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Q1. Write a C/Matlab program to solve the following problem.

The bacteria concentration in a reservoir varies as $C = 4e^{-2t} + e^{-0.1t}$, calculate the time required for the bacteria concentration to be 0.5 by applying the Newton-Raphson method.

Note: Also Upload **C/Matlab** Code

Code:

```
clear all;
clc;
f= @(t0) 4*exp(-2*t0) + exp(-0.1*t0)-0.5;
dft= @(t0) -8*exp(-2*t0)-0.1*exp(-0.1*t0);
t0= input('enter the interval where roots lies:');
n=input('enter the loop number: ');

for i=0:n
    t1= t0 - f(t0)/dft(t0);
    iterration = i
    t0= t1


end
bacteria_concentration = t0
fprintf('calculate the time required for the bacteria concentration to be 0.5 by applying the  Newton-
Raphson method %f \n',bacteria_concentration)
```

output:

```
enter the interval where roots lies:6
enter the loop number: 4
iterration = 0
t0 = 6.8891
iterration = 1
t0 = 6.9315
iterration = 2
t0 = 6.9315
iterration = 3
t0 = 6.9315
iterration = 4
t0 = 6.9315
bacteria_concentration = 6.9315
calculate the time required for the bacteria concentration to be 0.5 by applying the  Newton-Raphson method 6.931548
>> |
```