Chapter 4 homework

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1 Theoretical questions

1.1 I

result $= 1.11011101 \times 2^8$

1.2 II

result $= 1.001001001\cdots \times 2^1$

1.3 III

$x = 1.0000\cdots00 \times \beta^e$
$x_L = (\beta-1).(\beta-1)\cdots(\beta-1) \times \beta^{e-1}$ $x_R = 1.000\cdots1 \times \beta^{e-1}$
So, $x_R - x = \beta^{e-p}, x - x_L = \beta^{e-p-1}$
Then we have $x_R - x = \beta(x - x_L)$

1.4 IV

$x_L = 1.00100100100100100100100 \times 2^{-1}, x_R = 1.00100100100100100100101 \times 2^{-1}$
$fl(x) = x_R$,roundoff error $= \frac{|x_R - x|}{|x|} \approx 2^{-25}$

1.5 V

$\epsilon_u =$