<table>
<thead>
<tr>
<th><strong>Proposition for C2x</strong></th>
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<td><strong>WG14 N3098</strong></td>
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<th><strong>Title:</strong></th>
<th>GB-089 on [[fallthrough]]</th>
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<tr>
<td><strong>Author, affiliation:</strong></td>
<td>Aaron Ballman, Intel</td>
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<tr>
<td><strong>Date:</strong></td>
<td>2023-01-31</td>
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<td><strong>Proposal category:</strong></td>
<td>Proposed NB Comment Response</td>
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<tr>
<td><strong>Abstract:</strong></td>
<td>Clarifies whether block item meant by “next block item that would be encountered” is in lexical order or in execution order.</td>
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GB-089 on [[fallthrough]]

Reply-to: Aaron Ballman (aaron@aaronballman.com)
Document No: N3098
Date: 2023-01-31

Summary of Changes

N3098
  • Original proposal

Introduction and Rationale

From GB-089:

It is unclear whether “next block item that would be encountered” refers to next lexically, or in execution order (the latter being problematic for a Constraint, since those are translation-time properties). A similar issue was previously raised for C++ - see https://www.open-std.org/jtc1/sc22/wg21/docs/cwg_defects.html#2406 – but it appears the resolution for C++ was not applied for C.

Proposed Straw Poll

Does WG14 want to resolve GB-089 by adopting the proposed wording from N3098?

Proposed Wording

All proposed wording in this document is a diff from WG14 N3054. Green text is new text, while red text is deleted text.

Modify 6.7.12.5p1:

The attribute token `fallthrough` shall only appear in an attribute declaration (6.7); such a declaration is a fallthrough declaration. No attribute argument clause shall be present. A fallthrough declaration may only appear within an enclosing switch statement (6.8.4.2). The next block item (6.8.2) that would be encountered after a fallthrough declaration shall be a case label or default label associated with the smallest enclosing switch statement and, if the fallthrough declaration is contained in an iteration statement, the next statement shall be part of the same execution of the secondary block of the innermost enclosing iteration statement.

Modify 6.7.12.5p4: Editorial note: feel free to change the added comments to have different line wrapping, punctuation, etc.

EXAMPLE

```c
void f(int n) {
    void g(void), h(void), i(void);
    switch (n) {
    case 1: /* diagnostic on fallthrough discouraged */
    case 2:
        g();
        [[fallthrough]];
    case 3: /* diagnostic on fallthrough discouraged */
```
do {
    [[fallthrough]]; /* constraint violation: next statement is not part of the same secondary block execution */
} while(false);
case 6:
do {
    [[fallthrough]]; /* constraint violation: next statement is not part of the same secondary block execution */
} while (n--);
case 7:
while (false) {
    [[fallthrough]]; /* constraint violation: next statement is not part of the same secondary block execution */
}
case 5:
    h();
case 4: /* fallthrough diagnostic encouraged */
    i();
    [[fallthrough]]; /* constraint violation */
}

References

[CGW2406]
[[fallthrough]] attribute and iteration statements. Miller. https://www.open-std.org/jtc1/sc22/wg21/docs/cwg_defects.html#2406