- mbrlen, mbrtowc, and wcrtomb have an additional parameter named ps. When one of these functions is called, the corresponding argument should point to a variable of type mbstate_t; the function will store the state of the conversion in this variable. If the argument corresponding to ps is a null pointer, the function will use an internal variable to store the conversion state. (At the beginning of program execution, this variable is set to the initial conversion state.)
- When the s parameter is a null pointer, the older mblen, mbtowc, and wctomb functions return a nonzero value if multibyte character encodings have state-dependent encodings (and zero otherwise). The newer functions don't have this behavior.
- mbrlen, mbrtowc, and wcrtomb return a value of type size_t instead of int, the return type of the older functions.

mbrlen A call of mbrlen is equivalent to the call

```
mbrtowc(NULL, s, n, ps)
```

except that if ps is a null pointer, then the address of an internal variable is used instead.

mbrtowc If s is a null pointer, a call of mbrtowc is equivalent to the call

```
mbrtowc(NULL, "", 1, ps)
```

Otherwise, a call of mbrtowc examines up to n bytes pointed to by s to see if they complete a valid multibyte character. (Note that a multibyte character may already be in progress prior to the call, as tracked by the mbstate_t variable to which ps points.) If so, these bytes are converted into a wide character. The wide character is stored in the location pointed to by pwc as long as pwc isn't null. If this character is the null wide character, the mbstate_t variable used during the call is left in the initial conversion state.

mbrtowc has a variety of possible return values. It returns 0 if the conversion produces a null wide character. It returns a number between 1 and n if the conversion produces a wide character other than null, where the value returned is the number of bytes used to complete the multibyte character. It returns –2 if the n bytes pointed to by s aren't enough to complete a multibyte character (although the bytes themselves were valid). Finally, it returns –1 if an encoding error occurs (the function encounters bytes that don't form a valid multibyte character). In the last case, mbrtowc also stores EILSEQ in errno.

wcrtomb If s is a null pointer, a call of wcrtomb is equivalent to

```
wcrtomb(buf, L'\0', ps)
```

where buf is an internal buffer. Otherwise, wcrtomb converts wc from a wide character into a multibyte character, which it stores in the array pointed to by s. If wc is a null wide character, wcrtomb stores a null byte, preceded by a shift sequence if one is necessary to restore the initial shift state. In this case, the