`strtol` and `strtoul` functions return the smallest or largest values of their respective return types. (`strtol` returns either `LONG_MIN` or `LONG_MAX`, and `strtoul` returns `ULONG_MAX`.)

<limits.h> macros ➤23.2

atoll
strtof
strtold
strtoll
strtoull

C99 adds the `atoll`, `strtof`, `strtold`, `strtoll`, and `strtoull` functions. `atoll` is the same as the `atol` function, except that it converts a string to a `long long int` value. `strtof` and `strtold` are the same as `strtod`, except that they convert a string to a `float` or `long double` value, respectively. `strtoll` is the same as `strtol`, except that it converts a string to a `long long int` value. `strtoull` is the same as `strtoul`, except that it converts a string to an `unsigned long long int` value. C99 also makes a small change to the floating-point numeric conversion functions: the string passed to `strtod` (as well as its newer cousins, `strtof` and `strtold`) may contain a hexadecimal floating-point number, infinity, or NaN.

Q&A

PROGRAM

Testing the Numeric Conversion Functions

The following program converts a string to numeric form by applying each of the six numeric conversion functions that exist in C89. After calling the `strtod`, `strtol`, and `strtoul` functions, the program also shows whether each conversion produced a valid result and whether it was able to consume the entire string. The program obtains the input string from the command line.

tnumconv.c

```
/* Tests C89 numeric conversion functions */

#include <errno.h>
#include <stdio.h>
#include <stdlib.h>

#define CHK_VALID  printf("    %s            %s\n",          \
                          errno != ERANGE ? "Yes" : "No ", \
                          *ptr == '\0' ? "Yes" : "No")

int main(int argc, char *argv[])
{
  char *ptr;

  if (argc != 2) {
    printf("usage: tnumconv string\n");
    exit(EXIT_FAILURE);
  }

  printf("Function   Return Value\n");
  printf("--------   ------------\n");
  printf("atof       %g\n", atof(argv[1]));
  printf("atoi       %d\n", atoi(argv[1]));
  printf("atol       %ld\n\n", atol(argv[1]));

  printf("Function   Return Value   Valid?   "
         "String Consumed?\n"
```