Numerical Analysis
Quiz 1: Unavoidable Errors in Computing

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April 9, 2007

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1. (50 %) Convert the following numbers to the normalized floating-point values with eight-bit mantissas: 0.3, 0.7.

   Answer:

   One can convert a real number to a binary number by applying the algorithm 5.1 in the textbook.

   The binary mantissa for 0.3 is $(00100110)_2$.
   The binary mantissa for 0.7 is $(01011001)_2$.

   Noth that the first bit is the sign bit.

2. (50 %) Implement the combined tolerance $|x_k - x_{k-1}| < max[\Delta_a, \delta_r|x_{k-1}|]$ in the `newtsqrt` function. Note that Δ_a and δ_r should be *separate* inputs to your `newtsqrt` function.

```
function r = newtsqrt(x, delta_a, delta_r, maxit)

r = x/2; rold = x;   % Initialization

it = 0;
while abs(r - rold) > max(delta_a, delta_r*abs(rold)) & it<maxit
rold = r;                          % Save old value
r = 0.5*(rold+x/rold);             % Update the guess
it = it+1;
end
```