK2='LO' THEN SUB=15;
  ELSE IF MASK1='W' THEN SUB=16;
  ELSE IF MASK1='E' THEN SUB=17;
  ELSE IF MASK2='FN' OR MASK2='FS' OR MASK2='FP' THEN SUB=18;
  ELSE IF MASK1='S' THEN SUB=19;
  ELSE IF MASK1='A' THEN SUB=20;
  ELSE IF MASK1='O' THEN SUB=21;
IF SCH='PE ' OR SCH='HU ' THEN SCHOOL=1;
  ELSE IF SCH='NRS' OR SCH='HLS' THEN SCHOOL=2;
  ELSE IF SCH='F ' OR SCH='A ' THEN SCHOOL=3;
  ELSE IF SCH='DP ' OR SCH='P ' THEN SCHOOL=4;
  ELSE IF SCH='E ' OR SUBSTR(SCH,2,1)='E' OR SUBSTR(SCH,3,1)='E'
    THEN SCHOOL=5;
  ELSE IF SCH='T ' OR SUBSTR(SCH,2,1)='T' OR SUBSTR(SCH,3,1)='T'
    THEN SCHOOL=6;
  ELSE IF SCH='CFS' THEN SCHOOL=7;

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ELSE IF SCH='GR ' THEN SCHOOL=8;
ELSE IF SCH='S ' THEN SCHOOL=9;
ELSE IF SCH='M ' THEN SCHOOL=10;
ELSE IF SCH='UNC' THEN SCHOOL=11;
ELSE IF SCH='VM ' OR SCH='V ' THEN SCHOOL=12;
ELSE SCHOOL=13;
RES:
IF RS='0' THEN RES='IN      '; ELSE IF RS='1' THEN RES='OUT    ';
ELSE RES='FOREIGN';
PROC SORT DATA=FY;
BY SCH MAIN SUB;
PROC FORMAT;
VALUE MN 1='FEDERAL GRANTS'
2='P.U. FEE REMISSIONS'
3='P.U. SCHOLARSHIPS'
4='ALUMNI SCHOLARSHIPS'
5='OUTSIDE AWARDS'
6='SSACI'
7='OTHER SCH/GRANTS/BENEFITS'
8='LOANS'
9='EMPLOYMENT'
10='NOT INC';
SUB:
VALUE SB 1='PELL RECOMMENDED'
2='PELL RECEIVED '
3='SEOG'
4='GRANTS'
5='SCHOLARSHIPS'
6='TEACHER TRAINING'
7='NDSL'
8='NURSING'
9='PHARMACY'
10='VET. MEDICINE'
11='GSL RECOMMENDED'
12='GSL RECEIVED'
13='PLUS'
14='P.U. LOANS'
15='OTHER LOANS'
16='WORK STUDY PROGRAM'
17='OTHER EMPLOYMENT'
18='P.U. FEE REMISSIONS'
19='P.U. SCHOLARSHIPS'
20='ALUMNI SCHOLARSHIPS'
21='OUTSIDE AWARDS';
SCHOOL:
VALUE SC 1='HUMANITIES'
2='HEALTH SCIENCES'
3='AGRICULTURE'
4='PHARMACY'
5='ENGINEERING'
6='TECHNOLOGY'
7='CONSUMER AND FAMILY SCIENCE'
8='GRADUATE'
9='SCIENCE'
10='MANAGEMENT'
11='UNCLASSIFIED'
12='VETERINARY MEDICINE'
13='UNKNOWN';
PROC TABULATE DATA=FY;
CLASS MAIN SUB RES SCHOOL;
VAR AMOUNT UNDUP;
FORMAT MAIN MN. SUB SB. SCHOOL SC.;
TABLE ALL SCHOOL, (MAIN*SUB) ALL,
(RE ALL)*(AMOUNT*(N*F=COMMA8.
SUM*F=COMMA10.2))/ MISSTEXT='0';
TABLE ALL SCHOOL, (RES ALL)*UNDUP*N;
TITLE 'AID BY RESIDENCY';
RUN;

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