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AVERAGES FOR SELECTED CLASSIFICATIONS

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Averages for Selected Classifications

by

Verner G. Hurt

General: This program was written in Fortran for the IBM 1620 II with the 1443 printer. It calculates averages for several items of data which may be classified by several alternative systems of classification. Two types of averages are calculated - one based upon all observations and the other upon non-zero observations. In addition, the number of units and the number of units with non-zero observations are counted.

For example, one might consider data for which averages are to be calculated as representing characteristics of elementary units. In such a context, an elementary unit could be an individual, a household, a farm, etc. One characteristic of an elementary unit - say, an individual - could be age; another, education; another, income; and so on.

Oftentimes, rather than being interested in the particular numerical value of a characteristic, one is interested only in whether or not it lies within certain limits. For example, the interest may be in whether income is between, say, \$1000 and \$2000, rather than that it is \$1567.89. Such might also be true for characteristics other than income. Hence, the range of values taken on by a characteristic may be divided into classes and each class given a code designation, i.e., numbered serially beginning with one. This code or codes may then be used to classify the elementary units for purposes of computing the averages.

Let the term primary code denote one characteristic that is divided into classes and used for purposes of classification; another may be called the secondary code, and a third the tertiary code. Use of all three classifications simultaneously will yield a three-way classifica-

tion system for the averages computed. This program can be used for either a one-way, two-way, or a three-way classification system. The system used is controlled by the sense switches and information entered on the header card.

Input: Card input of three types: (1) a header card, (2) data cards, and (3) a blank trailer card.

A. Header card -- twelve two-digit fields beginning in column one.

Field 1 -- columns 1 and 2 -- the number of classes in the primary code plus one (1); e.g., for three classes, enter 04. A maximum of 13 classes is provided for.

Field 2 -- columns 3 and 4 -- the maximum number of classes per unit in either the secondary or tertiary code. For example, if a secondary code only is used (sense switches #1 and 2 OFF) and classes 1-17 are to be included in the averages, enter 17. If classes 1-8 are to be included, enter 08. If both a secondary and a tertiary code are used (sense switches #1 ON, #2 OFF) say a secondary code class number of 10 and a tertiary code for classes 1-17, then enter 17; for a tertiary code for classes 1-8, enter 08; for 17-25 (sense switches 1 and 2 ON), enter 09. Only one specific class may be used as a secondary code on a given pass when a tertiary code is to be used. The number of secondary or tertiary classes considered at one pass cannot exceed 17. The secondary code class number when the tertiary code is not used cannot exceed 17.

- Field 3 -- columns 5 and 6 -- the number of fields of data other than control codes per card. This number cannot exceed 11.
- Field 4 -- columns 7 and 8 -- the highest class for which the secondary code is being used. For example, to use class 10 (sense switches #1 OFF, #2 ON), enter 10. To use classes 1-10 on a given pass (sense switches 1 and 2 OFF) enter 10. For classes 1-8 on a given pass, enter 08.
- Field 5 -- columns 9 and 10 -- the number of fields of control data. For the formats specified for this program as written enter 09. However, if the formats are changed, up to 15 fields of control data may be used with the program as dimensioned.
- Field 6 -- columns 11 and 12 -- the number of the control field specifying the identification of the elementary unit for which averages are to be calculated. Control fields are assumed to be numbered beginning with field one as the first field of the card and in ascending order from left to right. Hence if the first field of control data is to be used as the basis for increasing the count of elementary units, then enter 01. If field 6 is to be used, then enter 06. For example, if one wished to calculate the average per farm and the farm identification was located in control field 6, then 06 would be entered.
- Field 7 -- columns 13 and 14 -- the number of the control field where the primary code is located. If the primary

code is in control field 2, then enter 02; if in field 4, enter 04, etc.

Field 8 -- columns 15 and 16 -- the number of the control field in which the secondary code is located. For example, if the secondary code is in control field 5, enter 05.

Field 9 -- columns 17 and 18 -- the number of the control field in which the tertiary code is located. For example, if the tertiary code is in field 4, enter 04. This should be blank if no tertiary classification is used.

Field 10 -- columns 19 and 20 -- the class of the tertiary code. For example, if all tertiary classes equal to or less than 12 are to be included in the average (sense switches #1 ON, #2 OFF), enter 12. If all tertiary classes greater than 12 are to be included in the average (sense switches 1 and 2 ON), enter 12. If the tertiary code is not used, leave blank. The number of tertiary classes considered on one pass cannot exceed 17.

Field 11 -- columns 21 and 22 -- the same as the field 10, when field 10 specifies that classes greater than the number are to be included in the averages, otherwise leave blank.

Field 12 -- columns 23 and 24 -- the number of characteristics for which averages are printed per line minus one. For data entered as 10 digit fields, enter 02, otherwise, enter 04 for the formats specified.

(This program is dimensioned for a maximum of 11 data fields.)

B. Data Cards -- assumed to contain two different types of information: (1) controls and (2) data for characteristics of the elementary units. Three different formats for data entry are provided. The format for the control information is the same for each of the three data formats.

1. Control format -

- a. Field 1 = XXX in columns 1 - 3
- b. Field 2 = XX in columns 4 - 5
- c. Field 3 = XX in columns 6 - 7
- d. Field 4 = X in column 8
- e. Field 5 = X in column 9
- f. Field 6 = X in column 10
- g. Field 7 = X in column 11
- h. Field 8 = XX in columns 12-13
- i. Field 9 = XX in columns 14-15

(This program is dimensioned for a maximum of 15 control fields.)

2. Data formats - (Three formats are provided. The one used is under the control of sense switches 3 and 4).

- a. Format I -- eleven five-digit fields beginning in column 16.
- b. Format II
 - (1) Field 1 in columns 16-20
 - (2) Field 2 in columns 21-30
 - (3) Fields 3-10 -- as five-digit fields beginning in column 31.
- c. Format III -- five ten-digit fields beginning in column 16.

(This program is dimensioned for a maximum of 11 data fields.)

C. Sense Switches

1. Switch #1 OFF, Switch #2 OFF -- primary and secondary codes only are used and all cards in the secondary classes less than or equal to that specified by control field 4 are included in the averages.
2. Switch #1 OFF, Switch #2 ON -- primary and secondary codes only are used and only those cards in the class the same as that specified by control field 4 are included in the averages.
3. Switch #1 ON, Switch #2 OFF -- a primary code is used and only cards in the secondary class specified by control field 4 and a tertiary class less than or equal to that specified by control field 10 are included in the averages.
4. Switch #1 ON, Switch #2 ON -- the primary class is used and only cards in the secondary class specified by control field 4 and in a tertiary class greater than that specified by control field 10 are included in the averages.
5. Switch #3 OFF -- read and write for Format I. Switch #3 ON to read-write formats conditioned by Switch #4.
6. Switch #4 OFF -- read-write Format III. Switch #4 ON -- read-write Format II.

D. Operating Instructions

1. Zero core storage.
2. Load program and sub-routines.
3. Set sense switches.
4. Press start.
5. Enter in order.

- (a) Header card
 - (b) Data cards (all cards for a particular elementary unit must be grouped together).
 - (c) Trailer card (blank).
6. The program is automatically conditioned to accept another problem after completion of the print out. For problems after the first, set sense switches and start with step 5.
- E. Output =- Printer output in the form of tables. The first line printed on each page lists (1) the control field number for the primary code used, (2) the secondary code class for which the averages were calculated, (3) the tertiary code class (0 if tertiary code is not used), (4) the numbers of the data fields for which averages were calculated. The first column of each page lists the primary code class for the averages and the number of observations used to calculate the averages on each line. The last line in each table represents the averages for all elementary units and for all elementary units where the observations were non-zero, as well as the number of units and the number of units with non-zero observations.