

$\overline{101}_2$, since $x_1 = 0:\overline{010}_2$ and $x_2 = 0:\overline{101}_2 = x_0$, thus it has period 2. To expand $0\overline{101}_2$ in base 10, let $y = 0$:

From this, let's make a finitely long sequence starting with all the d_k , then a zero, then the digits of a , $a_{k+2} a_{k+3} \dots$ up the next zero, and terminate our sequence by replacing this zero with a 1. That is

$$0.d_1 d_2 \dots d_k 0 a_{k+2} a_{k+3} \dots 1.$$

This number is identical to a up to that final 1 (where a has a 0) so it is bigger than a .