Make an algorithm to compute $\int_a^b f(x)dx$ numerically within a tolerance e by using adaptive Simpson's rule. You have to implement either **recursion** or **stack** subprogram.

Temporary Inputs:

e	a	b	$f(x)$
10^{-5}	2^{-10}	1	$\sin(x^{-1})$
10^{-15}	2^{-10}	1	$\sin(x^{-1})$

Outputs:

(1) Print an approximation value s to $\int_a^b f(x)dx$.

(2) Print the deepest level m.

(3) Let $\Delta = \{a = x_0 < x_1 < \cdots < x_n = b\}$ be the nodal points obtained in your program. On one figure, plot $f(x)$ over Δ and $\{(x_i, -0.5),\ (x_i, +0.5)\}_{i=1,\ldots,n}$ to see the distribution of the nodal points.

The End