C Floating Point Study Group Teleconference

2025/06/11: 8 AM PDT / 11 AM EDT / 3 PM UTC

Attendees

Jim Thomas, Rajan Bhakta, Jerome Coonen, Damian McGuckin, Joshua Cranmer, Tue Ly, Fred Tydeman

Updated agenda plus new items

https://wiki.edg.com/pub/CFP/WebHome/CFP%20meeting%20agenda-20250611-update.pdf – These minutes should be read alongside the agenda, with its many reference links.

Previous meeting notes

https://mailman.oakapple.net/pipermail/cfp-interest/2025-May/003479.html

Study group logistics

Next meeting: 9 July 2025, 8:00 AM PDT/3:00 PM UTC
ISO Zoom teleconference
Please notify the group if this time slot does not work.

C documents

The latest C2Y draft is N3550 May 2025 https://www.open-std.org/jtc1/sc22/wg14/www/docs/n3550.pdf
C23 has been published ISO/IEC 9899, available for purchase. https://www.iso.org/standard/82075.html

IEEE 754 liaison

Damian: Came to agreement on the meaning of "precision". Damian takes an action send a note elaborating.

Jerome Briefly, it's a matter of the number of significant bits in a binary type (traditionally, its "precision") vs. the approximate precision in decimal digits vs. the number of decimal digits required to distinguish binary values in the given precision vs., yes, the number decimals distinguished by the binary numbers.

Damian: I will join Jim Demmel and others to investigate complex arithmetic for the standard.

C++ liaison

Reproducible floating point -- no update from Guy Davidson but David Hough has sent a note to the group.

Joshua: Working on a proposal along the lines of Annex F to tighten up the floating point semantics. The next C++ group meeting is the week of 16 June.

WG14 update

The mailing deadline is 25 July 2025 for the next meeting over 24-29 August.

TS-4 and TS-5 revisions

Jim: MInor issue, to be discussed below.

Carry-over action items from last meeting

Damian: Update the proposal re. the wording of cimag() and creal().
 Done.
Ly: Send email to CFP about the next____() issues pertaining to the several functions inspired by nextafter().
 Done.
Rajan: Monitor the new WG14 issue tracker re. TS 18661-4, the domain and range error issue.
 Rajan: Nothing has happened here, so I will raise the matter at next WG14 meeting.

Action items from last meeting
    Jim: Draft a note about the [[reproducible]] issue.
        Done.
    Jerome & Jim: Get a document # for the powr proposal, 3550, check the minor updates, and submit to WG14.
        Done.
    Damian & Jim: Get a document # and submit the cproj proposal with minor updates to WG14.
        Done.
    Jim: Review the complex.h proposal from Damian to confirm that the changes listed in CFP 3448 are correct, and there if are no other significant changes then submit it to WG14. Otherwise, CFP will review it again next month.
        Done.
    Jerome: Search C2Y for instances of "return value" vs. "return type" and summarize the usage across the whole document.
        Done.
    Rajan: Send note to Javier supporting his changes re. atan2 and atan2pi range errors, and encouraging him to proceed with his proposal.
        Done, and more.
    Jim: Write up a suggestion re. semantic rules for constant evaluation.
        Done, email 3465 (linked here in case anyone missed it).

    Ly: Send email on expanded complex functions.
        Carry over.

    Jim & Group: Write a note about the priorities list while group ponders list.
        Done.

Discussion of issues:
    Reproducible floating point
        Jim: David is unavailable to discuss his note. The topic is closed.
    [[reproducible]] example in 6.7.13.8 ignores exceptions
        Jim: No response from JeanHeyd. Should we just remove the example?
        Rajan: The only way to get action is to write a paper. Perhaps start with JH.
        Jim: Will follow up.
    powr(x,y) with x < 0
        Jerome: The proposal reflects the decision last meeting to add the language "all y (including NaN)" to bring the 3 relevant usages in C2Y into harmony. Whether this is actually the best phrasing might come up in the future.

    Range error wording for atan2 and atan2pi
        Damian: This proposal removes an ambiguity in the phrasing of the elaborate conditional, using language that is consistent with other usage in C2Y.
        Jerome: As in the powr(x,y) case just above, this may not be the best language, but it is clear and consistent.

    Semantic rules for constant expression evaluation
        Jim: The fix deals with one, maybe two, cases where constant evaluation cannot match non-constant evaluation, which is otherwise required by C2Y. Takes an action to write up a proposal.
    Return value vs return type
        Jerome: After surveying some 137 instances of "return type" and 49 instances of "return value", I found 3 more instances of "return value" that should be fixed as Damian did as part of his completed N3537 proposal for complex.h. Takes an action to write a proposal.
    next____() issues
        Ly: Re. exceptions in the functions, tried to follow Annex F closely, but found too many cases. Implemented a compiler switch to give results without exception.
    Editorial suggestions incl wording for cimag and creal
        Jim: Proposes rewording of the real floating type that gives the real and imaginary components.
        Damian: Takes action to rework.
    Imaginary I macro and i suffix issues, N3390 update
        Jim: There has been no update to N3390. Suggests that Rajan bring this up at WG14 meeting, allowing CFP to move forward with a response to the change.

Rajan: Confirms that this issue has come up with WG14, but no action yet.

Editorial consistency in Annex F

Damian: Summarizes the long document covering many different usages and inconsistences. Mentions Vincent's comments re. quiet NaNs. Offers many suggestions for more concise language. Evokes a discussion about footnotes, when a specific issue arises multiple times but is covered by a footnote in just its first instnace.

Jim: Propose splitting the large effort into blocks of manageable size for the group, not to mention presentation to WG14. (1) Syntax for special cases; (2) Use of qualifiers on variables, as in "integer n"; (3) How to deal with signaling NaNs; (4) F.10.1.<several> separate topics; (5) From F.10.7 on, look at those topics farther on. Takes action to split the Annex F proposal and proceed.

Jim: Signaling NaNs were nearly removed from 60559 in 2008. Let's find language to handle them concisely, in one place, in C2Y.

Should pragmas be tied to headers?

Jim: Shows how the language of usage of pragmas is repeated verbatim for each of the STDC pragmas. Suggests that a better organization might be a single treatment of the STDC pragma mechanism, with each individual pragma discussed apart from the header file that currently provides general context but no definitions essential to the pragma. Takes an action with Rajan to investigate.

frexp() in Annex F

Damian: Let's skip this for now. It will arise in the Annex F work.

More complex functions, e.g. ccbrt, csinpi

Jim: We will await email from Ly.

CFP list of post C23 issues

Jim: Presents a taxonomy of issues allowing CFP to organize tasks. Given the limited time of monthly meetings and the size of the CFP group, we need to choose our tasks well.

Jerome: Suggests adding 60559 to the list of originators of tasks.

Other issues:

Carried over

Adjournment

10:02 AM PDT

Action items to be carried over:

Ly: Send email on expanded complex functions.

New action items:

Jim: Add WG14 issues to the agenda.

Jim: Add discussion of Ly's note about fixed point arithmetic to the agenda.

Damian: Send a note about the improved use of "precision" in 754.

Rajan: Raise TS issue at August meeting.

Jim: Follow up with JeanHeyd on the [[reproducible]] example.

Jim: Write up proposal re. constant evaluation semantics

Jerome: Write a proposal re. return type vs. value with changes along the lines of N3537 for complex.h

Damian: Rework the creal and cimag proposal with updated wording from the discussion. Distribute to the group for email comments. With no objections, move forward with WG14 before the next CFP meeting.

Rajan: Bring the N3390 update issue up at WG14 meeting.

Damian & Jim: Break the Annex F work into individual items for the committee.

Jim & Rajan: Investigate the change to decouple pragmas from headers.

Discussion issues to be carried over:
Missing quotes in C standard

Magnitude or Absolute Value or |x| or ....

Rounding Direction Mode or Rounding Direction or Rounding Mode

hypot(x, NAN) in Annex F

canonicalise() in AnnexF - F.10.9.7

F10.1#14

F.10.9.1 - nextafter(x, y)

Preferred Style in Annex F - fromfp/fromfpx or nearbyint/rint

hypot(x, y) - C2Y F.10.5.4

Preferred quantum exponent

Signoff
Respectfully submitted.

Changes
754 liaison -- Clarify the order of comments, fix a few typos.
C++ liaison -- Clarify Joshua's task.
Reproducible -- Change issue to closed and remover from carry-over list.
Damian on Annex F -- Clarify in the discussion that the action is Damian's (with input from Jim and others).
creal & cimag proposal -- Clarify the action.

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