

sinx.c

```
1  /**
2   * write a C program that computes the sine of an angle in radians using the Taylor
3   * series * * expansion.
4   *
5   * sin(x) = x - x^3/3! + x^5/5! - x^7/7! + ...
6   *
7   */
8 #include <stdio.h>
9 #include <math.h>
10
11 int main() {
12     float xdeg, sine, term;
13     int nStep, sign;
14
15     // input number of terms
16     printf("Enter number of terms for Taylor series approximation: ");
17     scanf("%d", &nStep);
18     // Input angle in degrees
19     printf("Enter angle in degrees: ");
20     scanf("%f", &xdeg);
21
22     // convert degrees to radians
23     float x = (xdeg * 3.14159) / 180.0;
24
25     for(int i = 0; i < nStep; i++) {
26         // Calculate each term of the Taylor series
27         sign = (i % 2 == 0) ? 1 : -1; // alternate signs
28         int exponent = 2 * i + 1;
29
30         // Calculate factorial
31         int factorial = 1;
32         for(int j = 1; j <= exponent; j++) {
33             factorial = factorial * j;
34         }
35
36         term = sign * (pow(x, exponent) / factorial);
37         sine += term;
38
39     }
40
41     printf("Sine of %.2f degrees is approximately: %f\n", xdeg, sine);
42
43     return 0;
44 }
```