

INE5351 - Tópicos Especiais em Arquitetura de Computadores I (Princípios de Projeto de Sistemas Computacionais Embutidos)

Algoritmo de divisão escolhido para implementação em SystemC RTL

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Referência: <http://www.bearcave.com/software/divide.htm>

```
void unsigned_divide(unsigned int dividend, unsigned int divisor, unsigned int &quotquotient,
unsigned int &remainder)
{
    unsigned int t, num_bits;
    unsigned int q, bit, d;
    int i;

    remainder = 0;
    quotient = 0;

    if (divisor == 0)
        return;

    if (divisor > dividend) {
        remainder = dividend;
        return;
    }

    if (divisor == dividend) {
        quotient = 1;
        return;
    }

    num_bits = 32;

    while (remainder < divisor) {
        bit = (dividend & 0x80000000) >> 31;
        remainder = (remainder << 1) | bit;
        d = dividend;
        dividend = dividend << 1;
        num_bits--;
    }

    /* The loop, above, always goes one iteration too far.
       To avoid inserting an "if" statement inside the loop
       the last iteration is simply reversed. */

    dividend = d;
    remainder = remainder >> 1;
    num_bits++;

    for (i = 0; i < num_bits; i++) {
        bit = (dividend & 0x80000000) >> 31;
        remainder = (remainder << 1) | bit;
        t = remainder - divisor;
        q = !((t & 0x80000000) >> 31);
        dividend = dividend << 1;
        quotient = (quotient << 1) | q;
        if (q) {
            remainder = t;
        }
    }
} /* unsigned_divide */
```