Introduction to Computer Midterm, HW2

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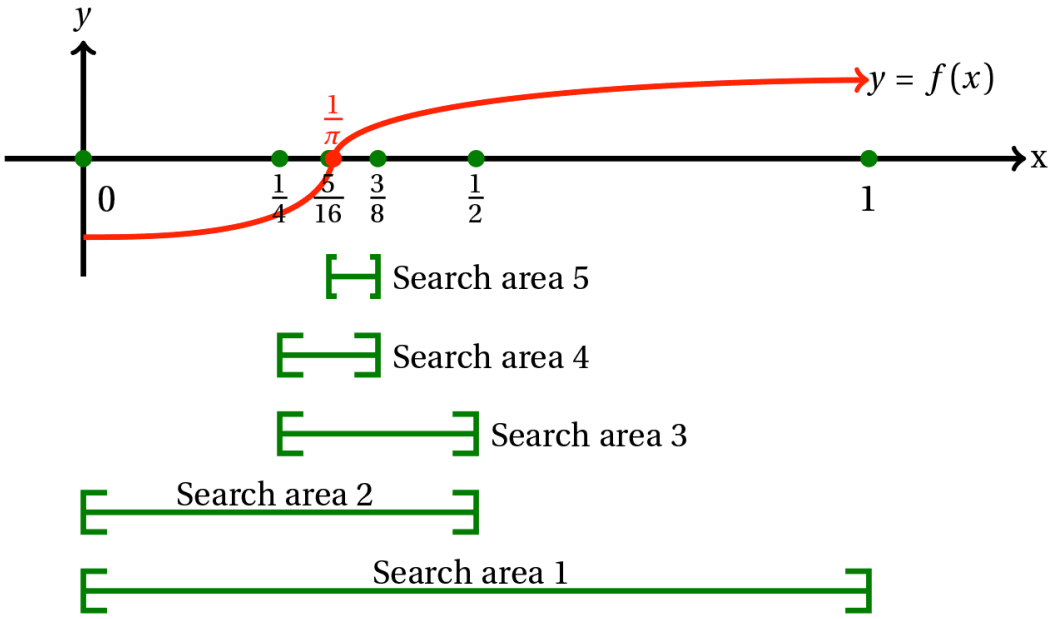
檔名請千萬不要打錯，請大家留意！

Based on the Bolzano's Intermediate Value Theorem, if f(x) is continuous in the range [a, b] and f(a)•f(b) < 0, then there exists a root value c in the range (a,b) such that f(c) = 0.

The bisection method is a root-finding method that applies to any continuous functions for which one knows two values with opposite signs. Consider a continuous function f, an interval [a, b], and the function values are of opposite sign (there is at least one zero crossing within the interval). Each iteration performs these steps:

1. Calculate c, the midpoint of the interval, c = (a + b)/2.
2. Calculate the function value at the midpoint, f(c).
3. If convergence is satisfactory (that is, c - a is sufficiently small, or |f(c)| is sufficiently small), return c and stop iterating.
4. Examine the sign of f(c) and replace either (a, f(a)) or (b, f(b)) with (c, f(c)) so that there is a zero crossing within the new interval.



Considering the following function:

$$f(x) = 0.0021 \times x^5 + 0.00067 \times (x - 13)^4 + 46.7 \times x - 100$$

Write a C code to estimate the root value in the range of [-15, 15] for the above f(x) function with the accuracy of <10^{-5}.