Theoretical Models for Computing

Lab #2

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Lab Procedure

Part 1: Bisection Method
Objective: Implement the bisection method to find the root of f(x).
Task: Write a program to solve $f(x)=x^3-x-2=0$ using the bisection method. Use [1,2] as the initial interval.

Part 2: Secant Method
Objective: Implement the secant method for the equation $f(x)=x^2-2=0$.
Task: Solve the equation starting with initial guesses $x_0=1$ and $x_1=2$.

Part 3: Newton-Raphson Method
Objective: Apply the Newton-Raphson method to find the root of $f(x)=\cos(x)-x=0$.
Task: Write a program to implement the method, starting from $x_0=0.5$.

Part 4: Comparative Analysis
Objective: Compare the performance (iterations, accuracy) of the three methods for the same problem $f(x)=x^3-x-2=0$.
Task:
Solve the equation using all three methods.
Tabulate the number of iterations and the accuracy.

Part 5: **Problem**
Solve the equation $f(x)=\ln(x)+x^2-4=0$ using any two methods of your choice.
Compare the results and discuss the best method for this problem.