

```

//*****
//Program for implementation of Newton-Raphson Method
//Coded by Ashwini K. Singh on 27-Jan-2021
//*****

#include<stdio.h>    // Inclusion of the input-output header file
#include<math.h>     // Inclusion of the math header file

//*****EVALUATION OF THE FUNCTION
float f(float x)
{
    return ((exp(-x))-x);
}
//*****END OF FUNCTION f

//*****EVALUATION OF THE DERIVATIVE OF FUNCTION
float df (float x)
{
    return (-((exp(-x))+1));
}
//*****END OF FUNCTION df

//*****STARTING MAIN FUNCTION*****
int main(void)
{
    int i, N;                                //Variable declaration
    float h, x0, x1, e;                      //Variable declaration

    printf("\nF(x) = ((exp(-x))-x)\n");
    printf("\ndF(x) = (-((exp(-x))+1))\n");

    FILE *input, *output;
    input=fopen("inNewtonRaphson.txt", "r");
    output=fopen("outNewtonRaphson.tsv", "w");

    // Reading inputs from the input file
    fscanf(input, "%f,%f,%d", &x0, &e, &N);

    // Displaying inputs read from the input file on the console
    printf("\nValues of x0, allowed error and maximum iterations read
from 'inNewtonRaphson.txt' are: %f, %f, %d\n", x0, e, N);
    // Writing the column-headers in the output file
    fprintf(output, "Iteration\tx0\tx1\n");
    printf("\nIter\tx0\t\ttf(x0)\t\ttdf(x0)\t\tth\t\ttx1\n");

    for (i=1; i<=N; i++)
    {
        h=f(x0)/df(x0);
        x1=x0-h;
        fprintf(output, "%3d\t%9.6f\t%9.6f\n", i, x0, x1);    // Writing
the outputs in the output file

printf("%3d\t%9.6f\t%9.6f\t%9.6f\t%9.6f\t%9.6f\n", i, x0, f(x0), df(x0), h, x1)
;

        if (fabs(h) < e)
        {
            printf("\nAfter %3d iterations, root = %8.6f\n", i, x1);
// Displaying the final output on console
            return 0;

```

```
    }
    x0=x1;
}
printf("\nThe required solution does not converge or iterations are
insufficient\n");
return 1;
}
//*****END OF MAIN FUNCTION*****
```