WG14 N2403
Meeting notes

C Floating Point Study Group Teleconference

2019-06-19
8 AM PDT / 11 PM EDT / 3 PM UTC

Attendees: Rajan, Jim, Fred (first 20 minutes), David H, Ian

New agenda items:
   None.

Carry over action items:
   All: Review the rationale for part 5 a, b, c proposal. - Done.
   Fred: Create papers for the SNAN initialization and unary + operation as CFP papers (CFP
1249, 1253, 1247, 1250) for future submission to WG14. - Remove.
   Jim: Ensure that the quantum exponents table defines dN sufficiently in C2X. - Done.

Last meeting action items:
   Jim: Investigate creating our own CFP compendium. - Done.
   Fred: Give a new version of the SNAN initialization paper (as per CFP1316). - Carry over.
   Jim: Point out to Jens that we're using two spellings for analog in the current C2X draft. - Done.
   Jim: Look into the commas needed in the why_no_wide_string_strfrom_functions document,
then get a document number and submit it. - Done.
   Jim: Keep rounding of negated constants on the agenda to discuss for next meeting. - Done.
   Jim: Keep fesetexcept on the agenda to discuss for next meeting when Fred is present. -
Done.

New action items:
   Jim: Create a link to the 250 draft into the references section in the C FP wiki.
   Rajan: Forward the IEEE article to WG14 once David H sends it out to us.
   Jim: Draft a slide deck and a proposal based on CFP1331.
   Jim: Draft a note to warn about CFP1315's rounding of negative constants issue.

Next Meeting(s):
   Wednesday, July 17th, 2019, 11:00 EST, 8:00 PST, 4PM UTC
   Same teleconference number.
   Please notify the group if this time slot does not work.

Discussion:
   754 revision:
   IEEE standards board approved the 2019 revision. Now will be edited by the IEEE staff.
Should be published this year.
   AI Jim: Create a link to the 250 draft into the references section in the C FP wiki.
   Jim: When will IEC 60559 be updated and who initiates that?
   David H: I don't know. I know it's not us or IEEE. I think they have to do it.
   No one knows of any IEC person.
    Fred: David Keaton may.
   Jim: Will WG14 be willing to consider including the IEEE update rather than wait for IEC?
    Rajan/Fred: They already said they are OK with taking the new IEEE standard changes for
C. No mention on waiting for IEC.

David: Article for IEEE. Maybe interesting to WG14.
AI Rajan: Forward the IEEE article to WG14.

C++ Liaison:
Ian: Nothing new.

C2X integration:
Part 1 – In C2X (draft http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2385.pdf)
Part 2 – In C2X.
Part 3 – A draft based on the latest C2X paper is almost ready.
Part 4a – Will be put in first before part 3 to allow part 3 to be based on that newest working draft with part 4a already integrated in.
Part 4b - Looking as an updated TS.
Part 5a,b,c,d – Discuss later. Part 5d is a TS update.

Action item details:
Jim: Investigate creating our own CFP compendium. See Jim's CFP 1332.
Looks like a good way forward.

Fred: Create papers for the SNAN initialization and unary + operation as CFP papers (CFP 1249, 1253, 1247, 1250) for future submission to WG14.
See Tydeman's CFP 1290.
Fred: Give a new version of the SNAN initialization paper (as per CFP1316).
Leave until next time.

Jim: Ensure that the quantum exponents table defines dN sufficiently in C2X.
http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2385.pdf
Looks good.

Jim: Look into the commas needed in the why_no_wide_string_strfrom_functions document, then get a document number and submit it.
See http://wiki.edg.com/pub/CFP/WebHome/n2400.pdf.
Looks good.

All: Review the rationale for part 5 a, b, c proposal.
http://wiki.edg.com/pub/CFP/WebHome/cfp5x-20180624.pdf
http://wiki.edg.com/pub/CFP/WebHome/n2120.pdf
http://wiki.edg.com/pub/CFP/WebHome/n2121.pdf
http://wiki.edg.com/pub/CFP/WebHome/n2122.pdf
See Jim's CFP 1331.
Jim: Has anything changed so we could repurpose this as a package?
Rajan/David H: I don't think anything has changed.
Jim: The listed low quality implementation is the only way to support the existing pragmas that are there now. This also recasts it as an annex.
Jim: Is this a basis for a slide deck?
David H: My original idea for this was to encourage performance analysis. It was to allow the optimizer to be turned on at the hot spots.
Jim: We can add that into the reasoning. The pragmas give that scoping.
AI Jim: Draft a slide deck and a proposal based on CFP1331.

Other issues
Rounding of negated floating-point constants under FENV_ROUND pragma.
See Jim's CFP 1314 and Mike's 5/14 reply.
Ian: Hard for us to do anything about. It is a fundamental part of how C is designed.
David H: If you needed this to work, you could enter the number as a hex constant, pre-rounded how you like.

Ian: A workaround is to have a different pragma around the single constant and then go back to the normal rounding mode.

Jim: Or use the strtod function.

Ian: This is normally execution time.

Jim: We could add a warning note in the documentation (along with workarounds possibly). Another way would be to not have the pragmas affect constants. They would take the default rounding mode.

Ian: Does this apply to non-constants as well? Ex. -x? Only if you want to cast to a different type so not really a problem.

AI Jim: Draft a note to warn about CFP1315's rounding of negative constants issue.

fesetexcept and optional inexact

See CFP email thread (Ex. CFP1307) "fesetexcept() and optional inexact"

David H: The point of view of the IEEE standard is the second exception is generated by handling the first one and can be handled differently. The flags should be viewed as being independent even though they are correlated.

Jim: Are we agreed that fesetexcept for overflow/underflow doesn't allow optional inexact?

Agreed.

Fred's WG 14 papers:

See WG14 email thread "N2380: printf of NaN()"

Jim: We want to avoid having WG14 specify what goes into the parenthesis since that goes beyond what the floating point standard specifies. It could disallow things the floating point standard intended to allow.

*Keep this item on the agenda for next time.

Action items from WG14 London meeting:

C FP: Give 18661 part 4a (not reduction functions) for inclusion into C2X.

In process. Waiting for a document number.

C FP: Put N2309 into TS 18661-4 and C2X.

rootn: In the document from above.

TS DR13: Move to C2X (C FP action item).

Round result to narrower type: In the part 3 as annex draft.

TS DR16: Move to C2X (C FP action item).

cbrt macro example: Decided on the _Roundwise* were pointers to functions that are affected by the constant rounding modes. This will go into C2X.

TS DR20-25: Move to C2X (C FP action item).

DR22 Already in draft, others should be soon.

Tydeman, SD3 1: DR 440: Test macros for FP being 754 types [N 2323]

Result: Want something like N2323 option 1 to be put into C2X.

The macros concern the format and not anything else. Expected this is the case.

Unnormalized

See Robert Seacord's SC22WG14.16861, Fred's SC22WG14.16863, and Jim's SC22WG14.16864.

David H: You can have unnormalized extended.

Jim: Aren't these redundant of normals/subnorms?

David H: Yes, different representations. They may have different arithmetic properties.

David H: Part of the confusion may be terminology, if we talked about values being normalized or not and avoided talking about subnormalized it might have helped.

Jim: The floating point model talks about representations and values which can be confusing.

Jim: This issue may be settled. The ball is in Robert's court.