Algorithm: Bisection method for root finding

Result: Root of a given function

Input : a function $f(x)$, two end points a and b, convergence tolerance ϵ, and maximum iteration number N_{max}

Output: root within a tolerance of ϵ

if $f(a) * f(b) > 0$ **then**
  report error and exit
end
N=1
while $N <= N_{max}$ **do**
  $c = \frac{a+b}{2}$ **if** $f(c) = 0$ *or* $(b-a)/2 < \epsilon$ **then**
    output c as the root
    exit
  end
  N=N+1
  if $sign(f(c)) = sign(f(a))$ **then**
    a = c
  else
    b = c
  end
end
output("Method failed. Maximum iterations reached.")