Lab Task 1 Root-Finding Algorithms - Newton's Method vs. Bisection Method

Problem Statement

1. **Function to Solve**:
   Consider the function:

$$f(x) = \cos(x) - x$$

   This function has a root in the interval $[0, 1]$.

2. **Error Target**:
   Set a stricter error tolerance of $\epsilon = 10^{-8}$.

3. **Implement the Following Methods**:
   - **Newton's Method**
   - **Bisection Method**

4. **Error Calculation**:
   Define the error for each iteration as:

$$E_n = |x_n - r|$$

   where r is the most accurate root approximation obtained (either by running the method for a very high number of iterations or by using a library for verification).

5. **Stopping Criteria**:
   - Stop each method when the absolute error is less than $\epsilon = 10^{-8}$.
   - Alternatively, stop if the method reaches a maximum of 100 iterations.

Desired Output:

1. Estimated root in both method
2. Error calculated in both method
3. Plot errors found in each iteration for both methods to show how the error minimized in both case.