Proposal for C2X
WG14 N2552

Title: F.3 editorial cleanup for rounding macros
Author, affiliation: C FP group
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Proposal category: Editorial
Reference: N2124, N2478

The suggested changes below address three editorial issues.

Issue 1:

When N2124 was incorporated into C2X, the macros in the first sentence in F.3 #9 were reordered. In the corresponding reordering of the IEC 60559 rounding-direction attributes, the roundTiesToAway attribute was omitted. This issue was noticed and reported to CFP by Paul Zimmermann in [Cfp-interest 1643].

Issue 2:

IEC 60559 uses the same rounding attribute names for binary and decimal floating-point arithmetic, but says that if both binary and decimal are supported, then they must have separate rounding-direction attributes. Therefore, in C the corresponding macro names are different for binary and decimal. The macros’ binding statements in F.3 #9 (for binary) and #19 (for decimal) should say explicitly whether the macros apply to binary or decimal floating-point arithmetic.

Issue 3:

F.3 #9 mentions the use of the macros by the FENV_ROUND pragma. The analogous words should be in F.3 #19 for the FENV_DEC_ROUND pragma.

Suggested changes:

Change F.3 #9:

[9] The macros (7.6) FE_DOWNWARD, FE_TONEAREST, FE_TONEARESTFROMZERO, FE_TOWARDZERO, and FE_UPWARD, which are used in conjunction with the fegetround and fesetround functions and the FENV_ROUND pragma, represent the IEC 60559 rounding-direction attributes roundTowardNegative, roundTiesToEven, roundTowardZero, and roundTowardPositive, respectively. Support for the roundTiesToAway attribute for binary floating-point arithmetic, and hence for the FE_TONEARESTFROMZERO macro, is optional.

to:
[9] The macros (7.6) `FE_DOWNWARD`, `FE_TONEAREST`, `FE_TONEARESTFROMZERO`, `FE_TOWARDZERO`, and `FE_UPWARD`, which are used in conjunction with the `fegetround` and `fesetround` functions and the `FENV_ROUND` pragma, represent the IEC 60559 rounding-direction attributes `roundTowardNegative`, `roundTiesToEven`, `roundTiesToAway`, `roundTowardZero`, and `roundTowardPositive`, respectively, for binary floating-point arithmetic. Support for the `roundTiesToAway` attribute for binary floating-point arithmetic, and hence for the `FE_TONEARESTFROMZERO` macro, is optional.

And change F.3 #19:

[19] The `fe_dec_getround` (7.6.5.3) and `fe_dec_setround` (7.6.5.6) functions provide the `getDecimalRoundingDirection` and `setDecimalRoundingDirection` operations defined in IEC 60559 for decimal floating-point arithmetic. The macros (7.6) `FE_DEC_DOWNWARD`, `FE_DEC_TONEAREST`, `FE_DEC_TONEARESTFROMZERO`, `FE_DEC_TOWARDZERO`, and `FE_DEC_UPWARD`, which are used in conjunction with the `fe_dec_getround` and `fe_dec_setround` functions, represent the IEC 60559 rounding-direction attributes `roundTowardNegative`, `roundTiesToEven`, `roundTiesToAway`, `roundTowardZero`, and `roundTowardPositive`, respectively.

to:

[19] The `fe_dec_getround` (7.6.5.3) and `fe_dec_setround` (7.6.5.6) functions provide the `getDecimalRoundingDirection` and `setDecimalRoundingDirection` operations defined in IEC 60559 for decimal floating-point arithmetic. The macros (7.6) `FE_DEC_DOWNWARD`, `FE_DEC_TONEAREST`, `FE_DEC_TONEARESTFROMZERO`, `FE_DEC_TOWARDZERO`, and `FE_DEC_UPWARD`, which are used in conjunction with the `fe_dec_getround` and `fe_dec_setround` functions and the `FENV_DEC_ROUND` pragma, represent the IEC 60559 rounding-direction attributes `roundTowardNegative`, `roundTiesToEven`, `roundTiesToAway`, `roundTowardZero`, and `roundTowardPositive`, respectively, for decimal floating-point arithmetic.