Proposal for C2Y
WG14 N3291

Title:	Decimal floating-point number—misuse of terms
Author, affiliation:	C FP group
Date:	2024-06-12
Proposal category:	Editorial
Reference:	N3220

This proposal addresses an editorial problem identified in email (Feb 20, 2024) to CFP by Vincent Lefevre:

> 7.24.1.6p5 starts with "If the subject sequence has the expected form for a decimal floating-point number", which does not make much sense as one may use both the decimal form and the hexadecimal form for decimal floating-point numbers. I suppose that it should say "If the subject sequence has the decimal form" like strtod.
>
> 7.24.1.6p6 starts with "If the subject sequence has the expected form for a hexadecimal floating-point number". Same problem. I suppose that it should say "If the subject sequence has the hexadecimal form" like strtod.

This misuse of terminology also occurs in 7.24.1.5p4 and 7.24.1.6p4 which say "if neither an exponent part nor a decimal-point character appears in a decimal floating-point number, or if a binary exponent part does not appear in a hexadecimal floating-point number". All these misuses also appear in the corresponding parts of the specification for wide strings.

The suggested changes below give specific meaning to the terms "decimal form" and "hexadecimal form" and use them to eliminate the misuses of "decimal floating-point number" and "hexadecimal floating-point number".

Using these terms, the changes also eliminate certain problematic uses of "floating-point number" (pointed out by Vincent). 7.24.1.5p4 begins:

> If the subject sequence has the expected form for a floating-point number, ...

Floating-point numbers are defined in 5.2.5.3.3 to be numbers in the C model. The C model ordinarily describes numbers in floating types, not character sequences. Floating-point numbers exclude non-model numbers such as occur in double-double format, though the specification can apply to such numbers. As a practical consideration, a reader of 7.24.1.5 might not think that "floating-point number" is a technical term and erroneously assume in includes infinities.

Suggested changes:

In 7.24.1.5p3:

> The expected form of the subject sequence is an optional plus or minus sign, then one of the following:
>
> — decimal form: a nonempty sequence of decimal digits optionally containing a decimal-point character, then an optional exponent part as defined in 6.4.4.3, excluding any digit separators (6.4.4.2);
>
> — hexadecimal form: a `0x` or `0X`, then a nonempty sequence of hexadecimal digits optionally containing a decimal-point character, then an optional binary exponent part as defined in 6.4.4.3, excluding any digit separators;
> ...

In 7.24.1.5p4:

> If the subject sequence has the ~~expected form for a floating-point number~~ decimal or hexadecimal form, ... if neither an exponent part nor a decimal-point character appears in a ~~decimal floating-point number~~ decimal form, or if a binary exponent part does not appear in a ~~hexadecimal floating-point number~~ hexadecimal form, ...

In 7.24.1.6p3:

> The expected form of the subject sequence is an optional plus or minus sign, then one of the following:
>
> — decimal form: a nonempty sequence of decimal digits optionally containing a decimal-point character, then an optional exponent part as defined in 6.4.4.3, excluding any digit separators (6.4.4.2);
>
> — hexadecimal form: a `0x` or `0X`, then a nonempty sequence of hexadecimal digits optionally containing a decimal-point character, then an optional binary exponent part as defined in 6.4.4.3, excluding any digit separators;
> ...

In 7.24.1.6p4:

> If the subject sequence has the ~~expected form for a floating-point number~~ decimal or hexadecimal form, ... if neither an exponent part nor a decimal-point character appears in a ~~decimal floating-point number~~ decimal form, or if a binary exponent part does not appear in a ~~hexadecimal floating-point number~~ hexadecimal form, ...

In 7.24.1.6p5:

If the subject sequence has the ~~expected form for a decimal floating-point number~~ decimal form, …

In 7.24.1.6p6:

If the subject sequence has the ~~expected form for a hexadecimal floating-point number~~ hexadecimal form, …

In 7.31.4.1.2p3:

The expected form of the subject sequence is an optional plus or minus sign, then one of the following:

— decimal form: a nonempty sequence of decimal digits optionally containing a decimal-point wide character, then an optional exponent part as defined in 6.4.4.3, excluding any digit separators (6.4.4.2);

— hexadecimal form: a `0x` or `0X`, then a nonempty sequence of hexadecimal digits optionally containing a decimal-point wide character, then an optional binary exponent part as defined in 6.4.4.3, excluding any digit separators;
…

In 7.31.4.1.2p4:

If the subject sequence has the ~~expected form for a floating-point number~~ decimal or hexadecimal form, … if neither an exponent part nor a decimal-point wide character appears in a ~~decimal floating-point number~~ decimal form, or if a binary exponent part does not appear in a ~~hexadecimal floating-point number~~ hexadecimal form, …

In 7.31.4.1.3p3:

The expected form of the subject sequence is an optional plus or minus sign, then one of the following:

— decimal form: a nonempty sequence of decimal digits optionally containing a decimal-point wide character, then an optional exponent part as defined in 6.4.4.3, excluding any digit separators (6.4.4.2);

— hexadecimal form: a `0x` or `0X`, then a nonempty sequence of hexadecimal digits optionally containing a decimal-point wide character, then an

optional binary exponent part as defined in 6.4.4.3, excluding any digit separators;

...

In 7.31.4.1.3p4:

If the subject sequence has the ~~expected form for a floating-point number~~ decimal or hexadecimal form, ... if neither an exponent part nor a decimal-point wide character appears in a ~~decimal floating-point number~~ decimal form, or if a binary exponent part does not appear in a ~~hexadecimal floating-point number~~ hexadecimal form, ...

In 7.31.4.1.3p5:

If the subject sequence has the ~~expected form for a decimal floating-point number~~ decimal form, ...

In 7.31.4.1.3p6:

If the subject sequence has the ~~expected form for a hexadecimal floating-point number~~ hexadecimal form, ...