

142.1.1.4 Comparisons of cyclic Operations on wrap-around variables

Various integer variables/counters defined in this standard wrap around on overflow, i.e., reset to zero when incremented by one after reaching the maximum value. A subtraction operation ($a-b$) on such variables is straightforward and can be replaced by addition of the first operand a and two's complement of the second operand b . Unless explicitly stated, the result of such subtraction is a signed integer of the same size (bit width) as the largest of the two operands. In other words, the subtraction operation assumes that the maximum absolute difference between the two operands does not exceed half of their maximum range.

A function $a < b$ is used to compare two wrap-around values. Returned value is true when b is larger than a allowing for wrap-around of a and b . The comparison is made by subtracting b from a and testing the MSB. When-If $\text{MSB}(a-b) = 1$ (i.e., if the result of $a-b$ is negative) the value *true* is returned, else *false* is returned. In addition, the following functions are defined in terms of $a < b$:

- a) $a > b$ is equivalent to $!(a < b \text{ or } a = b)$
- b) $a \geq b$ is equivalent to $!(a < b)$
- c) $a \leq b$ is equivalent to $!(a > b)$