WG14 N3675
Meeting notes

C Floating Point Study Group Teleconference

2025/07/09: 8:00 AM PDT/3:00 PM UTC
[Please submit proposed changes to these minutes to Jerome or to the group. Revision changes appear at the bottom.]

Attendees

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

Updated agenda plus new items

https://wiki.edg.com/pub/CFP/WebHome/n3640.pdf – These minutes should be read alongside the agenda, with its many reference links.

Previous meeting notes

https://wiki.edg.com/pub/CFP/WebHome/n3639.pdf

Study group logistics

Next meeting: 13 August 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: Latest issue is adopting float16 as a standard type, allowing implementations of just that type to be considered conforming.

C++ liaison

Joshua: Pragmas and attributes are very unpopular in the committee, though we are still trying to accommodate fast math. The committee prefers solutions that are type-based. We continue to search for a way to make it work.

WG14 update

Rajan will attend virtually. The meeting is in the Czech Republic, so the time difference is challenging.
The mailing deadline is 25 July 2025 for the meeting over 24-29 August.

TS-4 and TS-5 revisions

None.

Carry-over action items from last meeting

Ly: Send email on expanded complex functions.

Carry over.

Rajan: Monitor the new WG14 issue tracker re. TS 18661-4, the domain and range error issue.

The burning issue is #1014 in WG14, pertaining to reference to domain and range errors in functions that have been moved out of math.h. Jim addresses this in email 3451.

Rajan: The choices are to live with it, add an item to the corrigenda, or go through the work of an update, which is a major effort. There is no active corrigenda document at the moment.

Action items from last meeting

Jim: Add WG14 issues to the agenda.

Done.

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

Done.

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

Damian: The 754 committee has removed some abuses of "precision" in the doc. Closed.

Rajan: Raise TS issue at August meeting.

Discussed earlier. Carry over.

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

Done.

Jim: Write up proposal re. constant evaluation semantics

Done.

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

Done.

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.

Done, submitted, closed.

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

Carry over.

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

Done.

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

Done.

Discussion of issues

Fixed point arithmetic

Ly: Filed TS 20 years ago. Would like the option to substitute fixed types and operations for their floating point counterparts. That requires naming that corresponds to the current floating point wording, plus the issue of error handling. Fixed point is a parallel arithmetic universe, with different types, semantics, and error handling but with computations similar in spirit to floating point computations.

Ly: Will forward report about what's required. ERRNO will be the only error handling.

Rajan: Robert at WG14 suggested CFP look at this issue, given the importance of embedded systems.

Jim: Work on a TS for this would consume all this bandwidth of this group.

David: CFP always has enough to do in just the floating realm.

Group: Perhaps another study group is called for.

Rajan: Will discuss a new study group at WG14, probably August 25 around 02:00-02:30 Central time, if anyone wishes to sign on with Rajan.

Follow up on the [[reproducible]] example

Jim: Sent a message to JeanHeyd regarding issues with the example as it is. No response. Propose waiting for next C2Y draft and then write a proposal about the issue if still needed.

Range error wording for atan2 and atan2pi

Jim: We discussed this last time, removing some awkward language around the situation of being nonzero yet too close to zero.

Group: OK to submit. Action.

Proposal re. constant evaluation semantics

Group: OK to submit small wording change. Action.

List of papers to submit to August WG14 meeting

Rajan: Requests that the group take an action to review email 3530 re. issue to come before the standards group next month.

Proposal re. return type vs. value with changes along the lines of N3537 for complex.h

Jerome: We discussed last meeting how these changes parallel Damian's changes in complex.h. Action to propose.

Decoupling pragmas from headers

Jim: First approach was to move out of the header, but that led to extra verbiage in the pragma definitions and tedious cross-referencing for the reader. Second approach is to leave the descriptions where they are but add language decoupling pragmas from the header file inclusion. Will submit a proposal with some wording changes.

Rajan: Colors are an issue for some readers of these proposals. Suggest using the form change X to Y with red strikeouts in X, green added text in Y. No need to retrofit all outstanding proposals.

Annex F - syntax for function special cases

Damian: action

Annex F - integer ‘n’

Damian: action.

Annex F – signaling NaNs in F.2.2

Damian: action.

More complex functions, e.g. ccbrt, csinpi

Carry over.

Missing quotes in C standard

Jim: Correction for the editor. Action.

Preferred quantum exponent

Jim: Vincent has pointed out that "preferred" is applied incorrectly for library functions not required to be correctly rounded. Takes action to draft a proposal, after some discussion of wording.

Rajan: The footnote, with its several references into Annex F, is brittle.

Jerome: The phrase, "...all the cases where those functions, even if correctly rounded, can be exact," would be better without the phrase "even if correctly rounded".

Reserved ‘exp’ used in prototypes

Jim: Vincent has noted suboptimal use of "exp" in arguments.

Rajan This is not a technical error, but is not best usage.

Jerome: Agrees to draft a proposal.

Other issues

None

Adjournment

10:04 AM PDT

Action items to be carried over

Ly: Send email on expanded complex functions.

Rajan: Monitor the new WG14 issue tracker re. TS 18661-4, the domain and range error issue, to see the level of interest in making this small fix.

New action items

Jim and group: Check changes to [[reproducible]] example in next C2Y draft.

Jim: Submit proposal re. atan2 and ata2pi.

Jim Submit proposal re. compile time semantics.

Group: Review the doc list in Rajan's email 3530 before the 25 July WG14 mailing deadline, to ensure that all submitted proposals are included in his list. Contact CFP or Rajan directly with any additions.

Jerome & Jim: Re. the changes of "return value" to "return type", get a document number, submit, and add to Rajan's list.

Jim: Change the wording of the decouple proposal and update for next meeting. Use the new X to Y form of suggestion, less heavily dependent on colored text.

Damian: update the source documents for the 3 Annex F topics under consideration.

Damian: Send note to JeanHeyd, cc CFP, re. missing quotes around the invalid exception.

Jim: Write a proposal for changes re. "preferred" quantum exponent.

Jerome: Write a proposal to remove "exp" as an argument name, per Vincent's suggestion.

Discussion issues to be carried over

F10.1#14
F.10.9.1 - nextafter(x, y)
canonicalize() in AnnexF - F.10.9.7
hypot(x, y) - C2Y F.10.5.4
hypot(x, NAN) in Annex F
Magnitude or Absolute Value or |x| or ....
Rounding Direction Mode or Rounding Direction or Rounding Mode
Preferred Style in Annex F - fromfp/fromfpx or nearbyint/rint

Signoff

Respectfully submitted.

Changes

Fix link to previous meeting notes.

-Jerome Coonen
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