IEEE Task P854 Minutes, 8 July 1985

The radix-free floating-point working group of the Microprocessor Standards Subcommittee of the IEEE Computer Society met from 10:05 a.m. to 1:55 p.m. at Apple Computer in Cupertino. Eighteen people attended.

Minutes from 12 April.

Ris asked that special attention be paid to page 4 in view of the controversy surrounding raising the inexact exception in the round floating-point to integral value operation. Change the spelling of "Forward" to "Foreword" in two appearances. Approved as corrected.

Mail Ballot.

Cody announced that of 31 ballots mailed, 21 votes were received and one ballot was returned as undeliverable. There were 15 affirmative votes, 6 negative votes, and 1 late letter indicating negative intention. A two thirds majority is required, so the ballot has passed. An additional letter supporting the negative position signed by three people not eligible to vote was also received.

Cody ruled that the negative ballots were sufficiently strong that further attention today is required.

Inexact on Round to Floating-Point Integral Value.

The principal hang-up is clearly stated in the letter from Thomas, Coonen, Hanson, and Lewis to Cody (IEEE P854/85-3.7). Most of the negative ballots reference this letter explicitly.

Cody ruled that the negative ballots must be responded to in writing. If the draft standard is changed to signal inexact in Section 5.5, the negative votes would become affirmative; but we would then be honor-bound to go to another mail ballot. In this case, the draft standard would not be presented to the Microprocessor Standards Committee tonight, but this would instead be deferred at least to the next MCS meeting on September 9.

Kahan argued that the technical merits of signalling inexact devolve principally on the case of conversion to integer format (5.4) because of the tendency of some languages (e.g., Fortran) to bury format coercions. Where operators are used explicitly to change representation, the value of inexact is substantially reduced.

Some discussion about the "intent" of the framers of IEEE 754 led to the observation that in the expository article in August 1984 Micro it was explicitly stated that "Conversion of a nonintegral value to a floating-point integer (Section 5.5) is always inexact ...". Further, the widely-distributed test vectors clearly reinforce this view.

The major imperative from the IEEE is that it be possible to create an implementation which conforms to both 754 and P854; this is clearly possible, even though existing 754 implementations do not conform to the present draft of P854.

Further discussion established that existing codes make good use of either regime.

The discussion not leading to new arguments, Cody called for a straw vote on whether the standard should be modified or not. The consensus was that it should be modified in some way. Possibilities for this include (1) reverse the position, (2) make an implementation option, (3) make two operations -- one which signals and one which does not. A straw vote on this favored the last of these, by a rather slimmer margin than before.

Much further discussion again raised no new issues.

Cody formally called the question whether the negative ballots be responded to by letter (i.e., accept the affirmative outcome of the mail ballot) and ruled that a simple majority would suffice to carry the question. Failed 5-10-1.

Another straw vote was taken on various options: (0) no change, (1) signal inexact without additional function specified, (2) permit either signaling or non-signaling at the implementer's option, (3) signal inexact with a recommended function (in the Appendix) recommending a complementary function which does not signal, (4) require separate operations one of which signals and one of which doesn't, (5) as before but with linguistic discriminants. All but (3) attracted no more than modest support and non-trivial opposition.

Motion to change the draft in three places as proposed in the Thomas et. al. letter (IEEE P854/85-3.7). Passed 15-1-1.

Motion to add to the Appendix, "Nearbyinteger (x) is the operation of Section 5.5 without an inexact exception." Passed unanimously.

Balloting.

Cody will reply to the negative ballots; the essence of the reply is that there will be a fresh ballot arising from the above changes.

Further changes.

Pexton proposed changing wording in Section 7.3 from "in that or a wider precision" to "in that precision or a wider precision". Passed unanimously. Formatting change in Table 1 also agreed.

Kahan proposed that the final clause of Section 7.3 be changed to permit delivering optionally a correctly signed infinity in cases of attempted conversion of such gargantuan decimal strings that exponent wraparound is to no avail. Accepted unanimously.

Similarly, at the end of Section 7.4, make the last sentence read "Trapped underflows on conversion shall be handled analogously to the handling of trapped overflows on conversion, with zero in place of infinity." Accepted unanimously.

Ng proposed that the third sentence of Section 5.7 be changed to read "The last case arises only when at least one operand is a NaN." This precludes comparing two infinities as unordered, as apparently may be happening in some implementations which implement comparison through subtraction even when operands are infinite. Accepted unanimously.

Microprocessor Standards Committee.

Cody will apprise the MSC of the current state of P854 this evening.

Language Issues.

Kahan will shortly host a meeting at Berkeley to prepare a document which will discuss specific language issues in the naming of flags and interrupts. Attendees will include at least Coonen, Kahan, James, and Karpinski.

Next Meeting.

September 9 at Apple in Cupertino. Jim Thomas again to be the host.

Special Thanks.

From your secretary to Jim Thomas for providing a PC-AT upon which to enter these minutes during the meeting.

F. N. Ris
29 July 1985