CHAPTER

22

Length and Precision of Variables

Length and Precision of Variables under Windows

For detailed information about how the SAS System stores representations of numeric and character data, see *SAS Language Reference: Concepts*. Data representation issues vary among different operating systems; the topics in this section discuss how data are represented in the SAS System under Windows.

Numeric Variables

The default length of numeric variables in SAS data sets is 8 bytes. (You can control the length of SAS numeric variables with the LENGTH statement in the DATA step.) In the SAS System under Windows, the Windows data type of numeric values that have a length of 8 is LONG REAL. The precision of this type of floating-point values is 16 decimal digits. For more information about the representation of the LONG REAL Windows data type, see Intel Corporation's *i486 Microprocessor Programmer's Reference Manual*. Table 22.1 on page 481 specifies the significant digits and largest integer values that can be stored in SAS numeric variables.

Table 22.1 Significant Digits and Largest Integer by Length for SAS Variables under Windows

	Largest Integer Represented	
Length in Bytes	**Exactly**	**Exponential Notation**
3	8,192	2^{13}
4	2,097,152	2^{21}
5	536,870,912	2^{29}
6	137,438,953,472	2^{37}

Length in Bytes	Largest Integer Represented Exactly	Exponential Notation
7	35,184,372,088,832	2^{45}
8	9,007,199,254,740,992	2^{53}

For example, if you know that a numeric variable always has values between 0 and 100, you can use a length of 3 to store the number and thus save space in your data set. Here is an example:

```
data mydata;
    length num 3;
    more data lines
run;
```

Note: Dummy variables (those whose only purpose is to hold 0 or 1) can be stored in a variable whose length is 3 bytes. △

CAUTION:
> **Use the 3-byte limit for only those variables whose values are small, preferably integers.**
> If the value of a variable becomes large or has many significant digits, you may lose precision when saving the results of arithmetic calculations if the length of a variable is less than 8 bytes. △

The maximum number of variables in a single SAS data set under Windows is 32,767. In addition, an observation under Windows cannot be longer than 5M. Therefore, if you want your data set to contain 32,767 character variables, the longest each variable can be is 160 bytes.

However, a DATA step can reference more than 32,767 variables, if you write only 32,767 or fewer variables to the data set. For example, you could drop some variables with a DROP= data set option. The maximum number of variables a DATA step can reference under Windows is 2,147,483,647.

Character Variables

In the SAS System under Windows, character values are sorted using the ASCII collating sequence. As an alternative to the numeric dummy variables discussed previously, you can choose a character variable with a length of 1 byte to serve the same purpose.

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