The SAS Histogram Procedure (HIST), useful for displaying and analyzing data, provides for vertical and horizontal histograms, but has the disadvantage that a numeric variable will be subject to grouping if it has more than 10 distinct values. The DISCRETE parameter in this procedure is the overriding option for this maximum number of 10 classes but it has some apparent problems.

Since no histogram procedure currently exists in SAS-76, a short code utilizing various features of the PUT statement was developed to produce simple frequency histograms with minor restrictions on the number of classes. These histograms can be printed vertically or horizontally on the output page along with single axis labeling and title information. The number of classes and the height of the histogram are subject only to page limitations. No specific graphic routines are required to produce this type of printer plot.

The need for displaying frequency values for discrete classes led to the development of a computer code written in the Statistical Analysis System (SAS) language. Each class and its accompanying frequency value will be plotted as part of a histogram on printer output. All classes must be arranged in ascending order on input.

A listing of the program and sample data are given in Table 1. While this program was not designed to be universal in its application, it does provide for rapid display of integer frequency values and their respective classes, and emphasizes the flexibility of the PUT statement. Like all languages, the user must be familiar with SAS and its syntax. We chose the SAS language because of its flexibility and ease of use. We provide no error checking of the data input. The user selects the type of histogram desired by coding either V (vertical) or H (horizontal) in column 1 of the first data card. The number of classes is coded on the same card in columns 4-5. The class value occurs in columns 10-12 while the frequency for that class is coded in columns 20-25. The first class and frequency values are coded on the first data card which, as defined above, contains the histogram type and number of classes. The rest of the class and accompanying frequency values are coded as described above, one pair to a card. When all classes, as indicated in columns 4-5 of the first data card, have been printer plotted, program execution allows for additional class and frequency sets to be plotted as a new histogram. The type of histogram (either V or H) and the number of classes must be specified with each new set of values.

The symbols used for creating each frequency on the histogram are currently asterisks (*). This symbol may be changed to another symbol by modifying the "PUT" statement.

It should be noted that the frequency histogram for any one class will contain one more value than the actual data value; e.g., a frequency value of 10 will have 11 asterisks on the histogram. This allows for a frequency value of zero to be graphed.

The titles "SAMPLE VERTICAL HISTOGRAM" and "SAMPLE HORIZONTAL HISTOGRAM" may be changed by modifying the respective code in the program. If modified the title must be kept in single quotes and the starting position of the title can be changed from 54 in the case of the vertical histogram or from 1 in the case of the horizontal histogram to a value of the user's choice. The title must not exceed the length of the defined printer line.

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The methodology developed allows for rapid display of frequency and class values. We have emphasized the use of SAS as a programming language and how SAS statements can be used to format a printer page. We have not exhausted the possible uses of the program, and feel certain that imaginative and competent SAS users will soon create and test additional uses for the code.

Table 1. Histogram Program and Data

```
DATA SET;
* 
<table>
<thead>
<tr>
<th>DESCRIPTION OF THE VARIABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARS IN REPORT TO FORM A VERTICAL HISTOGRAM AND TO H FOR</td>
</tr>
<tr>
<td>A HORIZONTAL HISTOGRAM.</td>
</tr>
<tr>
<td>CLASS IS THE GROUP OF CLASSES.</td>
</tr>
<tr>
<td>CLASS REPRESENTS THE CLASS VALUE.</td>
</tr>
<tr>
<td>PICS REPRESENTS THE FREQUENCIES TO THE REPORT STATEMENT.</td>
</tr>
<tr>
<td>T0PE ARE CLASSES FOR COUNS ON THE FIRST DATA CARD FOR</td>
</tr>
<tr>
<td>EACH SET OF DATA.</td>
</tr>
</tbody>
</table>

INPUT VAR1 CL1ASS 4-5 CLASS 10-12 PEAR 20-25;
RUN;
```

Horizontal Histogram Code

```
DATA; 
* 
* HORIZONTAL HISTOGRAM CODE 
* 
* DATA SET H IN 
```

```
DATA; 
* 
* VERTICAL HISTOGRAM CODE 
* 
* DATA SET H IN 
```

```
DATA; 
* 
* PLOTS THE HISTOGRAM 
```

```
DATA; 
* 
* HORIZONTAL HISTOGRAM CODE 
* 
* DATA SET H IN 
```

Fig. 1. Vertical Histogram from Sample Data Set V in Table 1.

```
DATA; 
* 
* SAMPLE VERTICAL HISTOGRAMS 
* 
* DATA SET H IN 
```

```
DATA; 
* 
* SAMPLE HORIZONTAL HISTOGRAMS 
* 
* DATA SET H IN 
```

Fig. 2. Horizontal Histogram from Sample Data Set H in Table 1.

129