

WG14/N434
X3J11/95-035
18 July 1995

WG14/X3J11 Meeting Minutes
12-16 June 1995

Dansk Standard
Baunegaardsvej 73
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Denmark

Legend:

The following symbols in the left margin of these minutes have the indicated meaning:

A General approval
SV Straw vote
FV Formal vote
*** Action item

The activities reported here are grouped by subject and do not necessarily follow the exact chronological order of presentation during the meeting.

Formal votes are reported as:

In-favor/Opposed/Abstaining/Not Voting/Total-eligible

1 Opening Activities

1.1 Opening Comments

Plauser convened the co-located WG14/X3J11 meeting at 9 AM, 12 June 1995, and immediately turned the meeting over to Jaeschke, chair of X3J11.

Jaeschke stated that the goals of the meeting were to process defect reports, old business, and new work for C9x.

1.2 Introduction of Participants

Attendees introduced themselves. Attending the meeting were: John Benito, Peter Cordsen, Jutta Degener, Frank Farance, Rex Jaeschke, David Keaton, Ed Keizer, John Kwan, Tom MacDonald, Neil Martin, Randy Meyers, Dave Mooney, P. J. Plauser, Tom Plum, Jim Thomas, Keld Simonsen, Ted Van Sickle, Douglas Walls.

A copy of the attendance sheet of X3J11 members is attached to these minutes.

WG14 members in attendance were: P. J. Plauger (WG14 convenor), John Benito (US), Peter Cordsen (DS), Jutta Degener (TU Berlin), Ed Keizer (NNI), Neil Martin (BSI), Keld Simonsen (DS).

1.3 Selection of Meeting Chair

A Jaeschke was selected as the meeting chair.

1.4 Host Facilities/local information

Simonsen (Dansk Standard) was the meeting host. He requested feedback on the local hotels used by meeting attendees.

1.5 Procedures for this Meeting

Meyers volunteered as secretary.

After the attendance list was circulated, MacDonald announced 12 eligible voting members of X3J11 were present, and that constituted a quorum.

WG14 had representatives from Denmark, Germany, the Netherlands, the United Kingdom, and the United States.

1.6 Approval of Previous Minutes (WG14/N396)

The minutes from the Plano meetings were accepted with the following corrections:

Page 3, Section 2, Add Benito (US delegation) to ISO membership.

Page 13, Section 5.3, Meyers discussed single inheritance in Simula, not Smalltalk.

Page 61, Section 9.1, The location of the June 24-28, 1996 meeting is Amsterdam, the Netherlands and the host is the Vrije Universiteit.

1.7 Review of Action Items and Resolutions

The following action items from the previous minutes were determined to be pending:

- *** Gwyn will draft a proposal for deprecating implicit int.
- *** Gwyn will draft a proposal for adding // comments.
- *** Benito will investigate new minimum translation limits for a 500k conceptual machine.

*** Keaton will draft a proposal for adding a repetition count to the designated initializers proposal.

Plauser requested that the minutes state that Doug Gwyn had done an outstanding job in fulfilling his action item from the previous minutes to review RR2/TC2.

1.8 Approval of Agenda (WG14/N400)

After minor adjustment, the agenda was approved. The revised agenda is attached to these minutes.

1.9 Distribution of New Documents

New documents were assigned WG14/X3J11 numbers and will appear in the next mailing.

Meyers distributed an updated draft of LIA-2 (Language Independent Arithmetic) for informational purposes.

1.10 Information on Next Meeting

Meyers announced that Digital Equipment Corporation will host the next meeting on 16-20 October 1995 in Nashua, New Hampshire.

*** Meyers will get hotel information into the post-Copenhagen mailing.

2 Reports on Liaison Activities

2.1 X3J11

Jaeschke reported that the US has applied to track the revision of ISO C.

Jaeschke stated that his X3J11 annual report to OMC was well received, and garnered a few complements on the charter and rules we have put in place.

Farance's nomination as project editor is in process.

MacDonald is officially approved as vice chair.

2.2 WG14

TC1 was reformatted by Plauser to correct problems introduced by the ISO editors. It was distributed to the committee as document N425/95-024.

Simonsen reported that ANSI had become the JTC1/SC22 Secretariat.

2.3 WG21/X3J16 (C++)

Plum reported that C++ was undergoing CD balloting for approval as a DIS. The voting ends on 28 August 1995.

Concurrent with the ISO voting, several countries are having public review periods, but because of the voting schedule, the public review periods are fairly short. WG21/X3J16 meets 10-14 July 1995 and will go over as many public comments as were received. Realistically, comments must be received by WG21/X3J16 by 6 July 1995 to be considered at the meeting.

Sending mail to `c++std-notify@research.att.com` will automatically add your e-mail address to a reflector that broadcasts information about the C++ public comment period.

*** Meyers will post to the `sc22wg14@dkuug.dk` reflector and place in the minutes a list of FTP sites for the C++ Working Paper.

The following URLs can be used to access the C++ Working Paper:

```
ftp://research.att.com/dist/c++std/WP
ftp://research.att.com/dist/stdc++/WP
http://www.cygnum.com/~mrs/wp-draft/
http://maths.warwick.ac.uk/c++/
ftp://maths.warwick.ac.uk/pub/c++/std/wp/
ftp://ftp.su.edu.au/pub/C++/CommitteeDraft/
ftp://ftp.mch.sni.de/pub/documents/c++/
http://www.dcs.hull.ac.uk/~cw/C++.wp-draft/index.html
http://www.ph.tn.tudelft.nl/People/klamer/wp/index.html
```

Plauser reported that most of the previous review comments from WG14/X3J11 were acted upon by WG21/X3J16. Plauser called for volunteers to review the C++ Working Paper and send him their comments by the end of June. He would combine the comments and forward them to WG21/X3J16.

Jaeschke (and others) expressed concern that the C++ Working Paper lacks constraint sections. Plum stated that he did not think that WG21/X3J16 would be willing to add constraint sections.

Plum reported that WG21/X3J16 voted to remove implicit int, although some members of X3J16 were unhappy that the rule also applied to `main()`.

2.4 WG15 (POSIX)

Simonsen reported that Danish Standards was working on a C language binding for the kernel and on a LIS specification for the kernel.

2.5 WG20 (Internationalization)

Simonsen reported that WG20 was producing Working Draft TR 10176, a guideline for programming languages to support internationalization and large character sets (e.g., ISO 10646).

Simonsen also reported that WG20 was working on a C API for sorting character strings, and a Cultural Conventions specification (locale) standard. An API standard for internationalization is being proposed to SC22.

Plauser pointed out that the C Standard has `strcoll` and `strxfrm` to do locale dependent comparisons. He requested that Simonsen make sure that new internationalization work in WG20 not break these routines.

2.6 Other Liaison Activities

2.6.1 X3H5

Farance reported that he had received no mail or e-mail from X3H5 for one year. The committee is no longer producing a standard; instead it is producing a non-normative technical report.

2.6.2 JTC1 Ad Hoc Mechanization Group

Farance reported that one of the groups working on mechanization set up a web site and then disbanded. [The secretary's notes are unclear which group, ANSI or ISO, Farance was speaking about.] There is interest in mechanizing document distribution via e-mail or ftp, and to allow electronic balloting.

The committee discussed its web page. WG14 has a web page under construction at <http://www.dkuug.dk/JTC1/SC22/WG14>. In addition, Keaton's web page, <http://www.dmk.com/~dmk/>, might be used (Keaton's page already has links to some committee documents).

*** Jaeschke will monitor our ability to get hypertext links to our web page.

2.6.3 X3T2

Farance discussed the language independent binding work going on in WG11.

Farance has contacted Craig Schaffert, one of the authors of the Language Independent Arithmetic standard. Farance is working on an LIA binding for C.

- *** Farance will produce a paper for the Nashua meeting on the impact of LIA on C.

Farance stated that the work in WG11 on language independent data types could guide his future extended integer proposals.

Simonsen proposed that we should try to accommodate all cross language issues that are being proposed in SC22. The cross language producing groups are WG11, WG15, WG20, WG19 and PCTE and Simonsen noted that we are in good shape with regards to these SC22 working groups.

2.6.4 HPF

MacDonald reported that a Type 2 "Fast Track" TR on FORTRAN interoperation with C was being developed by HPF.

- *** MacDonald and Jaeschke will follow the FORTRAN/C Interoperation TR for possible review.

3 Status of Technical Corrigenda [N423/95-024] (Plauser)

Plauser reported that the second batch of Technical Corrigenda, TC2, was in the process of approval.

- *** Plauser will put TC2 in the post Copenhagen mailing.

4 Redactor Reports

4.1 Standard [N412/95-013] (Farance)

Farance reported that the latest version of the draft in SGML looks more like the original, and that a summary page details the remaining formatting problems. Walls has reported a list of problems with the draft that need to be addressed.

Members of the committee requested line numbers. Unfortunately, ISO guidelines prohibit line numbers since they cause problems when translating standards. Paragraph numbers are permitted, however.

- *** Farance will make the corrections pointed out by Walls, add paragraph numbers, and fold in TC2.

*** Plauger will check at the plenary or with the secretariat what must be done to adopt the working draft.

Plauger proposed that every meeting of WG14/X3J11 vote to adopt the latest draft after review by a small editorial committee.

Plauger pointed out that if a Defect Report results in a Technical Corrigenda that it becomes a work item for a revision of the standard.

Simonsen requested that an issue log be maintained that included a list of closed issues.

*** Benito, Keaton, Martin, and Walls will serve as the editorial review board.

Plauger emphasized the importance of reviewers fulfilling their commitments, and suggested that reviewers who fail to deliver be banned from further reviews.

*** Farance will be able to translate the SGML standard to HTML by October 1995.

4.2 Rationale (Benito)

Benito lead a brief discussion on tracking topics for the Rationale.

5 Defect Reports [N424/95-025, DIN001 to 003]

5.1 N425/95-025 DR 142

Kwan lead the discussion. The committee concluded that it was undefined behavior to #undef a reserved macro name from a standard header except if the macro name is the name of a reserved function as described by Clause 7.1.7.

The committee discussed whether to do a TC3. There was general agreement that an RR should be issued, but another TC should be delayed until absolutely needed. The committee should shift its focus to C9x.

The committee agreed that when a DR points out a problem that TR text should be drafted and given to Farance to put in the C9x working document.

5.2 N425/95-025 DR 148

Kwan lead the discussion. The committee concluded that no change was required. The "should" is providing guidance that programs should not declare a function from a standard header after including the header.

5.3 N425/95-025 DR 143

Keaton lead the discussion. The committee approved the following draft TC wording describing the mode argument to fopen in Clause 7.9.5.3:

"The argument mode points to a string. The mode is determined by the string's longest initial match to the following sequences, at least the initial characters shall match:"

5.4 N425/95-025 DR 144

Keaton lead the discussion of whether the initial # of a preprocessing directive could be derived from macro expansion. The committee approved the following draft TC wording for Clause 7.9.5.3:

"A preprocessing directive consists of a sequence of preprocessing tokens that begins with a # preprocessing token that (at the start of translation phase 4) is either ..."

5.5 N425/95-025 DR 147

Benito lead the discussion of whether standard library functions must have a sequence point at their return, even though standard library functions might not be written in C. The committee agreed that standard library functions must act like C functions.

5.6 N425/95-025 DR 149

Benito lead the discussion. Clause 7.7.1.1 uses the term "variable," which is not defined in the Standard. The committee accepted the proposed wording in the DR which uses the word "object" instead.

5.7 DIN-003

Benito lead the discussion on whether a longjmp can be used to return from a signal handler. This had been discussed when the original standard was written, and some committee members remembered that this caused extreme problems for some implementations.

The committee tabled this issue until the Nashua meeting.

5.8 DIN-001

Jaeschke lead the discussion. The committee confirmed its intent to allow string literals to be used to initialize objects of static storage duration by accepting the proposed wording in the defect report.

5.9 DIN-002

Keaton lead the discussion of what should be printed by:

```
printf("%#.0o", 0);
```

The Standard says a precision of zero for an o conversion specifier produces no characters. The Standard also says of the # flag, "For o conversion, it increases the precision to force the first digit of the result to be zero." Are these statements contradictory?

Degener pointed out that implementations differ in their behavior.

SV What is the correct output of printf("%#.0o", 0)?

12 in favor of printing zero
0 in favor of printing nothing
5 Don't know or don't care

The committee decided that the Standard is clear enough as it is. printf("%#.0o", 0) should print 0.

6 Sequence Points

Plum raised sequence point issues that had been discussed on the C and C++ mail reflectors.

The expression:

```
(*p++) + (*p++)
```

is undefined according to the Standard. May an implementation interleave operations from separate sequenced operands? Should the expressions like the following be undefined:

```
(0,*p++) + (0,*p++)  
(1 && *p++) + (1 && *p++)  
(*p++ ? 1 : 0) + (*p++ ? 1 : 0)
```

Several people expressed concern about the performance impact of forbidding interleaved execution of such sequenced operands.

Meyers, MacDonald, and Mooney expressed the opinion that it is unacceptable to get unexpected answers for such expressions, and that aggressively optimizing compilers will interleave expressions even from separate statements after the compiler proves that it is

safe.

SV (Tentative vote to be taken over later in the week) In favor of no interleaving of sequenced operands.
11 Yes. 0 No. 5 Abstain.

SV (Later vote) In favor of no interleaving of sequenced operands.
12 Yes. 1 No. 2 Abstain.

7 C++ Public Review

Plauser called participation in the public review for C++ and explained that time was very short. The deadline for getting comments to Plauser to be included in the WG14/X3J11 review of the C++ Working Paper is 30 June 1995.

Plum pointed out that the C++ Working Paper defines some terms differently than the C Standard. For example, "conformance" is different. He asked for volunteers to look into that particular issue.

*** The following people tentatively volunteered to review parts of the C++ Working Paper: Plauser (library), Farance (templates, exceptions), Thomas (floating point), Benito (overloading, exceptions).

8 Revision of ISO/IEC 9899:1990

8.1 Milestones/Discussion on how to achieving closure

Farance, as project editor, expressed misgivings over the new JTC1 electronic document format and how they might effect the final delivery of the new Standard.

Farance asked what formats did the committee need the standard in? The committee requested postscript, HTML, and ASCII text (good for searching). All will be derived from a single SGML source.

Simonsen stated that SC22 required that we have a backup editor (in case of disaster). Keaton will serve as the backup editor, and will keep copies of the draft and tools needed to process it.

Plauser stated that we needed a restricted FTP site. We do not want (possibly altered) versions of the draft floating around the net.

*** Keaton and Keizer will set up a restricted FTP site.

Someone asked who owns the copyright on the standard. Plauser stated that SC21 claims that they own the copyright on any DIS (Draft International Standard) and IS (International Standard), and that the working group owns the copyright on all other documents. SC21 goes on to say that although the working group owns the other

documents, they are not necessarily free to give them to the public.

Other committee members observed that copyright ownership of standards has always been a murky issue, and just because an organization claims the copyright, that doesn't necessarily mean they are correct to do so.

Plauger reported the long standing rule that committee members can distribute documents "for the purposes of standardization," and can even charge a reasonable duplication fee.

Plum stated a public web site would be good for dialog with the C community.

Various people stated opinions:

1. The defect reports are too low level for the public.
2. The list C9x features under consideration would be useful.
3. We should make available the submission form for new features.
4. We should get something going, and then refine our presence.

*** Simonsen will set up a public World Wide Web Page.

*** Keaton, Farance, Jaeschke, Simonsen, Cordsen, and Keizer will make recommendations for our public online presence.

Keaton's site will be the WG14 FTP site. It will remain public until next meeting.

The head of delegation for each country is responsible for forming a list of people who should have access to the restricted FTP site.

*** Cordsen, Farance, Benito, Keaton, Simonsen will develop an official WG14 position on the electronic document format to be communicated by Plauger at the plenary.

8.2 Review of Charter for Revision [N398/94-083] (Jaeschke)

Jaeschke presented the C9x charter.

Cordsen suggested avoiding using the word "we" on pages 2-3, items 8, 10, 11.

*** Jaeschke attempt to avoid the word "we" on pages 2-3, items 8, 10, 11.

*** Jaeschke will add to item 5 a reference to JTC1/SC2 (Character Sets).

The committee discussed trying to set an early deadline for any proposals for changes to the language or preprocessor (to allow time to debug the accepted proposals). No formal deadline was adopted.

People briefly listed proposals they are considering making.

Farance: Operator and function overloading. Loops in the preprocessor.

MacDonald: anonymous structs and unions. Variable argument list macros.

Thomas: inlining.

Plum: alternative class proposals.

Simonsen: National characters in identifiers. Symbolic character names. POSIX Character maps. POSIX locales. Character set conversion. Universal character types. Different input and output locales. Greater alignment with POSIX. Greater alignment with WG20. Supporter for greater alignment with LIA and LID. Use of cultural registry.

Jaeschke reiterated a point made by others at past meetings: The extensions described in the Technical Report have no guarantee of inclusion in C9x.

9 Extended Initializers [N403/95-004, N427/95-028] (Keaton)

Keaton presented his extended initializers proposal.

There was a discussion of whether multiple initializations of the same member or element should be permitted. Keaton pointed out that multiple initialization was useful when using repeat counts [initialize elements 1 to 100 to -1 and element 77 to -2].

Plum stated constructors in C++ and compound literals serve similar needs, and this might concern people who do not want the languages to diverge.

SV In favor of a proposal along these lines for C9x?
15 Yes. 0 No. 2 Abstain.

SV In favor of repeat counts in initializers?
8 Yes. 3 No. 6 Abstain.

SV In favor of changing the proposal to not explicitly allow multiple initialization of the same member or element?
0 Yes. 10 No. 6 Abstain.

SV In favor of disallowing multiple initialization of the same member or element and requiring that an attempt to initialize the same

member or element multiple times be diagnosed?

5 Yes. 7 No. 5 Abstain.

Meyers pointed out that the committee was taking votes to express approval of proposals, but not voting to adopt the proposals into C9x. Many committee members, Meyers included, admitted to a "go slow" attitude.

SV In favor of taking formal votes to adopt or reject proposals at the Nashua meeting?

17 Yes. 0 No. 0 Abstain.

Keaton presented his outline proposal for non-zero default initializers.

SV In favor of a full proposal along these lines for non-zero default initializers?

4 Yes. 5 No. 8 Abstain.

10 Compound Literals [N403/95-004] (Keaton)

Keaton presented his proposal for compound literals.

Issues were raised about the storage duration of the compound literals: Should it be static or automatic?

Issues were raised about whether the expressions must be constant or can they be non-constant runtime expressions.

Issues were raised about whether a compound literal is initialized only once or every time control flows past the compound literal.

*** Keaton will write a rationale for compound literals and designated initializers.

SV Who believes the compound literals proposal is unacceptable as it is?

12 Yes. 0 No. 4 Abstain.

SV In favor of some sort of compound literals feature?

7 Yes. 3 No. 6 Abstain.

SV In favor of compound literals that behave like string literals?

2 Yes. 3 No. Lots Abstain.

11 Restricted Pointers [N403/95-004] (MacDonald)

MacDonald presented his proposal for restricted pointers.

SV In favor of some sort of restricted pointers feature?
14 Yes. 0 No. 3 Abstain.

12 C/C++ Compatibility Issues

SV In favor of adding the WG14 mail reflector (sc22wg14@dkuug.dk) to
the C++ C Compatibility mail reflector
(c++std-compat@research.att.com)?
Lots Yes. 0 No.

13 N425/95-025 DR 145

Mooney lead the discussion. The committee concluded that the
following is not a constant expression:

&x[5] - &x[2]

The committee also decided that a zero cast to a pointer type, for
example, (int *) 0, should be allowed as an constant expression in
an initializer in C9x.

14 Encapsulation [N424/95-025] (Walls, Jervis)

Walls presented the Jervis class proposal.

There was a discussion of reducing the number of keywords introduced
by the Jervis proposal. "struct" could be used instead of "class",
and since "public" is the default access, only the "private" keyword
seems necessary.

Benito asked if Sun had implemented this "C++ subset" in a C
compiler. Walls said no, but a large project was limiting itself to
this set of features.

Meyers pointed out that C++ did not start out with all of its
current features, and that early C++ looked similar to this
proposal.

Thomas stated that he wanted to be able to develop numeric classes
that supported algebraic notion, and thus needed operator
overloading and constructors for conversions.

Plauger stated that C++ contains demonstrably useful features. The
trick is to find the knee of the curve of complexity and usefulness.
We have to pick up some things from C++.

MacDonald said that C++ is too popular to ignore. Projects too big
for C use C++. If we don't put in some C++ features, we are

limiting the lifetime of C.

Meyers stated that function overloading and operator overloading may be past the knee of Plauger's curve. They are nice to have but too complex to implement and use.

Degener stated that classes were not an appropriate direction for C.

There was much discussion of the "invisible" nature of constructors and destructors. Several committee members thought this was incompatible with the Spirit of C.

Meyers presented a proposed set of features:

1. Classes, i.e., access specifiers and member functions
2. Constructors and destructors
3. Single inheritance
4. Virtual Member functions
5. New and Delete.

Meyers argued that this list was the knee of the curve. Subtract one of the features and you lose too much power. Add more features and you gain more complexity than usefulness. Meyers observed that this set seemed to be where Jervis was going with his series of proposals.

Farance, Mooney, Plauger endorsed the set of features.

Jaeschke asked about overloaded constructors, default arguments, and static data/function members. Meyers replied that some of those features could be considered as independent features to be added or not. For example, classes are still useful without static members, and you can add them without much increase in cost.

Mooney said, "You use other features, but these features are the core."

Degener pointed out that if you wanted classes to transparently manage associated dynamic memory that you would also want copy constructors and overloaded assignment.

Plauger likes constructors, but wants to disallow static constructors since they imply special support in the linker.

SV In favor of the so-called Meyers class feature set?
6 Yes. 7 No. 4 Abstain.

Kwan fears that such a package would be the nose of the camel for a

much larger set of features.

MacDonald stated that the namespace issue is important to solve, but he also fears the nose of the camel.

Thomas stated that this feature set was too restricted to support user defined numeric types.

Keizer stated that C++ started with this feature set. If we adopt it C will grow to be as large as C++.

Keaton expressed a desire to preserve performance transparency, and that the committee should not work backwards from C++ to get C9x.

Plum stated his goals for C was to be a well understood, efficient, unsurprising, reliable, useful implementation language. Perhaps C should track C++ 5 years behind.

Plauser stated that these features are chosen because they are proven in C++. We codify existing practice by adopting them.

Keaton: "If we are going to track C++, lets stop now!" Performance transparency is C's biggest feature.

SV In favor of N424 (Jervis's proposal) with struct used instead of class?

15 Yes. 0 No. 1 Abstain.

SV In favor of only this much of class oriented features?

3 Yes. 5 No. 8 Abstain.

15 Variable-Length arrays

15.1 [N403/95-004] (MacDonald)

MacDonald presented his variable-length arrays proposal.

Meyers raised the issue of integer constant expressions. Since many implementations extend integer constant expressions (offset of pretty much requires you to), some implementations might decide a declaration is a VLA and others might decide it is not.

Degener raised the issue of forming composite types with a VLA.

SV In favor of proceeding in this direction for C9x?

10 Yes. 0 No. 6 Abstain.

SV In favor of not requiring a diagnostic if branching past a VLA?

1 Yes. 6 No. 10 Abstain.

SV Clause 7.6.2.1, Line 5 makes it undefined to longjmp past a VLA cleanup.
7 in favor of deleting sentence.
2 in favor of strengthening sentence.
3 in favor of status quo.
5 Abstain.

SV Re-vote on above, with fewer choices:
7 in favor of deleting sentence.
2 in favor of status quo.
8 Abstain.

15.2 Variable Rank Arrays [N392/94-077] (Farance)

Farance presented his proposal for variable rank arrays.

SV In favor of seeing a revised proposal for variable rank arrays?
2 Yes. 8 No. 5 Abstain.

16 Complex Arithmetic

16.1 [N403/95-004, N408/95-009] (Thomas)

Thomas presented his proposal for complex and imaginary types.

SV In favor of complex arithmetic in C9x along the lines described in the TR (N403/95-004)?
4 Yes. 4 No. 8 Abstain.

16.2 Imaginary Type (Thomas)

Thomas discussed the imaginary type from his complex proposal.

MacDonald stated that the imaginary type is not justified by its usefulness, and that it adds too many types to the type system. There is no implementation experience with imaginary.

Martin thought that adding complex and imaginary is too much of a burden.

Van Sickle is in favor of complex, but not imaginary.

Thomas referred people to his paper on imaginary types, "Issues Regarding Imaginary Types in C and C++," in the March 1994 issue of the C Language Journal.

16.3 Complex [N406/95-007] (MacDonald)

MacDonald presented his proposal for complex.

Thomas pointed out that the lack of an imaginary type causes problems for IEEE implementations. When a real is multiplied by a complex, the real is promoted to complex first, which causes a NaN in the original complex number to creep into both of the real and imaginary parts of the result.

Thomas also stated that the imaginary part of the complex proposal from the TR is separable.

- SV In favor of the Cray complex proposal for future consideration?
6 Yes. 1 No. 7 Abstain.

Plum stated that the differences between the Cray and TR complex proposals are a long list of independent decisions to choose one from column A or one from column B.

MacDonald pointed out that Cray had actual implementation experience with their proposal.

Plauser said that when you codify existing practice, you buy a package. There is a risk in picking and choosing.

Farance stated he liked some features from both proposals.

17 Floating-point extensions [N403/95-004, N407/95-008] (Thomas)

Thomas presented proposal for floating-point extensions for C9x.

Plum recommended that Thomas submit his proposal as a public comment to C++ and recommend that C++ make it an annex in its standard.

Thomas said he planned to take a closer look at LIA.

The committee discussed the issues around having a standard macro that is a feature test for optional behavior and whether parts of the proposal should go into the main text or an annex of the standard.

- SV In favor of putting the type mapping, conversion mapping, operation mapping, and conformance macro in the normative text of C9x?
3 Yes. 6 No. 7 Abstain.

- SV In favor of moving the "correctly rounded binary-decimal conversion" to the normative text, as either a "should" or "shall" for all implementations?
7 Yes. 3 No. 6 Abstain.

SV In favor of changing fegetexcept to fesetexcept?
1 Yes. 1 No. Lots Abstain.

SV In favor of continuing with proposal for C9x?
13 Yes. 0 No. 3 Abstain.

18 Extended Integers [N403/95-004] (Kwan)

Kwan presented his proposal for inttypes.h.

Farance and others pointed out that this is only a partial solution.

Kwan and Meyers acknowledged this, and stated that this is an extremely cheap partial solution that does not preclude more ambitious solutions.

Kwan reported a number of vendors are shipping or plan to ship versions of this header file.

Keizer stated he hated the printf specifiers in the header file.

Thomas wants to require all implementations to provide all of the types in inttypes.h.

SV In favor of continuing with inttypes.h for C9x?
8 Yes. 1 No. 7 Abstain.

19 Extended Integers (EIR) [N413/95-014] (Farance)

Farance presented his proposal for extended integer types.

Degener brought up the issues involved with maintaining and determining the attributes during expression evaluation.

Keaton pointed out if one operand is signed and the other is unsigned that the evaluation rules make the result signed. That is a problem if the signed result can not hold all of the values of the unsigned type.

Plum stated he opposes the general direction: it fragments integers into too many types and would appear to complicate overloading.

Meyers and Thomas didn't believe that the performance attribute had meaning for intermediate results of an expression. The performance attribute appears only to have meaning for storage.

MacDonald objected to the notation used in Section 5.7.

Jaeschke raised the issue of the traditional K&R types. If their attributes are implementation defined, then the resulting type from most expressions becomes implementation defined.

Jaeschke requested that Sections 4.1 and 4.2 compare the "?" specifier to the "*" specifier.

Mooney asked about argument passing rules. Are EIR types widened?

Thomas and Degener asked about the role of constants in expressions and the need for EIR constants.

SV In favor of continuing EIR for C9x?

4 Yes. 1 No. 11 Abstain.

MacDonald stated doubts about the complexity of the proposed feature and the impact it might have on C++.

Jaeschke was concerned about the conversion rules.

Plum worried that this was over complicating the type system. Programmers eventually learn they should do their own masking if they need exact bit sizes.

Kwan was concerned that the proposal was overkill. Do programmers really need integers 4 bits long?

*** Farance will update the EIR proposal.

20 Extending character constants for named characters [N390/94-075]
(Farance)

Farance presented his proposal for named characters.

Meyers asked how the type names were specified in header files.

Simonsen described POSIX char maps and that WG20 wants such features.

Plum suggested that the UNICODE standard name be used, which is derived from the UNICODE code value for the character.

Kwan stated that the existing multibyte features are good enough. Let users type the character they want.

SV In favor of some mechanism to solve this sort of problem?

12 Yes. 2 No. 2 Abstain.

*** Farance will update the named character constant proposal.

21 // Comments (Keaton)

In the absence of Gwyn, Keaton outlined a proposal on // comments. He pointed out that // comments introduce two quiet changes: when divide is immediately followed by a /* comment and when two slashes are characters in a macro argument to be stringized.

Jaeschke joked that the proposal should be rejected because it was not in the spirit of C to comment programs.

SV In favor of adding // comments to C9x?
16 Yes. 0 No. 0 Abstain.

*** Keaton will turn over the results of his // comments work to Gwyn.

22 Separate US TAG and WG14 admin meetings

Jaeschke asked anyone not representing a US domiciled company or organization to leave the room, and called the US TAG meeting to order.

Jaeschke reported that ITI believes that Project 878TIB is pending.

FV Move that we recommend that the document we produced for Project 878TIB not be published because of the delay and the fact that the information is already available in TC1 and RR1. (Jaeschke/Meyers)
11/0/0/7/18

*** Benito will send Meyers an invitation form for the meeting Meyers is hosting.

*** Meyers will fill out the invitation and return it to Benito.

The US delegation consists of Benito, Plum, Keaton, Farance, and Walls.

*** Jaeschke will investigate having a vocabulary representative.

*** Farance will produce a paper for Plauger to use describing the issues with the the electronic document format.

FV We empower the X3J11 Chair and the WG14 Convener to communicate to SC22 our belief that they have configuration problems with their electronic document format and our willingness to work with them on this issue. After careful consideration, and for a variety of reasons, we are producing our standard in SGML. (Jaeschke/Meyers)
11/0/0/7/18

The US Tag meeting ended.

23 Harmonizing C and POSIX [N431] (Simonsen)

(N431 had previously been distributed at N371.)

Simonsen described his paper on differences between C and POSIX, and his interest in harmonizing the two standards.

Plauger thanked Simonsen for making the list, and said the next steps are to turn it into proposals and for the committee to evaluate it.

SV In favor of a receiving a proposal to harmonize C and POSIX?
11 Yes. 0 No. 2 Abstain.

*** Simonsen will produce a proposal to harmonize C and POSIX.

*** Keizer, Farance, Plauger will review Simonsen's proposal.

24 Process Miscellaneous Proposals

24.1 Improved random number guidelines [N415/95-016] (Jones)

The committee discussed whether it should replace its example random number generator with one of higher quality.

SV In favor of changing the example random number generator?
3 Yes. 3 No. Lots Abstain.

24.2 Addition of a Boolean type [N416/95-017] (Lemings)

Plum stated he would like a standard feature test macro that indicated whether bool is supported by an implementation yet.

SV In favor of a proposal on bool?
10 Yes. 2 No. 1 Abstain.

*** Plum will produce a proposal on bool.

24.3 String Classification and Conversion Functions [N417/95-018]
(Lemings)

Few committee members expressed interest in the string classification functions.

Several committee members expressed interest in the toupper and tolower string conversion functions.

Degener pointed out that the functions were bad from a natural language point of view. In German, an all uppercase string may contain a different number of letters from its all lowercase counterpart.

SV In favor of the string classification functions?
1 Yes. 11 No. 3 Abstain.

SV In favor of bitwise uppercase and lowercase string conversion functions?
4 Yes. 6 No. 5 Abstain.

SV In favor of culturally correct uppercase and lowercase string conversion functions that can handle issues like differing lengths between all uppercase and all lowercase strings?
6 Yes. 3 No. 6 Abstain.

*** Simonsen will write a proposal for culturally correct uppercase and lowercase string conversion functions. Farance will review.

24.4 Signed Integer Division [N421/95-022] (MacDonald)

MacDonald presented his proposal to make more aspects of signed integer division defined. The new specified behavior is the same as integer division in FORTRAN.

Farance stated that the formal proposal should reference the LIA Standard.

SV In favor of making signed integer division better defined?
13 Yes. 0 No. 2 Abstain.

*** MacDonald will update his proposal on signed integer division. Farance will review.

24.5 Big integer (at least 64-bit) library [N420/95-021] (Rogers)

The committee discussed the proposal.

Several members stated that using a functional library to do math was inferior to Algebraic notation, and that a 64 bit integer type should be built into the language.

Plum noted that a long long proposal has been submitted to C++, and perhaps it should be added to C.

Farance and MacDonald thought that long long was the wrong direction.

Degener expressed concern about the lack of data format guarantees and the lack of I/O in the proposal.

SV In favor of a library solution for big integers?
1 Yes. 7 No. 7 Abstain.

24.6 long long

This committee then discussed adding "long long".

MacDonald said he would rather have a library than long long.

Meyers pointed that long long has been in and out of favor with the committee. An early NCEG vote on extended integers approved long long as a direction for the tech report. Meyers pointed out that long long was an extension available from several vendors.

Keaton stated that long long turns his stomach, but it is existing practice, and we may need to standardize it.

Plum stated that long long was in the spirit of C.

SV In favor of long long as a proposal for C9x?
3 Yes. 4 No. 8 Abstain.

SV In favor of providing programs with at least a 64 bit integer support though some mechanism.
6 Yes. 2 No. 7 Abstain.

24.7 Addition of predefined identifier __FUNC__ [N419/95-020] (Tribble)

Meyers and Plauger summarized the mail to the reflector on this topic. Both endorsed having a local array in every function that was initialized by the compiler with the name of the function. Plauger observed that it is easy to optimize away such an array if it is never referenced.

SV In favor of some sort of __FUNC__ support in C9x?
6 Yes. 1 No. 7 Abstain.

*** Mooney will produce an updated proposal on __FUNC__.

24.8 Removal of "auto" keyword [N422/95-023] (Tribble)

SV In favor of deprecating the auto keyword?
6 Yes. 4 No. 5 Abstain.

MacDonald said, "We have better things to do than this."

Meyers expressed support for the auto keyword: It is easier to explain the storage classes of C when there is a keyword for each model.

Plum stated that we were going out of our way to make what the C teachers said be wrong.

25 Administration

25.1 Future Meetings

25.1.1 Future Meeting Schedule

Date	Location	Host
16-20 Oct 95	Nashua, New Hampshire	Digital Equipment Corp.
5-9 Feb 96	Orange County, California	Unisys
24-28 Jun 96	Amsterdam, the Netherlands	Vrije Universiteit
21-25 Oct 96	Toronto, Canada	IBM
3-7 Feb 97	Kona, Hawaii	Plum Hall
23-27 Jun 97	No host yet.	
20-24 Oct 97	No host yet.	

*** Jaeschke will ask if Sun is still interested in hosting a meeting.

25.1.2 Future Agenda Items

The following were identified as future Agenda Items:

Simonsen: Harmonizing C and POSIX.

Gwyn: // comments. (Note that Gwyn was not at the meeting to decline this work.)

Plum: Boolean.

MacDonald: Signed integer division.

25.1.3 Future Mailings

Plauser thanked Cray (MacDonald) for handling the international mailing, and reported that ITI was timely in handling the US mailing.

All document numbers must be obtained from Plauser:

P. J. Plauser
398 Main Street
Concord, MA
01742 USA

Phone: +1 508 369 8489
FAX: +1 508 371 9014
E-mail: pjp@plauser.com

Items for mailings should have the document number on the cover of the document, and then should be sent to Plauser. He prefers hard copy, then fax, then e-mail. When sending hard copy, please print single sided.

The deadline to get papers to Plauger for the post-Copenhagen mailing is Friday, 7 July 1995.

The deadline to get papers to Plauger for the pre-Nashua mailing is Friday, 25 August 1995.

25.2 Resolutions

25.2.1 Review of Decisions Reached

Meyers reviewed the votes taken at the meeting, which are marked in the left margin of these minutes (SV, FV).

25.2.2 Formal Vote on Resolutions

WG14 took the following votes:

- FV Move to empower the WG14 Convener to communicate to SC22 our belief that they have configuration problems with their electronic document format and our willingness to work with them on this issue. After careful consideration, and for a variety of reasons, we are producing our standard in SGML.
5/0/0/?/?
- FV Move that we accept the proposed responses to defect reports.
5/0/0/?/?
- FV Move that we accept N412 plus N433 as the working paper.
5/0/0/?/?
- FV Move that we empower the project editor to make the changes to the working paper described in TC2, as well as to add paragraph numbers and to handle the issues raised in issue list.
5/0/0/?/?

25.2.3 Review of Action Items

Meyers reviewed the action items from the meeting, which are marked in the left margin of these minutes (***).

25.2.4 Thanks to Host

The committee thanked Simonsen and Dansk Standard for hosting the meeting.

The committee thanked DKUUG for providing lunch.

The committee thanked Dorthé for the cakes.

25.3 Other Business

26 Adjournment

The meeting was adjourned at approximately noon on 16 June 1995.

27 C Implementation Validation

After the meeting, Benito and Plum met informally with several implementors to discuss C validation and Amendment 1. This was not part of the WG14/X3J11 meeting, and is only included in these minutes as a courtesy to other interested parties.

Benito reported the following:

XOPEN will not brand to Amendment 1 and TC1 until May 96.

NIST validates against the FIPS (Federal Information Processing Standard). As of six months ago, there was no action and no funding to update FIPS C to reference Amendment 1 and TC1. If a new FIPS is approved, there would be a two year delay before validation.

XOPEN will accept NIST validation, but NIST will not accept XOPEN branding. NIST and BSI do not recognize each other's validations.

BSI has dropped its sticker, and Europe no longer seems to require the BSI sticker.

AGENDA FOR 12-16 JUN 95
MEETING OF ISO/JTC1/SC22/WG14 AND X3J11
WG14/N400 X3J11/95-001

12 Jun 95 09:00-12:00 13:30-17:00
13 Jun 95 08:30-12:00 13:30-17:00
14 Jun 95 08:30-12:00 13:30-17:00
15 Jun 95 08:30-12:00 13:30-17:00
16 Jun 95 08:30-12:00

Dansk Standard
Baunegaardsvej 73
DK-2900 Hellerup
Denmark

+45 39 77 01 01 +45 39 77 02 02 Fax

Monday June 12th

8:30 -- 9:00 --- Coffee ---

9:00 -- 10:15 1. Opening activities

- 1.1 Opening Comments
- 1.2 Introduction of Participants
- 1.3 Selection of Meeting Chair
- 1.4 Host Facilities/local information
- 1.5 Procedures for this Meeting
- 1.6 Approval of Previous Minutes (WG14/N396)
- 1.7 Review of Action Items and Resolutions
- 1.8 Approval of Agenda (WG14/N400)
- 1.9 Distribution of New Documents
- 1.10 Information on Next Meeting
- 1.11 Identification of National Bodies/J11 voting members

10:15 -- 10:30 --- Morning break ---

10:30 -- 11:15 2. Reports on Liaison Activities

- 2.1 X3J11
- 2.2 WG14
- 2.3 X3J16/WG21
- 2.4 WG15
- 2.5 WG20
- 2.6 Other Liaison Activities

11:15 -- 11:30 3. Status of Technical Corrigenda [N423/95-024]
(Plauser)

11:30 -- 11:45 4. Redactor Reports
Standard [N412/95-013] (Farance)
Rationale (Benito)

11:45 -- 12:00 5. Defect Reports [N424/95-025, DIN001 to 003
(overview and announce review groups)

12:00 -- 13:30 --- LUNCH ---

13:30 -- 15:15 5. Defect Reports, review by groups

15:15 -- 15:30 --- Afternoon break ---

15:30 -- 17:00 5. Defect Reports, proposed responses

Tuesday June 13th

8:00 -- 8:30 --- Coffee ---

8:30 -- 10:15 5. Defect Reports, wrap-up

10:15 -- 10:30 --- Morning break ---

10:30 -- 12:00 6. Revision of ISO/IEC 9899:1990

6.1 Review of Charter for Revision [N398/94-083] (Jaeschke)

6.2 Milestones/Discussion on how to achieving closure

12:00 -- 13:30 --- LUNCH ---

13:30 -- 14:30 7. Compound Literals [N403/95-004] (Keaton)

14:30 -- 15:15 8. Extended Initializers [N403/95-004, N427/95-028]
(Keaton)

15:15 -- 15:30 --- Afternoon break ---

15:30 -- 17:00 9. Restricted Pointers [N403/95-004] (MacDonald)

Wednesday June 14th

8:00 -- 8:30 --- Coffee ---

8:30 -- 10:15 10. Encapsulation [N424/95-025] (Walls, Jervis)

10:15 -- 10:30 --- Morning break ---

10:30 -- 12:00 10. Encapsulation (continued)

12:00 -- 13:30 --- LUNCH ---

13:30 -- 15:15 11. Variable-Length arrays
[N403/95-004] (MacDonald)
[N392/94-077] (Farance)

15:15 -- 15:30 --- Afternoon break ---

15:30 -- 17:00 12. Complex Arithmetic [N403/95-004, N406/95-007,
N408/95-009] (Thomas, MacDonald)

Thursday June 15th

8:00 -- 8:30 --- Coffee ---

8:30 -- 10:15 13. Floating-point extensions [N403/95-004] (Thomas)

10:15 -- 10:30 --- Morning break ---

10:30 -- 12:00 14. Extended Integers [N403/95-004] (Kwan)

12:00 -- 13:30 --- LUNCH ---

13:30 -- 15:15 15. Extended Integers [N413/95-014] (Farance)

15:15 -- 15:30 --- Afternoon break ---

15:30 -- 16:30 16. Extending character constants for named characters [N390/94-075] (Farance)

16:30 -- 17:00 17. Separate US TAG and WG14 admin meetings

Friday June 16th

8:00 -- 8:30 --- Coffee ---

8:30 -- 10:15 18. Process Miscellaneous Proposals

Improved random number guidelines [N415/95-016] (Jones)

Addition of a Boolean type [N416/95-017] (Lemings)

String Classification and Conversion Functions [N417/95-018] (Lemings)

Signed Integer Division [N421/95-022] (MacDonald)

Big integer (at least 64-bit) library [N420/95-021] (Rogers)

Addition of predefined identifier FUNC [N419/95-020] (Tribble)

Removal of "auto" keyword [N422/95-023] (Tribble)

10:15 -- 10:30 --- Morning break ---

10:30 -- 11:00 18. Continue Processing Miscellaneous Proposals

11:00 -- 12:00 19. Administration

19.1 Future Meetings

19.1.1 Future Meeting Schedule

19.1.2 Future Agenda Items

19.1.3 Future Mailings

19.2 Resolutions

19.2.1 Review of Decisions Reached

19.2.2 Formal Vote on Resolutions

19.2.3 Review of Action Items

19.2.4 Thanks to Host

19.3 Other Business

12:00 20. Adjournment

Attendance Roster - X3J11

Voting members	NAME	Mon	Tue	Wed	Thu	Fri
1 Convex						
2 Cray Research	Tom MacDonald	X	X	X	X	X
3 DEC Professional	Rex Jeschke	X	X	X	X	X
4 Digital Equipment	Randy Meyers	X	X	X	X	X
5 Farance Inc	Frank Farance	X	X	X	X	X
6 Hewlett-Packard	JOHN KWAN	X	X	X	X	
7 IBM Corp	Dave Mooney	X	X	X	X	X
8 Keaton	David Keaton	X	X	X	X	X
9 Motorola	TED VAN SICKLE	X	X	X	X	X
10 OSF						
11 Perennial VSA	John Bew. Et	X	X	X	X	X
12 Plum Hall	Tom Plum	X	X	X	X	X
13 RG Consulting						
14 SDRC						
15 Sun	Douglas Walls	X	X	X	X	
16 Taligent	Jim Thomas	X	X	X	X	X
17 Tydeman						
18 Unisys						
19 US Army						
20 Watcom						

C. J. PLAUER

P. J. PLAUER

X X X X X

1

UNI
BSI

Ed Keizer
NEIL MARTIN

X X X X X
X X X X X

PETER E. CORDSEN
Keld Simonsen

X X X X X
X X X X X

Luba Lequer

X X X X X

ISO

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Tu Berlin