

IEEE Standards Interpretation for IEEE Std 1003.1™-1990 IEEE Standard for Information Technology--Portable Operating System Interfaces (POSIX®)

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Interpretation Request #92

Topic: Seconds since the epoch **Relevant Sections:** p25, ll 497-498, clause 2.2.2.113 PASC

IEEE Std 1003.1-1996 contains an error in section 2.2.2.113 which defines the term "seconds since the Epoch". The error is that the expression: $tm_sec + tm_min*60 + tm_hour*3600 + tm_yday*86400 + (tm_year-70)*31536000 + ((tm_year-69)/4)*86400$ does not correctly account for leap years. It adds one day for every four years, thus disregarding the rule that years divisible by 100 are only leap years if also divisible by 400. The expression produces incorrect values for years 2101 onwards, and so the error could perhaps be called a "Year 2101 bug". Of course, this does not affect implementations with a (signed) 32-bit time_t, which can only represent years up to 2038, and this probably explains why the necessary extra parts of the expression were omitted in the original 1988 standard.

I believe a suitable correction is as follows: $tm_sec + tm_min*60 + tm_hour*3600 + tm_yday*86400 + (tm_year-70)*31536000 + ((tm_year-69)/4 - (tm_year-1)/100 + (tm_year+299)/400)*86400$

Interpretation Response

The standards states the requirements for seconds since the epoch, and conforming implementations must conform to this. However, concerns have been raised about this which are being referred to the sponsor.

Rationale for Interpretation

None.

Notes to the Project Editor (not part of this interpretation)

The proposed correction in section 11 should be considered for a future revision. Forwarded to Interpretations group: 22 July 1998 Proposed Interpretation: 10 August 1998 Finalised: February 17 1999